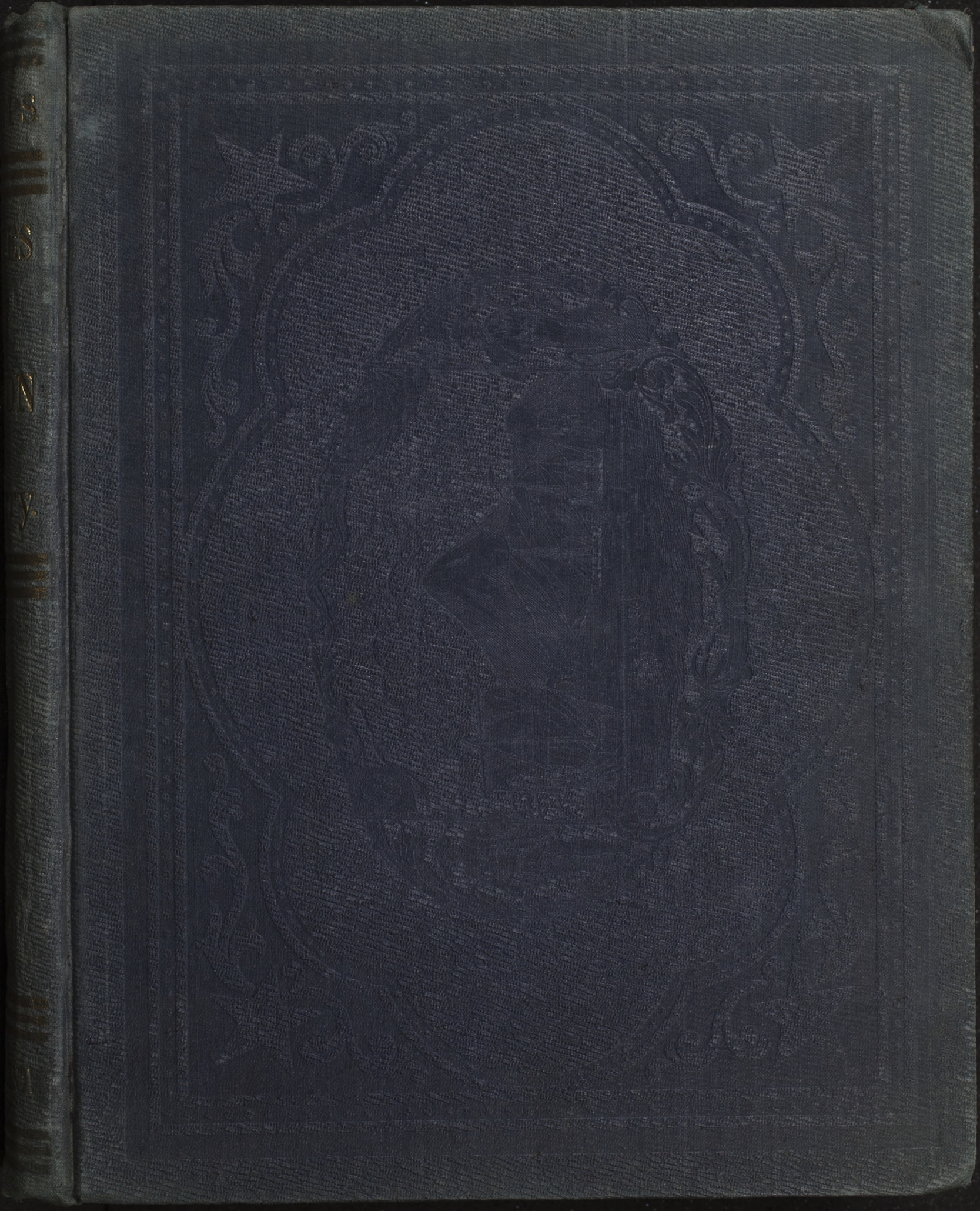

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NARRATIVE

OF

THE EXPEDITION OF AN AMERICAN SQUADRON

TO

THE CHINA SEAS AND JAPAN,

PERFORMED IN THE YEARS 1852, 1853, AND 1854,

UNDER THE COMMAND OF

COMMODORE M. C. PERRY, UNITED STATES NAVY,

BY

ORDER OF THE GOVERNMENT OF THE UNITED STATES.

VOLUME II—WITH ILLUSTRATIONS.

WASHINGTON:
A. O. P. NICHOLSON, PRINTER.
1856.

IN THE HOUSE OF REPRESENTATIVES,

FEBRUARY 14, 1855.

Resolved, That the Secretary of the Navy be requested to communicate to this House a copy of the report of Commodore M. C. Perry on the subject of the late Expedition to Japan; and if said report shall not be completed before the expiration of the present session of Congress, then to deliver the same to the Clerk of the House during the recess.

Resolved, That 10,000 extra copies of the said report, together with the maps, charts, and drawings, be printed and bound in the style of Lieutenant Gillis's report, for the use of the members of the present House of Representatives, and five hundred additional copies for the use of the said Commodore M. C. Perry.

PREFATORY NOTE TO SECOND VOLUME.

In the preparation of this, the second volume of my report, I have continued to keep in view a determination, formed at the outset of the Expedition, of giving full credit to every individual who might contribute to the general stock of information I was desirous of collecting during the progress of my mission; and, in accordance with this intention, an invitation by "General Order" was given to all who might be disposed to aid me in this design.*

I was well satisfied, and more than once so expressed myself, that if the talents and acquirements of the officers of the navy, serving in various parts of the world, were properly developed, and their labors in pursuit of knowledge duly encouraged and appreciated, a vast amount of interesting and useful information would be constantly added to science.

To those who responded to my invitation I again, and finally, tender my thanks; they will find that ample justice has been done to their contributions by the entire publication of their valuable papers.

And so in regard to the construction of the charts, and the assistance rendered in the accomplishment of the original surveys by the several officers employed in the hydrographical department. The names of all who mainly contributed to the work have been especially noticed.

It is true that I took upon myself the general direction and supervision of the various branches of investigation prosecuted during the cruise, but this should not lessen the obligations I am under to those who so ably aided me in these researches.

M. C. PERRY.

New York, *June* 10, 1857.

* See General Order No. 2, Appendix.

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ERRATA.

Page 339, line 21 from bottom—for gale S.E. by 10 E., read gale *S.E by E.*

Page 341, lines 6 and 10 from top—for Eament, read *Eamont.*

Page 343, line 19 from top—after Sumatra, omit remainder of sentence.

Page 346—for Annie Buckman, read *Annie Bucknam.*

Page 346—for Henry Barber, read *Henry Baber.*

Page 388, first note—for are, read *is.*

Page 391, line 17 from bottom—for 44°, read 46°.

Page 410, in the list of officers, the name of Lieut. Wm. A. Wayne, Saratoga, was accidentally omitted.

REPORT MADE TO COMMODORE PERRY

ON

THE AGRICULTURE

OF

MADEIRA, THE CAPE OF GOOD HOPE, MAURITIUS, ETC.,

BY

D. S. GREEN, M. D.,
SURGEON U. S. N.,

ATTACHED TO THE FRIGATE MISSISSIPPI ON THE LATE EXPEDITION TO JAPAN.

AGRICULTURAL NOTICES AND OBSERVATIONS

MADE DURING

A CRUISE IN THE UNITED STATES STEAM FRIGATE MISSISSIPPI FROM THE UNITED STATES TO JAPAN, DURING THE YEARS 1852, 1853, AND 1854.

MADEIRA.

THIS island presents much of interest to the visitor. Besides its salubrious and delightful climate, its beautiful views, and picturesque scenery, its wine, of world-wide repute, would make it ever memorable; not Scian nor Falernian are more famous. But, alas for the island and the people! a blight had swept over their vines a short time before our arrival, and we found them anticipating not only scarcity, but even famine, from the failure of wines thence resulting. Nor is this their greatest calamity; as their immediate wants could be, as they have been, relieved by the humane assistance of foreigners; but the probability is, that this blight, like that of the potato, will continue for an indefinite time, and no period can be assigned for the island's return to prosperity.

This apprehension is further strengthened by its extending (again like the potato pestilence) over France and other vine countries of Europe, and even to the vineyards on the banks of the far-distant Ohio. Its causes and nature will be investigated in Europe; it is sufficient to state here, that it is a white, downy, or fungous growth, showing itself upon the branches of the plant, and upon the fruit, and preventing its due nutrition, in a manner analogous, probably, to the rust in wheat.

From the preceding cause alone, the vintage was decreased, in 1852, from about three hundred to thirty pipes of wine. Now, when it is considered that this is almost the only article given in exchange for foreign breadstuffs and manufactured goods, an idea may be formed of the magnitude of the misfortune, especially should it continue from year to year.

In connexion with the wine, it may be remarked, that although much of the quality of wine depends upon the climate where made, and its mode of manufacture, yet much also depends upon the character and nature of the soil on which it grows. In Madeira, as far as observed, the wine-growing region consists of a friable, red, argillaceous soil, darkened by the admixture of humus. It is confined chiefly, if not exclusively, to the lower portions, bordering upon the sea-shore; as you ascend higher, the soil, losing its humus and richness, assumes a lighter red color, but is still formed principally of clay, with small black pebbles intermixed. It is very similar to the red-clay lands lying at the eastern foot of the Blue Ridge, in the United States, extending from beyond the Susquehanna, upon the one hand, and the James river upon the other; and probably, from their nearly exact resemblance, they are of the same geological formation. A specimen was secured for comparative analysis. Doubtless this region in our country is adapted to the Madeira vine, as to soil; but will the climate answer as well?

The most experienced and most extensive wine-growers with us are abandoning foreign grapes,

in despair of their successful culture, and are improving our own varieties; but has this vine been tried in the above indicated region, where (in South Carolina) the tea-plant grows and flourishes? Nearer the sea it has been, but there the soil is generally sandy. It is worthy of a trial.

Madeira possesses a very large chestnut, which might be profitably introduced into our country. It is about one inch in diameter; rather insipid and indigestible when raw, it becomes nearly as, and, if anything, more pleasant to the taste, when roasted (and it is thus found at the tables of the opulent), than the Irish potato. Its nutritive properties must be considerably greater—probably about midway between that and the bean. As food for swine, it would be most valuable.

A few small parcels of wheat were seen. They were spread out upon mats, and exposed to the sun, being filled with weavil. It was an inferior sort of thick-skinned red wheat, not equal to ordinary Mediterranean.

Among other fruits found here, the peach grows by the side of the banana, and the pear by the orange. However, these would not have been mentioned, but for the fact that the *mandarin* orange of China is found growing well in the yard of the American consul, Mr. March. Should an attempt to introduce it into the United States from China fail, this would be a source near at hand, and its transference in the summer months would be exceedingly easy.

No other plant of interest is recollected, except a species of vine, or wide-spreading shrub, which makes a most beautiful arbor, with the densest shade. By training upon frames, it covers many yards in extent.

Upon entering the town of Funchal, one is struck with the cleanliness of the streets and their neat pavements. They are narrow, and bordered either by houses or stone walls, which latter extend with them, in some directions, into the country. These roads, in passing along steep places, are graded, by cutting down from the upper side, and embanking from below, which is faced and supported by stone-work. While walking upon this raised side, it is frequently observed that vines grow out horizontally, *i. e.*, at right angles with the facing, and are received upon frames. By keeping them properly trimmed, and not planting too close, the earth beneath is occupied by culinary vegetables or grass, and the vines require and receive neither cultivation nor tending, &c. In what manner the necessary atmospheric influences penetrate to, and the necessary moisture is retained at the roots, may be a question, seeing they spread out under the beaten road and along the land face of the wall. However this may be, the vines are healthy and flourishing. Might not a hint be taken from this, to construct a vineyard upon a moderate declivity, by laying it out in wide terraces, facing them with stone, training the vines from the walls, either horizontally or perpendicularly, at pleasure, and cultivating the level plots as indicated above—the whole to be regularly manured, &c.? No grass or weeds could ever encumber or choke the roots and stem of the vine in this way, and the labor of attendance would be greatly lessened, and more than repaid by the other produce, leaving the grapes for wine as nett profit. By-the-by, though no opportunity presented itself of visiting any regular vineyard, yet it was noticed that the usual close trimming of Europe was not followed here, and that around very many cottages or huts the frames were so made as to lean over, and at a few feet from their rooms, and rising nearly to the ridge poles, upon which vines were trained and embowered the houses—rivalling in size and extent those of Mr. Miller, of North Carolina. This observation corroborates the growing opposition in our country to very close cutting.

To return to the streets and roads about Funchal. These are paved with small thin stones placed upon edge, and retained in position by curbs. They are kept wonderfully clean by rains, and are used by pedestrians and horsemen, by carriages upon sleds, and for transporting heavy burdens upon slides. It is unnecessary to notice the horses, and peculiarities of riding, as these are mentioned by all visitors. The carriages upon sleigh-runners are of recent introduction; but the oxen of the island have been long used to dragging their weighty loads simply upon planks, which slide over the pavement upon their sides. These well-formed, and sinewy, but little fellows, stand well up to their work, which, however, is not so severe as one would imagine; but cloths are placed by the driver, from time to time, in front of the slide, in ascending acclivities, to diminish friction as it glides over them, and the downward course is easy and speedy enough. Such contrivances are, probably, better adapted to such roads than wheel vehicles would be, as the frequent roll of carriages, or the heavy tread of a single wagon, would almost certainly tear the slight pavement to pieces, particularly after a soaking rain.

It is inferred (with only a brief time and few opportunities for observing) that the agriculture, or rather horticulture, of the island is carried on chiefly by manual labor, and is in a comparatively rude and simple state. Loudon says: "It is the boast of the islanders, that their country produces the best wheat, the purest sugar, and the finest wines in the world; together with the most salubrious air, and a freedom from all noxious reptiles."

"The variety of grape cultivated is what in France is called the Rhenish, a sort of small black cluster; but its character is greatly altered since its transplantation to Madeira. The grape from which the Malmsey Madeira wine is made is the Ciotat of the French, or parsley-leaved muscadine with a white berry."

"The island, it is said, when discovered by the Portuguese, was covered with wood; and the first step taken by the new settlers was to set fire to the wood. The conflagration is said to have lasted seven years, and to have been the chief cause of the fertility of the soil; but, whatever may have been the effect at first, this fertility could not have lasted for three centuries."

CAPE OF GOOD HOPE.

From the anchorage, what seem to be numerous trees are seen in rows of a deep-green growth; they are too large for either maize or sugar-cane. They proved to be of pine, and are of various ages, from the smallest plants to full-grown, majestic trees, and are thinned out proportionably. The country without them would be very bare, and they serve not only the useful purpose of affording fuel, but also the ornamental one of shading the approach to, and the grounds around, suburban country-houses. From this cause, these present a comfortable and home-like appearance, in contrast with the arid aspect of the adjoining country. This system of planting might be adopted in some parts of our country with advantage; full directions for which could be found in English and Scotch agricultural writings.

The most interesting productions are wheat, wool, wine, a remarkable kind of cattle, broad-tailed sheep, and a peculiar farinaceous vegetable that grows above ground—all of which will be noticed in their order.

The Cape wheat is of very superior quality, being esteemed better than any other either grown in or imported into Great Britain, and it has sold at "from 10*s*. to 15*s*. more than the finest Dantzic," (per quarter?) It is remarkable for its whiteness, plump grain, and extraordinary weight, not unfrequently exceeding 70 pounds per bushel. "The Dutch, when they had the Cape in their possession, were accustomed to import seed-wheat from it." Sin-

clair says, "when the crop (of some that he had planted) came into ear, the sort evidently appeared to be a species of white cane-wheat. The straw had a pith in it, like a rush—a species which, it is said, had this advantage, that if rusted or mildewed the grain derives nourishment from the pith;" and further, "the produce is great; the quality excellent; and if the straw alone is rusted or mildewed, the ear is not affected by it, drawing its nourishment through the pith." (Can this be so?) No opportunity occurred of learning its mode of culture; but its superior excellence is easily understood, from the climate it grows in. Many tropical plants succeed well at the Cape; and it is well known that, if wheat has rain enough to mature well, it is always better in hot and dry than in cold and moist climates.

The production of grain (barley, brans, and wheat) is sufficient for home consumption, with a moderate surplus for exportation. Of the latter, there was exported in 1851, in grain, flour, &c., to the amount of £14,908. But this quantity will not be greatly increased for many years to come, however great may be the capacity of the land. This opinion is based upon the probable difficulty and expense of transportation from the interior to the seaports, and from the scarcity and cost of labor, already deficient, and becoming more so from the emigration to the gold-fields of Australia. This latter cause must diminish the breadth of land under culture; but, on the other hand, it will increase the pasture surface, and correspondingly increase the production of wool; and this will be further stimulated by the decreased yield of wool in Australia, where the flocks have been neglected and partially abandoned since the discovery of gold.

The exports of wool have been regularly on the increase for the last twenty years, and an intelligent merchant stated that it could be augmented to any amount to meet a demand. Nor is this improbable, considering the very extensive tracts of country recently opened to new settlers at the eastern end of the colony—lands rich, well watered, and admirably adapted to sheep. In 1833 the exports were 113,077 lbs.; in 1841 they had advanced to 1,016,807 lbs.; and in 1851 to 5,447,252 lbs.; which, however, was a little less than in the immediately preceding year, but the first three quarters of 1852 promised a great advance upon either. Thus, this is already the great staple of the colony for exportation. Including £12,707 worth of sheep-skins, it amounts to £294,317, which considerably exceeds the total amount of all other exported articles, viz: £222,317.

That this branch of industry will continue to increase, may be inferred, not only from the considerations already mentioned, but from the cheapness of producing, and the facility of transporting wool to market. As an evidence of the growing spirit upon this subject, the following extract from the Cape of Good Hope Almanac for 1853 is subjoined: "That the prejudice which formerly existed among the Dutch farmers against merino and other wool-bearing sheep has not only disappeared, but given way to a laudable desire to increase their operations in this respect, and to improve their breed, is proved by the ready sale of good stock mats within this district (Graf-Reynet)."

On the 17th September last (1852), at a sale held by Messrs. Mesenthal Brothers, thirty merino rams were sold at no less than £1,156 17*s.* 5*d.*, or at a little more than an average of £31 ($155) per head; some, however, fetching as much as £75 ($375). "It is pleasant," says the local paper, "to see so many Dutch farmers' names in the list of purchasers, as it shows that they are fully alive to the importance of improving the quality of their wool, and have quite discarded the prejudice which induced them, formerly, to laugh at the stupidity of those who, as they facetiously termed it, gave £10 for a sheep-skin!"

The samples examined are of very good quality, and the Cape may be regarded, hereafter, as a source of supply for our manufacturers, and of competition by our wool-growers.

Two kinds of wine are made here, viz: the ordinary, such as Cape Madeira, Cape Sherry, &c., and the Constantia. Of the former, about 500,000 gallons are exported annually, at about fifty cents per gallon; but this is of less importance comparatively. Of the latter, about 2,000 gallons are exported from the whole colony, at about $2 50 per gallon; that from Cape Town exceeding $3 75 per gallon, and this possesses considerable interest. It is a sweet wine, with good body, and is very limited in supply, being only grown upon a few favored spots. That near Cape Town is produced by only three vineyards, which are confined to a peculiar soil of small extent, and are distant from the town about ten miles.

The grapes from which the Constantia is made (so named from the vineyard where it originated) are of two kinds—the Frontignac and the Pontiac; and each of these again is of two varieties—the white, and the red or black—producing, respectively, a light and a dark colored wine.

The soil upon which these grow is a friable clayey loam, not unlike the grape soil of Madeira, except that it is of a brighter red color. It, too, is similar to the red lands near the eastern base of the Blue Ridge, United States, containing, as that frequently does, small, white, crumbly pebbles, or fragments of a chalky appearance; and also, like that, throwing up an abundant growth of pines where neglected. The climate, too, is not very dissimilar to that of this region, differing chiefly in the more uniform and continuous higher range of temperature; or, rather, though perhaps never rising so high, yet never falling so low.

In preparing for a vineyard, the ground is first trenched to the depth of $2\frac{1}{2}$ or 3 feet with the spade; whether much, or what kind of manure, or previous cultivation is put upon it, is not now remembered.

It is probable, were a crop of wheat or maize taken from the land after a full manuring of the surface, and it then had a deep ploughing with a four-horse plough, followed by a large sub-soil plough; and were this succeeded by another full manuring and a trench-ploughing by two four-horse ploughs, followed again by the sub-soiler, that the preparation would be equally good, or even better; and the expense far less, irrespective of the crop of grain, which would be clear gain.

The labor-doing sub-soil plough will probably be introduced into the formation of any additional plantations, from the satisfaction with which our labor-saving "cultivators" are spoken of by one of the proprietors, in the culture of his vineyard.

When the ground is duly prepared, the vines are set in rows, from four to five feet apart, each way; and are afterwards cultivated from year to year, upon precisely the same principles and with the same objects as our Indian corn or maize. It has been usual to keep the surface pulverulent and free of weeds, &c., by manual labor, with spades, hoes, and rakes; but our cultivators have been used for these purposes upon one of the estates for one or two years, to the entire satisfaction and delight of the owner; and his example must be followed by the others.

This stirring and cleansing the soil is continued until the new annual branches of the vines extend over the spaces between the rows, which then overshadow and arrest the growth of weeds, and would themselves be injured by further culture.

The vines are not supported by either stakes or frames. They are trimmed annually twice, the last time being very close, and are never allowed to grow high—about one and a half or two

feet for the stem being an average. The first trimming is done when the grapes have attained full size, and are ripening—all the shoots of that year having been allowed to remain until this period, to protect the fruit and the earth from the sun. These are now cut back nearly to the fruit, (which forms in clusters around the head of the stem,) and are strewn around the stalk upon the ground for shade, manure, &c. The second trimming cuts off the branches close to the stem, or leaves only a short spur, and is done between the time of gathering the crop and the next year's shooting forth of the buds.

In making wine, the grapes are permitted to remain upon the vines until they shrink, or become, indeed, nearly dry. They are then gathered, mashed by the foot, and, instead of being immediately pressed, are placed in a vat, and allowed to undergo a slight fermentation, which seems to liberate the liquor and cause it to flow more easily. It is then pressed out, and undergoes thereafter the various processes of the wine manufacture—becoming, finally, a delightful ladies' wine, being very like a cordial.

The ride to the Constantias is very pleasant, and no person ought to leave the Cape without visiting them. He will find the proprietors polite and hospitable.

The Cape cattle possess some prominent characteristic marks. They have a hump, though of moderate dimensions, upon the shoulders—in this, somewhat resembling the cattle of southern Asia; and their horns are of immense size—in this, strongly resembling the Abyssinian ox. When properly fattened, they make good beef; and attaining great size, and being well proportioned, they make admirable work-oxen. But the hills, or rather mountains of the country, are of such steep ascent, that many of them are required for a single wagon, varying from eight to twelve pairs. In such conveyances wheat is carried to Cape Town, and merchandise into the country.

Merinoes have been of recent introduction. The native sheep are a coarse-wooled breed, with broad, fat tails, which yield an oil that is at times exported.

These sheep make good mutton, but it is more than probable they will shortly be superseded entirely by their modern rivals, the merino. They possess one essential peculiarity of a species of sheep spread over nearly all Asia, viz: the broad tail.

This fact, taken in connexion with the apparent Abyssinian extraction of the cattle, would seem to indicate that they were both brought to the country originally by people migrating along the eastern shores of Africa from the neighborhood of the Red sea.

The peculiar farinaceous vegetable, alluded to above, was seen in the public botanical garden, but at that time was not recognized. It appeared like a large, coarse stump, brown and dead, but presenting the very singular and striking spectacle of numerous long, small, green, flourishing vines, growing out from this apparently dead and inert mass. Nothing better can be said about it than to transcribe from Loudon: "One of the most remarkable (of bulbous roots) grows on the mountains of Graf-Reynet, and is called Hottentot's bread (*Tamus elephantipes*, Herit., *Testudinaria elephantipes*, Burch.). Its bulb stands entirely above ground, and grows to an enormous size, frequently three feet in height and diameter. It is closely studded with angular ligneous protuberances, which give it some resemblance to the shell of a tortoise. The inside is a fleshy substance, which may be compared to a turnip, both in substance and color. From the top of this bulb arise several annual stems, the branches of which have a disposition to twine around any shrub within reach. The taste of this bulb is thought to resemble that of the yam of the East Indies, the plant being closely allied to the genus Dioscorea. (Burchell's Travels)." This vegetable is eaten by the natives.

Without pretending to enumerate all the different productions of Southern Africa, it may be added, that, at a public meeting in Natal, it was stated by one, that, "of the successful cultivation of cotton, he could not express a doubt; the only thing wanting was labor." By another: "I have as yet only tried a small quantity of cotton, part Sea-island and part New Orleans; but both are healthy and producing abundantly," &c. It was also stated that Natal was very well adapted to the production of sugar, the probable yield being from 2½ to 3 tons per acre.

MAURITIUS.

This is a beautiful island in the Indian ocean, heretofore chiefly known as the scene of the pathetic story of Paul and Virginia. Hereafter it will be more celebrated, though less romantic, for its immense production of sugar, and also for being most conveniently situated as a coal station for steamers in the Indian seas.

It is of no great extent, being an irregular oval, varying in length from N.E. to S.W. about 36 miles, and of a breadth varying from 18 to 27 miles, with an area of about 500,000 acres. Its situation renders it suitable for various intertropical productions; but one of these alone seems to have monopolized the industry and enterprise of the people. The exportation of sugar was, in 1812, 969,264 French lbs.; in 1820, 15,524,755; and in 1830, 67,926,692. From this time to 1843–'44, it vacillated from the above to 59,545,885 French lbs. It was during this period that the English emancipation act went into effect. In 1845–'46, the exportation was 102,168,168 French lbs.; in 1851–'52, 137,375,179; and in 1852–'53, it promised to reach 140,000,000; which, in English weight, would be 154,328,125 lbs. avoirdupois. What an immense amount for annual exportation from so small a surface!

The island consists of lofty mountains, descending on all sides towards the ocean. The soil is a clayey loam, with prodigious quantities of surface stone upon it. On the elevated portions, the temperature is cool, and at times cold; near the sea it is warm; and the lands are richer than they are more inland. The sugar culture was accordingly confined to a comparatively narrow belt, near the coast, for many years. But since the application of guano to European agriculture, it has been largely imported into Mauritius; causing the amount of sugar lands to be greatly augmented, and their farther extension is still in progress. But, with a propitious climate, good lands, and the best of fertilizers, such crops as the above could not be produced without a sufficient supply of labor; and of this there seems to be an abundance. I say an abundance, from the fact of the extremely low rate of wages, though there are even yet some complaints of a deficiency. Here there can be no well-grounded petitions—*i. e.*, from the necessity of the case—for differential duties in favor of sugars the production of hireling labor, over those the production of slave labor. Nor is this free labor freely rendered, nor free from compulsion, if we may judge from certain exhibitions in a coal-yard, within full view of our ship. The full-grown free laborer, procured from Hindostan, and indented for five years, costs, *per annum*, for hire, food, clothing, medicine, &c., only about $50, without the expenses attending the young, the inefficient, and the aged. Than this, it is scarcely possible that slaves can cost less annually, if, perchance, nearly so little, either in Brazil or Cuba; and in Louisiana they cannot cost less than from $100 to $150 or $200 each. And thus it always is, that in densely populated countries, where necessity, stronger than law, forces the laborers to work, it is to the proprietor's pecuniary advantage to employ hireling rather than slave labor.

It is under such circumstances that emancipation naturally takes place, and will ever take

place, where the interests of the ruling power are large and homogeneous; since selfishness is a more controlling and a more universally prevalent motive than philanthropy or benevolence, even if it were in all cases benevolent to emancipate. When liberation occurs under different conditions, disaster, and ruin, and a long train of evils ensue to all parties.

The cultivation of the cane is performed almost wholly by manual labor. A gentleman, sixteen years a resident of the island, states that "he only knows one estate where the plough could be used in the whole of Mauritius." This is owing to the great numbers of loose rocks or boulders lying scattered over the surface, in its original state. At present, these stones have been, by long and tedious labor, collected into rows or dikes, similar to rough stone fencing. And these dikes, in many places, are really surprising to behold, from their number, length, and proximity to one another, as also for the large size of the stones of which they are composed. The rows are three or four feet apart, varying in completeness from a mere line of detached rocks to well-built continuous dikes of two, three, or four feet in height. Their bases being wide, the interval of bare earth between them is very narrow. It is here that the *ratoons* (cane-cuttings) are planted. The labor of first clearing a field in this manner must be enormous; but, after being so prepared, such fields are preferred by planters above all others, as requiring less labor to keep the canes free from grass, and as suffering less from droughts; the thick covering of stones keeping the earth cool and moist continually, and also from a belief that the juice from such lands is richer in saccharine matter. A field of this sort, when in growing cane, looks like a bare and barren surface of rocks, the cane being invisible; but when nearly full-grown, it presents one uniform appearance of waving verdure, not unlike a dense field of our own noble Indian corn. The yield is very considerable; the above authority stating that "5,000 lbs. of sugar is a good average crop."

I am unable to enter into the details of culture, and perhaps they are not specially interesting; but it may be added, that besides guano, other manures are used, and particularly the ashes of the cane-stalks used as fuel for steam-engines upon the several estates.

A party from our ship was entertained by the proprietors of one of these estates, and we thus had an opportunity of observing its arrangements. The cane was being carried in wagons, on light, open-framed bodies, drawn by mules. The sugar-house was very extensive. Here the cane was undergoing all the processes, from heavy pressure in the steam-engine to the evaporation of the juice in pans, and its formation into sugar. The engine was a fine one, and was heated by brush-wood, assisted by the pressed desiccated cane-stalks. Fuel appeared to be scarce; and, in connexion with this, it may be remarked, that far more interest seemed to be taken in the success of Ericsson's caloric engine in Mauritius than in the United States. This fact indicates how alive the parties are to every incident bearing upon their particular interest.

It cannot be stated whether it is generally the case, but where we were the dwelling of the proprietor was small and unpretending in comparison with the magnitude of the sugar-house and the extent and value of the estate. In it we were received and entertained with an open-handed and generous hospitality, which will be long remembered.

Mauritius formerly possessed large numbers of neat cattle, probably sufficient for its consumption; but recently a fatal epidemic, the cause of which is unknown, has destroyed nearly all of this species of stock. It is now mainly dependent for its beef-cattle upon importations from Madagascar.

CEYLON.

Only a few remarks will be made upon this island, and these in reference to the neighborhood of Point de Galle.

Here we first met with the nutmeg-tree. There is a large one, and some others nearly equaling it, within a mile of the town. My little self-constituted guide was particularly anxious to attract attention to it, it appearing to him to be an object of especial interest to strangers. Its sight well repaid the walk. It was in full bearing, the fruit ripening from day to day; and in this condition there are few, if any, trees that can excel, or even rival, the nutmeg in its beautiful appearance. These trees were very flourishing, and are said to be the first ever planted in Ceylon. They have been a source of very considerable profit to the owner, from scions alone, independently of their fruit.

The cocoanut groves of this island are, perhaps, unequaled in the world. The coast is lined with a broad belt, and the trees are tall and luxuriant. There are no enclosures, nor are the people very honest; but the fruit is preserved from depredation by a simple contrivance. One of its great palm-like leaves is laid up against the stem of the tree, some six feet from the ground, and there secured by tying its leaflets around the body. This is no charm, contrived by superstition; but to tear it down, when dried, in order to ascend the tree freely, or to climb over it, would produce such a noise or alarm, as to awake the most sluggish inmates of an adjacent hut. These guards could only be circumvented by scaling-ladders.

Some of our officers visited a cinnamon garden at a considerable distance from the town. It was in a neglected state; nor was the air rendered odorous by its perfumes. They will be disappointed who expect spicy breezes in the lands of the east.

SINGAPORE.

Nothing particularly noticeable here, except that most beautiful of orchards, or plantations—an orchard of nutmegs. A full account of the culture and management of these trees is given in one of the numbers of Silliman's Journal. One peculiarity may be mentioned, and that is, that each tree, when planted, has to be protected from the heat of the sun for the first two or three years. This is done by coarse matting, supported upon rude and simple frame-work.

The mangusteen, considered by many as the most delicious of all fruits, is found here in perfection.

There are some extensive, though expensive, establishments for manufacturing sago, and large quantities of it are prepared. The raw material is derived from the sago-palm, and is brought in the way of commerce from the neighboring islands. Our attention was kindly drawn to these establishments by a friendly resident, whose courtesy is duly appreciated.

REPORT MADE TO COMMODORE PERRY

ON

THE AGRICULTURE OF LEW CHEW,

BY

J. MORROW, M. D.

ATTACHED TO THE LATE EXPEDITION TO JAPAN.

OBSERVATIONS

ON THE

AGRICULTURE, ETC. OF LEW CHEW,

MADE DURING A STAY ON THAT ISLAND FROM THE 22D JANUARY TO THE 7TH OF FEBRUARY, 1854.

THE prospect, as ships near the land in approaching the harbor of Napha, is beautiful. From the beach to the summit of the long and gently ascending slope, nearly the whole surface seems to be in the highest state of cultivation. The different shades of green presented by the different winter crops; the uniform, terraced hills; the occasional patches of large, spreading forest-trees, forming beautiful groves to relieve the uniformity of cultivated fields, and on the distant and even line of the summit of the ridge, the peculiar pines, with their limbless trunks and flat, broad, spreading tops, under which the deep-blue sky is seen, all conspire to form a most rich and highly cultivated rural landscape. Nor is the visitor disappointed on landing and gaining a nearer view. Every foot of ground appears to be carefully cultivated, unless from situation or barrenness cultivation would be unprofitable. Patches of sweet potatoes meet the eye in every direction, cultivated in broad, flat beds, from 8 to 10 feet across, and seldom more than 30 feet in length, when they are separated from others like them by narrow and dry ditches and corresponding dikes. But few of these beds have entire possession of the soil, for, generally, they have growing in them at the same time a crop of the common kidney-bean, (or house-bean,) planted in rows 2 or 2½ feet apart, and from 6 to 12 inches in the drill. This bean crop was in full flower the 1st of February, and would seem to thrive even better than the potato crop, which was at this season ready for harvesting; and in many places the people were seen digging them with a broad and deep hoe with a very short handle. The vines were not uniformly luxuriant, nor was the yield prolific. A few potato patches had for the double crop green peas instead of beans. These were of a large, coarse variety, and were well adapted to the soil and climate. An occasional patch of potatoes had turnips, or parsnips, or radishes, growing irregularly in places where the potato-vines were not so thick, or missing. These crops were all cultivated with a large chisel, used with one hand, holding the handle in the palm, and forced into the ground by a forward motion of the laborer on his knee, and seated on his heels; the left hand busy, at the same time, in pulling weeds and grass from about the roots of either crop. A few of the potato beds had been newly planted in slips, which seems to be the usual method, and had as yet no second crop. When potatoes are planted as a winter crop on rice lands, (as they were on the beautifully rich valleys between Napha and Phanyi, and on the bottom-lands near Melville bay, in the northeast part of the island,) they raise high beds, in some places from 2 to 3 feet high; from these, the vines are much more luxuriant, and, no doubt, the crops are more abundant. When they plant them on the steep and almost perpendicular mountain-sides, as they do south of Phanyi, and up the steep hills around Shah bay, and on the

newly cleared lands between Phanyi and Co-shing, they do not form beds at all, but make small drains and banks, very steep, and changing their direction every few feet, to prevent the washing of the soil by heavy rains. These steep surfaces have the additional protection of many small tree-ferns, often in horizontal rows, which are cultivated with the potatoes. These dark-green spots on the lighter green of the potato-vines present a handsome appearance, and, until a near approach, it is impossible for the stranger to conjecture what the steep hill-side crop can be.

Two distinct varieties of sweet potato are cultivated—a white and a red variety. The qualities of these are very variable, depending, no doubt, on the soil and mode of culture. Often they are watery, and small and stringy, and not as good as those of China, nor can the yield per acre be so great; though, from their universal cultivation at this season, they are evidently the principal food of the mass of the people in the winter and spring. From the qualities of these potatoes, one would conclude that they could not be stored in bulk for future use, but would rot very soon; and this seems to be the case, as they grate them soon after digging, and mix them with a coarse, dry substance, the nature of which could not be ascertained, and dry the mass in balls as large as a hen's egg, when they are stored for future consumption.

The beans so universally cultivated with the potatoes seem to be very prolific. They are very handsome, fat, and kidney-shaped, with a black elevated ridge in the place of the eye. Some of these were seen in the Napha market the day before the Lew Chew new year, as well as several varieties of small peas; among these a delicate pea resembling closely the lady pea of the United States. The small round yellow pea, so much used by the Chinese for sprouting, was also common in the market, as well as some pea-sprouts.

There are, evidently, three summer crops, but I could find no stubble or any marks indicating their mode of culture. Their green peas are large, and used when green; and, although the flavor is good, when boiled their color is quite dark, and they are hard and somewhat wrinkled. There are but few pods to each vine, owing to the fact, no doubt, that two crops are cultivated on the soil at once.

The Lew Chew radish was the most remarkable vegetable seen during our stay. They are very large and very abundant, seen on the poles of many porters, and in piles everywhere in market. Many of these are between two and three feet long, and often more than twelve inches in circumference. They boil them for food, and, when so treated, they resemble very much the common turnip; and when growing, it is difficult to distinguish their tops from those of the turnip. To raise so long and so large a vegetable, they sub-soil to a great depth, and force their plants with night-soil and liquid manure.

Their turnips are small and flat, and are pickled in salt and water for future use. They eat them with boiled sweet potatoes and small pickled fish.

The Lew Chew carrot and parsnip are small and long, and, though well flavored, the yield is too small to make them desirable as a root crop.

Mustard grows very well, but is not extensively cultivated, as only a few plants were seen, and these in flower.

The coarse winter-greens, so common in the southeastern portions of China, grow well in Lew Chew, and some were seen even larger and more beautiful than that vegetable, so indispensable to the former country. Yet it is not cultivated, generally, over the island, but only around Napha and Tumai. In the same vicinity, the common cabbage may be seen occasionally, but it is not generally cultivated in any part of the island.

The tara is cultivated in the very low, wet, rice lands near Napha and Shui, but is seldom seen in any other part. It seems to be of a dwarf variety, as the leaves are small and imperfectly formed, and the roots are much smaller than in China.

Of the cereals, wheat is the most common at this season, and grows tolerably well in all the central and limestone pastures of the island. Very little was found in the northeastern parts. It is common, and the great bread crop between Veccoo and Shui, the capital; though small patches were growing here and there, on the flat sandy lands near the beach, on the western coast, as high as Nago. This was more backward; and on the elevated ridges, from the middle to the northern end, on the western side, the young crops had a yellow appearance, and had been attacked, no doubt, by the Hessian fly. In the central portions of the island, and midway between the eastern and western coast, on the red clay and mulatto land, with a rich limestone, marly sub-soil, the crops were the best, as well as more forward. Here it could be found in all stages. Some we procured quite ripe and ready for harvesting on the 5th of February. While most of the crop was in full head and ripening, but an occasional plot was just planted. Two distinct varieties of wheat are cultivated, though these are often mixed in the same little patch —the smooth-headed and the bearded; the smooth much the most common. This is a small red wheat; the grain quite small, and short and flinty; and from the rich sweetness of the flour, no doubt yielding a large proportion of nutritious matter.

The usual mode of cultivation is to prepare their land carefully by sub-soiling with the hoe, and mixing compost, and then planting from 6 to 15 grains in chops or dibbles, in squares from 10 to 12 inches apart. But they do sometimes sow broadcast, and this is often in more productive lands, where the yield must be greater; for they understand the greater yield produced when the plant has an opportunity to send forth shoots, as it has when broadcast, though their ordinary land is better suited to the row culture, and the facing of single plants in bunches by culture. In some few places they had drilled it, but this was by no means so common as the checkered method. Not more than 12 bushels per acre could be safely estimated as the greatest yield, while the average would be less than 8 bushels; for, in addition to the reduced number of plants to the acre, from their peculiar mode of culture, the heads of both varieties, but especially of the smooth-headed, were very short.

Wheat in Lew Chew is, doubtless, subject to many of the diseases of that crop in more temperate regions. A few spots had the rust. They have no mills but hand-mills, and these were quite small, and probably imported from China. Saw no threshing-floors for any grain, but understood that they threshed wheat with a flail, as they do rice, on threshing-floors covered with matting or cloth. Barley is cultivated to a limited extent, and, strange to say, they usually select their poorest land high up the hill-sides, with a northern exposure; yet, in spite of this disadvantage, the grain was doing tolerably well. They understand cleaning it well, as some very fine specimens of it, neatly cleaned, were found in the Napha market.

Saw in market two varieties of millet, which is said to be a staple crop of the island. The grains of the most abundant variety were very large and fine-looking—twice the size of the ordinary millet. Large stacks of the dried stalks were common by road-sides, and on the tops of hills in pine forests, near the villages—placed there for fuel. These stalks were from 6 to 10 feet high, and quite large—near the ground three-fourths of an inch in thickness.

But the most important crop in Lew Chew is the rice crop. This the inhabitants cultivate with the utmost care and attention; and their fields, when ripe, are said to be beautiful beyond description. The middle and eastern portion of the island has more and better rice lands than any other; though, whenever a moist piece of bottom-land can be found, and where water can

be found, even in the gorges of the mountains, no matter how small, it is ditched and dyked and flooded, and planted in rice. At this season of the year they are busy preparing their soil for setting out the young crops, which have already been sown very thickly in beds flooded with water, and are now ready for transplanting in the method practised in all the Eastern world. To prepare the soil for transplanting, they drain much of the water off, but quite enough is left to cover the surface, and makes the labor as muddy and disagreeable as it is possible to conceive. If it is inconvenient to drain the land, they even dig in it when the water is a foot deep. They dig the soil up thoroughly, in beds one foot apart, with long broad hoes and very short handles, not unlike a ship-carpenter's adze. Six or eight men may be seen up to their knees in the mud, one following another, but each turning over deeply his own row or bed, so that the field, when dry, could not be distinguished, without close observation, from one that had been ploughed with a two-horse turning-plough. After digging, they flood again, and harrow with a simple wooden harrow with one handle, and quite light, drawn by a single ox, when both ox and driver sink in the mud above their knees. This is a very slow and rude agricultural operation; and the work of crossing and pulling down the beds made by the hoe imperfectly done, as the ox-man sometimes sinks deeper, and then goes by jerks and starts, when the harrow may be on the surface of the mud or buried too deeply. But to complete the operation and smooth down the inequalities left, a toothless wooden rake, or board-like scraper, is worked briskly back and forth, until all is smooth and uniformly mixed. The rice plants are pulled up and carefully washed, and tied into bundles of uniform size, and taken to the place intended to be planted, and distributed at equal distances, so as to be convenient for setting out. A number of men and women, 10 or 15, may be seen in one small patch, one following another, each making rows and checks, about 12 inches each way, and planting in each place from 12 to 20 plants. This they seem to do very rapidly; and as the operation is a very tedious one, they must acquire their great dexterity from long practice. The rice is planted in water from six inches to ten inches deep, so that only the tops of the plants are out of water. For several days the plants look yellow, and much time must be lost in their growth from transplanting. Yet this practice would seem to be necessary, for even the plant beds are entirely cleared of the young plants, and then transplanted as the others. After planting, the rice would seem to require but little attention, except to keep it constantly flooded. Very little grass would grow, and no weeds, as they are cropped out by constant cultivation. But the water must require changing often, when they can do it; and in suitable situations, fresh water is kept running through the fields all the crop season. When the rice grain is formed, and the crops begin to mature, the water is drawn off, and the lands drained as much as possible, so as to hasten the ripening and to facilitate the harvesting. They cut rice with a bill-hook grass-knife. The beating is accomplished by the primitive method, with a mortar formed by fire, chisel, and gouge. In the extremity of a large cylindrical piece of timber is a pestle, with rounded and cone-shaped extremities, made smaller in its middle portions, so as to be grasped by the hand, with which it is elevated and let fall, alternately, into the mortar filled with rough rice.

The rice of Lew Chew cannot be called fine, as the color is often reddish and striped; yet the plain is very good, and it is very nutritious.

Their granaries are of peculiar structure—ingenious and well adapted to keep grain dry and entirely free from rats. It consists of a section of a reversed pyramid, built of thin plank, and set in posts six or eight feet high, and carefully covered with thatch—usually rice straw. To prevent rats ascending the posts and working their way through the thin planks to the grain,

a section of a small pyramid made of broad boards, and shaped very much like the body of the house, is fitted over the top of each post, so that when the rats ascend to this point, they find it impossible to go farther; for, to do so, it would be necessary to climb down the inside of the hollow pyramid—a feat utterly impracticable. Some of the granaries have simply a broad plank capping each post, and the house built on these. Rats are abundant everywhere on the island; and without these precautions, much of their grain would be destroyed by them. Near some of the large villages, twenty-five of these granaries were built in one place—built in regular rows, four or five in a line. Many of the private yards have one or two; and the usual number, in proportion to the size of the village, were observed in the mountain districts and on the barren seaboard, where no grain could be cultivated for the distance of several miles from them; leading to the supposition that these granaries were the common property of the town, or that the grain was under the control of government, and stores for the season distributed at harvest to fishing villages, and those engaged in other than agricultural pursuits.

The Lew Chewans understand the use and economy of water in flooding their flat rice-fields, and having reservoirs for watering their higher lands, as well as any people in the East. They do not require the great "Chinese water-wheel" for raising water from large rivers; nor do they find any necessity for the endless-chain pump to raise water from a lower level to a higher; and so from one terrace to another, to the top of the hill; for almost every foot of land suitable for the cultivation of rice has been supplied by nature with an abundance of water on a higher level, in the beautiful running streams universally distributed over almost every mile of its surface, and in the pure fresh springs, finding their way out from among the crevices of every hill-side, and often near their summits. From the small size of the island, and its great length compared to its breadth, having in the middle generally an elevated ridge or beautiful plain, sometimes interspersed by peaks, deserving the name of mountains, the streams are of necessity short, and have a uniform but rapid descent. Yet the valleys on these streams are often broad, and extended in some places twenty miles in length, and from one-half to one mile and a half in breadth. They are terraced from the sea-beach to the summits of the hills, or to the springs and sources of every little rivulet, each level being from nine inches to two feet above the one immediately below it, and so arranged by ditches and embankments that the water which is turned from the stream at the head may be conducted from a higher to a lower level, and so water every acre even to the base; or by small dams in the streams and ditches constructed for the purpose, and by flood and water-gates of the most simple structure, often nothing more than sods of earth and grass to dam up the pond gateway, a higher, or a lower, or a middle terrace may be watered, while the others remain dry. In some situations, ditches run along the borders of the stream, and separate them from the fields. These crossed smaller streams and ditches by plank trunks, and often crossed in similar movable trunks the large streams which fed them, and watered indifferently either or both sides. The smaller beds, or divisions of terraces, are formed by small banks covered with tough sods of grass. These are seldom made in straight lines, but in various courses, and, winding as they do in every direction, produce a most pleasing effect on the beholder from the hill-sides. Yet these *carnes* are not accidental or for effect, but are arches, and so placed that in case of a great flood, or the accidental breaking of banks above, they would be able to sustain the increased pressure. The irrigation practised on the dry hill-sides on the crops requiring it, is accomplished by reservoirs filled by the frequent rains, and these, when required, may be let out to flood the rice lands below; often their ditches down the steep hill-sides have dams across them, and at short intervals and opposite the beds, so that deep water, from which buckets-full may be dipped, is found at the end of

almost every row of their crops. Although they have rows horizontal, and sometimes horizontal ditches and beds between them running with the ditches, yet they do not irrigate crops on dry land by running water in small streamlets among the plants. This is almost done by accident on some of their beds, and yet the idea seems never to have presented itself to them, and the advantage perhaps would not be great to their principal crops. These beds are made sloping in every direction, and many of them elevated quite high in the middle, and seem designed rather with a view of perfect drainage, after heavy rains. So of many of their ditches around their fields and on the sides of roads and the streets of their villages. By observations made at Tumai with the wet-bulb thermometer, the atmosphere is dry in winter, more so than islands generally in the same latitudes. But they have showers of rain almost daily, and these are often repeated in fine drifting mists, occurring almost every hour during the day.

Sugar-cane is cultivated extensively in all the middle portions of the island, and almost every village in this part has several sugar-mills in operation in January and February, when they harvest their cane.

They generally select for sugar-cane their strong clay lands, red and mulatto, with limestone sub-soil. But sometimes alluvial soil near the streams is cultivated in the cane, where it attains a greater size. Their best cane is small, and cannot yield a large proportion of saccharine matter. Their rows are less than four feet apart, and very thick in the rows. They are carefully cultivated, and those on the outside neatly tied up together to prevent injury from wind.

The sugar-mills are of the most simple construction, consisting of thin vertical cylinders, the central ones having cogs which work in mortices cut in each of the other two, and turn them. It has motion imparted by means of a simple sweep drawn by a single small ox moving around in a circle. The ox is geared to the sweep by traces attached to straps over a large rude saddle on his back, yet his pace is a brisk one, and the labor seems to be light.

Two or three canes are crushed at a time, when they are caught by a man or woman on the opposite side of the mill, and twisted together, and reintroduced between the other cylinder and the central one, and pass out the last time entirely divested of their juice.

The juice is caught in large tubs in holes dug in the ground near the heavy timbers making the foundation and platform of the mill, and conveyed to t he boilers near by.

The boilers are made of clay, and nearly heart-shaped at he rim, which is kept bound around with fresh green palm-leaves.

The bottom of the boiler is generally elevated like the bottom of a junk bottle.

They do not use sugar for sweetening tea and other drinks, but make of it, or the sirup, sweet cakes or sweetmeats, and groundnut candy, and parched millet candy, &c.

The production must be limited, and, no doubt, their method of manufacture is wasteful and imperfect, or sugar and molasses would be found in more common use. Their pressed sugar-cane is carefully dried and stacked away in cords between trees and stakes for fuel.

Tobacco is extensively cultivated, and in universal use for smoking. They cultivate a large coarse variety, as well as one small and fine flavored. Both of these would be better if they understood and practised a better method of curing. They pluck the leaves and string them on poles, and hang them up indifferently in the sun or shade, and suffer them to be wet or dry, as accident may direct; yet some specimens could be found which were good.

Cotton is cultivated on the island, but no traces could be found at this season of the year, except at the spinning-wheels, and these were of the most simple and primitive description; and on their looms, which were alike simple; and in their dress, which was entirely of cotton. It is probable that they raise enough cotton for their own consumption.

REPORT MADE TO COMMODORE PERRY

ON THE

MEDICAL TOPOGRAPHY AND AGRICULTURE

OF

THE ISLAND OF GREAT LEW CHEW,

BY

D. S. GREEN, M. D.,

SURGEON U. S. N.,

ATTACHED TO THE FRIGATE MISSISSIPPI ON THE LATE EXPEDITION TO JAPAN.

REPORT

ON THE

MEDICAL TOPOGRAPHY AND AGRICULTURE

OF

THE ISLAND OF GREAT LEW CHEW.

BY DR. D. S. GREEN, FLEET SURGEON.

SIR: Of the examination of Lew Chew, made by me, in obedience to your orders, I have the honor to submit the following report:

In company with a small party of officers, and two men as cooks, &c., I left Napha, January 31, 1854, on a tour of observation over the island of Great Lew Chew. The chief object of the expedition was to explore for coal, indications of which had been reported to exist on the shores of Shah bay, some sixty miles distant. That subject is matter for the geological reporter. This report will be a brief and general one upon the health of the island, as indicated by its climate and physical condition, and upon its agriculture—incidental remarks being occasionally introduced. Let it be remembered, however, that the whole distance, of not less than 125 miles, was accomplished in five days, and that, consequently, the observations must have been more or less superficial; but to compensate this deficiency, facts noticed last summer, during several weeks, will be used; and, doubtless, materials are at hand for an interesting exposition, could they be properly used.

The island lies between 26° and 27° north latitude, and is about sixty or seventy miles long, by about ten or fifteen in average width. It consists of elevated and high lands, having a central ridge rising in places to mountains of over one thousand feet in altitude, with spurs diverging on either side, forming promontories on the coast, with bays and indentations between. The streams issuing thence are small and short, and beautifully clear and pellucid; being thus brief in their course, and speedily reaching the ocean, or appropriated to irrigation, there are no extensive alluvial deposites; and such as there are, are used, every foot of them, in the culture of rice, so that no swamps or marshes, however small, exist in Lew Chew. The government would gladly reward the discoverer of any such, as it would add that much to the productive capacity of the country, and would be quickly converted into smiling fields of waving grain. This entire absence of marshes, together with the pure air constantly wafted over the land in the breezes of the surrounding sea, must exempt the island of all miasmal diseases, such as intermittent fevers and neuralgias, remittent and yellow fevers, &c.; *possibly* mild in-

termittents may arise about the time of the maturing of the rice, when the water is drawn off from the land for a brief period.

Situated near the tropics, intense heat might be expected here; but this is so tempered by sea winds and the elevation of the land, as not to be excessive or even severe; hence, diseases thence arising, as bilious disorders, diarrhœa, cholera morbus, &c., are not to be apprehended. Nor do the cold northwest winds from the continent of Asia reach this favored isle with their chilling blasts, being mellowed by traversing a lengthened sea, through which is flowing a current of warm water from the south. Thus softened in their long course, they do not bear with them inflammatory affections, such as pneumonia, pleurisy, rheumatism, and the like. In short, no causes seem to exist for endemics or epidemics—unless, indeed, a comparatively poor food may predispose the people to strumous complaints. Sporadic cases of any of the preceding classes of disease may occur, of course, but would arise from imprudence or accidental causes. The above opinion could not be brought to the test of personal experience; but it may be remarked, that of all the multitudes seen upon various occasions, only one person was noticed as having an anemic condition, owing, apparently, to disease of the digestive system. Several, however, were observed to have marks of contagious diseases, such as smallpox and the venereal. A few cases of noses caved in and flat with the face, in both men and women, were seen in the market-place at Napha, and also one case of elephantiasis.

To illustrate how sporadic cases may occur, the nature of the remedies used, and, perhaps, the physical endurance of the ruling classes, the following case is introduced:

Upon the third day, our road lay over three of the before-mentioned promontories, with very steep ascents and descents, and an elevation of some 200 feet. These had to be passed upon foot, both going and returning, by the whole party. The interpreter, of a low grade in the upper orders, and who, by the way, had walked much less the preceding days than any of us, had now this task to perform. After it was done, and before reaching shelter for the night, a cool, drizzly rain was blown upon us. The next morning, instead of making his appearance, Usisarti sent to ask for a little sugar. He had an ephemeral fever, arising from the fatigue and exposure of the day before, and, by my advice, remained behind. The sugar was for medicine. It was used first in *eau sucré*, which he thought would soon relieve him. It was next made into a paste with starch (of the sweet potato), and boiling water added; this he drank, and remarked he would be ready to start after sleeping a little. The sickness was slight, and apparently would be brief; the remedy was equally simple, (quite French,) and would probably be sufficient. Indications of a more active external practice are manifested in the course of the spine and upon the abdomen of many of the inhabitants.

To conclude this branch of the report, the climate of Lew Chew is, perhaps, as pleasant, as free from the severity of winter's cold or summer's heat, as any in the world; and the island is nearly, if not quite, as healthy as any on the bosom of the sea.

AGRICULTURE.

Soil,—is somewhat various. In the southern half of the island it lies upon limestone, which protrudes through it in many places on the tops and sides of ridges, in large and irregular masses, causing the scenery to be peculiar and picturesque. These frequently appeared like the ruins of fortresses, castles, and abbeys. Around and in the midst of these rocks the stratum of soil is thin, and, therefore, not susceptible of culture, except in small spots. In this section, and indeed in all the island, there is little sandy loam or sandy soil. The uplands consist, in

the main, of light, red-clay loams, intermixed with pebbles of various sizes and color; some lower lands, chiefly basins, consist of a blue or slate-colored stiff clay; and the bottoms, and valleys leading to them, being formed of the alluvium of the above, with vegetable matter, are rich, friable, argillaceous loams. The lands become higher and poorer as we advance north, until we arrive at the parallel of the head of Barrow's bay, about the middle of the island, where cultivation ceases, except in small vales.

The middle section is composed of hills and mountains; the soil of which, as far as observed, is generally a white clay mixed with sand, and lying upon red clay, hard, dry, and poor. The native growth is shrubbery or *chapparel*, but the mountains in the distance appeared clothed with trees. Near the sea, on either side, are plains of small extent, being the embouchures of mountain-valleys. These are mixed loams; there are also some sandy deposits, cultivated. Rocks: gneiss, soft granite, &c.

The northern third or fourth of the island is also mountainous, but having some large plains. These consist of a rich, dark-colored loam, as far as observed. Red-clay uplands show themselves, and the sides of some of the small mountains are of a greyish-colored gravelly soil. Rocks that crop out: slate, &c.

Climate.—Supposed to be, in general, genial to the pursuits of the cultivator of the soil. "Droughts" are spoken of in an official Lew Chew document, and we know that the country is in the direct range of *typhoons* or hurricanes. These drawbacks are not frequent.

Roads and bridges.—In the southern part, the roads are from six to ten feet wide, and even from twelve to fifteen near the larger towns or cities. They are paved with rough stones, where liable to become very soft or muddy on the occurrence of rain, or to wash on acclivities. They are carried over streams by substantial, well-built stone bridges, with from one to three Roman arches; some of them are very old, and are built to endure for ages. I noticed in the side-rail of one, a single stone twelve feet long, ten inches thick, and about two feet wide or deep. In the less cultivated and mountainous parts, the roads dwindle away to mere foot-paths or Indian trails; and in many places, by grading or wear, they pass through deep cuts from six to ten or twelve feet. Passages over the spurs and ridges are effected literally by scales or steps cut into the soft stone or firm clay, or by stones rudely but conveniently placed. The bridges also become different, being merely planks loosely secured, and supported upon rude piles of stones.

Enclosures and fences.—There are none in the open cultivated country, except where it borders upon the wilder parts, in which, it is said, wild boars may be found. In the less cultivated portions there are very large enclosures, embracing several hundreds, or even some thousands of acres, and also smaller ones around detached huts or hamlets. They are formed of small timber, sometimes split, and made indifferently into pickets, palings, stake and rail, &c., assisted sometimes by a kind of flat, leaf-shaped coral, and at times by a well-made ditch and bank; the latter built of large sods inverted and regularly laid. In one place a horizontal fence was seen, the object of which was not obvious at first sight. It appeared as if designed for a shelter, but no use for one was perceptible. The hill-sides were so steep that an upright fence, unless very strong, must soon get out of order and become useless; but, being set against the hill, and upheld by perpendicular pieces supporting what should be the upper edge or top of the fence, it was well secured, and formed an effectual barrier from either side, unless an animal were disposed to go out upon it, and take a long leap below.

Tenure.—Of this, it is conjectured that all lands are held by government, and let by it to

large tenants, and by them sub-let to smaller ones, until it reaches the family or individual cultivator. All this is upon the *Metayer* system, or plan of paying (in this instance "as taxes") a certain proportion of the produce.

Labor and habitations.—Labor is almost exclusively performed by human beings—men and women—a small portion only being done by horses and bulls. The laborers are supervised by men in authority, who carry umbrellas. Whether they are policemen, tenants directing their employés, or agents of government acting as overseers, I do not know. If the latter, it would make the government landlord and tenant both, and leave the laborer to be paid in kind.

The habitations are not scattered promiscuously over the land, but are collected into villages, larger or smaller, according to the fertility of the district, and are located upon a rocky or sterile spot, when not inconvenient, and all the inhabitants repair to them at night. The houses and their arrangements are all alike. Placed a little back from the streets, they are embowered on all sides by bamboos or trees, with a small open space or yard around them. In this, to the rear, is the invariable pig-pen, and, in front, the equally invariable hutch or poultry-house. In several, are a cow-house and a stable; and in a few, granaries. The houses themselves are of frame-work and boards, with plank floors and thatched roofs, comfortable, though small. The streets are lined on either side by bamboos or evergreen trees; and when these are not sufficiently close to insure privacy, that is effected by cane matting or stone walls; many of them are so worn by long use as to be several feet below the original surface. These villages are quite romantic, and more beautiful than any of like pretensions I have ever seen.

Implements,—rude and simple. The plough is small and light, made upon the old Greek or Roman model, and drawn by one bull, or a single horse.

The harrow is a large rake, of one *bull* or head-piece, from four to six feet long, and the same number of inches square. Two upright pieces and a cross-bar answer for a handle. The teeth are of iron, six to ten inches long, and about eight apart.

The large hoe is shaped to cut twelve or sixteen inches deep at one lick. It is five or six inches wide at the cutting-edge, and eight or ten inches at the top. The "eye" is peculiar, being formed by a broad flat piece of iron welded across the top of the blade, leaving an opening below, into which the helve or handle is inserted. This broad piece serves to strengthen the handle when used in leverage. The helve is only some two or three feet long.

The small hoe is about the size of an American grubbing-hoe, with "eye" as above, and a small handle six or eight inches long.

The sickle (hook or reaper) is an iron blade one inch wide, some eight inches long, very slightly curved, and attached at right angles to a wooden handle a foot in length.

The axe is a wooden mallet, with a handle of the usual length, and the head-piece small, but long and shod with iron—the cutting-part. Indeed, iron is so scarce that their anvils are not equal in size to a block six inches square.

These are all the implements of agriculture recollected to have been seen, except a sugar-mill and a quern or hand-mill, (if these fall under that denomination,) which will be noticed hereafter.

Grading, culture, &c.—Two objects seem to influence the islanders in all their operations, viz: *the retention of water or moisture, and the avoidance of surface-washing.* To effect these

desirable ends, especially in a rolling country, a great quantity of grading is required, besides very deep culture; and *here both of these have been done.*

Wherever a stream is found, whether large or small, also whenever springs issue from the sides of hills, (if not excessively steep,) the system of grading begins. If the ravine be very narrow, the sides near the bottom are cut down perpendicularly for several feet, and the bottom levelled from side to side; the level becoming wider as the sides recede from each other. It is formed into steps, by slight narrow banks running across, capped with grass. The height of these embankments is always small, rendering the length of the step or plot longer or shorter as the descent of the valley is greater or smaller. A plot of only six feet square is not neglected or despised. Where there is not a ravine, but an open, spreading valley, the sides are not thus cut, but the levelling is effected by running the embankments across it in a curved line, corresponding with the ground, the arch being always up the valley. If the stream be large enough to furnish side supplies, open ditches or conduits are carried along the sides, and the water is allowed to descend from plot to plot, the embankments of which are adapted to the surface, being arched outward, or from the side, where an elevation projects into the valley; and inward, or toward the side, where a depression occurs on its face. By this means, no dams, as such, are made, (liable to be washed away;) but gentle descents of a foot or so are made, from step to step, without any risk of injury, and requiring only the slightest restraints or banks. These are all covered with grass, and serve as divisions of property, and also as path-ways. A long and wide valley with a considerable stream in it, thus laid out, presents a pretty and interesting sight, with its numerous curved green borders and plots, from a few feet in size to an acre or more. When of the latter size, they are subdivided by straight lines, for convenience, or as land-marks. By this simple arrangement, great floods may be diffused over level land, and fall from grade to grade so gently as to pass off without detriment to the feeble embankments, and without injury to the soil by washings. This is the grading for irrigated lands.

That for rolling uplands is not unlike it, but is not brought to such exactness, as a perfect water-level is not so much needed; this, however, is approximated, where too much labor is not required. A gentle slope often occurs in practice. Hill-sides are thus cut into terraces, varying in width from a few feet to many yards; and also in length, according to the inclination or shape of the land. The same small margin of grass is found here on the embankments, which are from one to several feet in depth, ere another terrace is reached. In this way, when the hills are conical, and the terraces are arched outward, they look like giant circular steps from base to summit; and where a valley is regular and steep, they are arched inward, and appear as the steps of an immense amphitheatre. The terraces are subdivided, as the irrigated plots are, or by stones or slight mounds of earth, grassed over, as division-marks. They are bedded up gently towards the centre, and all around the margin there is a slight depression or furrow, by which superfluous rain-water is carried to some point, to be let down to the next level. But, before allowing it to escape, it has to pass over a hole, or reservoir, in the ground, generally partially filled with potato-vines, pea-haulm, and the like. Here any alluvial soil is arrested as sediment, to assist in making compost or manure, the water alone (muddy, it is true) escaping. Before escaping finally, however, into the stream or river, it has to traverse a much larger reservoir for the same purpose.

The most beautiful samples of each of these kinds of grading, together with the most perfect culture, and the best lands seen on the journey, occurred between Nugah and Tanegah, and around the latter constituting the most unique and picturesque artificial scenery. This is a

short distance S.W. of Melville Harbor, and might be called, from the fortress-like hills within and around it, Fort Hill Plain. Near by, and towards the S.E., is by far the most beautiful glen we passed through, left with its original forest in the upper portion, and traversed by a limpid stream. Amid a dense mass of tropical vegetation, were found tall cypresses and multitudes of ferns. Either bank was, in various parts, completely draped by the large and pendent leaves of the latter, of which some were seen rising aloft to twenty or thirty, and even thirty-five feet in height. He who delights in ferns would here be delighted to satiety. Fern Glen would be an appropriate name. In its lower portion there was a simple aqueduct thrown across the stream, some eight feet high, to keep the water at a proper level for irrigating larger surfaces. It consisted of rudely-hewn troughs, supported by forked stakes. At the outlet of the valley there is a long stockaded embankment, filled in with earth, to break the force of the rivulet when swollen to a mountain torrent.

All arable parts of the island being thus graded by the labor of ages, let us proceed to the *culture* of the land. This will be specified under the heads of various crops; premising, however, that the land being cultivated upon the *Metayer* system, brought down almost to individuals (or possibly upon an allotment system), and consequently divided into very small portions or parcels, and the labor being done by man, *horticulture* would seem to be a more appropriate term than *agriculture*, and the whole country to be overspread by a series of gardens rather than farms.

Rice (*oryza sativa*) appears to be the most valued, though probably not the most important article of produce. It is grown only upon irrigated land. This is prepared by first saturating it completely with water, which enables the long hoes to penetrate deeply and easily. While yet overflowed, a gang of men (one, two, three, or four) enter a plot, and each one hoes a row across it. They stand up to the knee in mud and water, which renders the short handle available. No. 1 carries a row near a foot wide, which he draws away from the land, not unlike a plough furrow. No. 2 follows with a similar slice and furrow, and so with the rest. When finished, it is not unlike ploughed land, deep, and well laid over in seams or ridges; and it is surprising with what rapidity it is done. This operation was frequently witnessed, and this alone; though the plough may *possibly* be used for this purpose at times. It is believed, however, that it only follows this, after an interval, for the purpose of still further loosening the soil. This again is followed by the harrow, to more effectually break down and comminute the whole, and also to level the surface perfectly; the water yet remaining serving as a guide. Here are ploughing and harrowing, not only in wet land, but in land actually under water! What would our agriculturists say to this, so exactly opposite to their best practice? And yet it is equally good practice. It may now be understood how these slight implements answer their purpose, and can be drawn by one small horse or bull. By the way, bulls only were seen at this work, and these sinking nearly to their bellies at every step.

The next operation is to set out the plants. These have been grown previously in similar plots, which presented lovely green spots in every valley. Across them demarcations are made by lines, where no plants grow—the small lots belonging to different persons. The whole is protected from crows by a few split bamboos set in the ground—some upright, and some bent into bows, and in places by cords extended over the plots upon stakes. The plants are drawn by hand, tied into conveniently-sized bundles, and dropped into the water until required for use. They are set out with great celerity. Gangs of hands move along inserting the plants into the soft earth, at intervals of six or eight inches, and, it being under water, the operation

is effected as speedily as the hand can be raised and again thrust down. Practice renders them expert, and lines unnecessary. In front of the gang is a sheet of water; behind them is a field of growing rice, in regular rows. At all periods of its growth, when the writer has seen it, the earth has been covered with water, which is, therefore, inferred to be always kept so, until the grain is about to form or ripen—perhaps, except when "droughts" occur. If such be the case, and a water-coming be essential, droughts must act most injuriously, by cutting short this, which seems to be the chief food of all the upper classes, and probably the chief article of tribute or taxes to Japan.

Apparently, no further culture is required, unless it be to pluck out aquatic weeds that may intrude. It is cut and gathered into bundles before "dead ripe," and placed in the air and sun to dry. All subsequent operations are unknown to me. A gentleman from South Carolina, who saw much of it growing, thinks it will average about twenty bushels to the acre; at the same time remarking, that the head (panicle) was very large, owing to its having been "set out," instead of being broadcast. From this fact, the average may be larger. We are under the impression that two crops are grown annually; besides which, a winter-crop of taro, or sweet-potatoes, is taken from the rice-grounds, as inferred from these occupying and being gathered from those grounds which were not already (February 1) either planted with rice or undergoing preparations for it.

Taro (*arum esculentum?*) is a water-plant, and occupies the wetter grounds and ditches. Where the sweet-potato is grown upon rice-grounds, if they are of stiff clay, it is planted upon beds, similar to strawberry and asparagus beds; the summits of these being dry, and the interspace moist or wet. It was never seen whether the rice-grounds are manured; but, occupying the rich alluvions, and being assisted always by water, they may require no manure.

The unwatered uplands are prepared for crops much in the same way as rice-fields—the large hoe being the principal, if not the sole instrument, for stirring the soil. The plough and harrow *may* be used here in the manner mentioned before; but at no time was any such operation witnessed. Whether a spade would answer better, is doubtful; and, as iron seems to be too scarce to supply both, the hoe is preferable, as being capable of performing more offices. When the land is once placed in an open, porous condition, all future culture is easily and quickly effected; it is never allowed to become compact and hard again; a constant series of crops, root and culmiferous, is taken from it; and the removal of roots serves as a preparation for the following crop. No grass or clover is ever sown—two lots of a coarse-looking grass, apparently spontaneous, being the only exceptions seen in thousands of divisions. Owing to this, no stock ever tramples the earth, which remains light and readily worked. In working it, the feet of the operator are rarely moved; being drawn up from the accumulated soil around them, and placed in the deep furrow next the unbroken ground, when the legs are again buried nearly to the knee by pulverulent earth, loosened by the deeply-penetrating hoe. The soil appears to be stirred thoroughly at least one foot in depth, and probably more. Lands thus deeply tilled, and lying nearly or quite level, are admirably adapted to absorb and retain the water that falls in rains—aided, as they are, by borders of firm earth, which are further hardened by being foot-paths. Nor is there danger of their becoming too wet, as superfluous water may escape by a sufficiently porous sub-soil, or by drains at the margins, as mentioned above. Such tillage is also admissible, as affording the roots of all plants a fine field for spreading and developing themselves.

The unwatered hollows, or intervales, levelled across and formed into steps or terraces, are

chiefly occupied by sugar-cane, beans, millet, and some wheat. The latter is, curiously enough, nearly restricted to the higher and poorer lands. Sweet-potatoes, which is the food for the laboring classes, are cultivated everywhere, and as secondary or intermediary crops.

Sugar-cane, (*saccharum officinarum*).—Considerable quantities of this are grown, principally in the southern portions of the island. Like everything else, it is cultivated in small divisions, seldom exceeding an acre in extent. It is set very close—about a foot or less apart—and presents a very dense appearance in all its stages. Whether the soil is stirred at all after planting, or the weeds (if any) merely hand-picked, is not known. It is gathered by being chopped down with the sickle or hook, the leaves and tops stripped off, and then carried in bundles to the sugar-mills—one, two, or three of which are located together near a highway. The cane is small and short—the effect, doubtless, of close planting—perhaps averaging three-quarters or an inch in diameter, and some four feet in length.

The mills deserve mention; they are simple, but effective. They consist of three cylinders of hard wood, held in an upright position by a timber frame. These are a foot or so in diameter, two feet high, and placed in a row with a mortise and wedge on either side to graduate the distance between them and the pressure. The central one has a wooden axle or shaft extending through the frame, some six feet high, to which is attached a curved lever of fifteen feet, by which the mill is easily worked. One bull or horse is the moving power, and he walks in a circle about thirty feet in diameter. This central cylinder has a row of cogs (hard wood) near its upper end, which play into mortises (instead of corresponding cogs) cut into the other two. This constitutes the whole apparatus, with conduits to lead the juice to a tub or receiver, placed in a hole near by. The cane is passed between the central and right roller; and before its escape, being seized on the opposite side and twisted together like a rope, is passed back between the central and left roller. This double operation seems to press it thoroughly, and to deprive it of its juices effectually. The juice is sweet, and appears to be very saccharine. It is boiled in adjoining temporary houses, in thin iron pans of eight or ten gallons. Fuel is used here, as everywhere else, very economically. The refuse cane is carefully piled away to dry, and is, doubtless, used as fuel. The yield I am unable to conjecture, but it is, probably, a very fair one. How it is used is equally uncertain; not for tea, as that is never sweetened, but probably in preserves or dulces for the upper classes, and, perhaps, for export to Japan. It is inferred that sugar is scarce, at least among the people, from one of our interpreters sending to ask some from us, when in a large village or town; such request of foreigners being very uncommon.

Wheat (*triticum vulgare*). This is produced to the same extent or less than rice. It is of two varieties, bearded or awned, and smooth-headed or awnless. It was (February 1st) in every stage of growth, from being ripe and ready for the sickle, down to its mere sprouting and starting out of the ground; indeed, preparation for additional planting was going on, by gathering the everlasting sweet-potato, and leaving the land ready for wheat. This is planted by dibbling, chiefly, at intervals of six or eight inches, next by drilling, and occasionally by broadcasting. The young wheat was affected in many patches by two diseases—one, a yellow appearance, arising from the death of the ends of the leaves, occasioned by cold or even frosty nights, succeeded by warm or hot days; the other, a crippled appearance, some of the stems or stalks growing uninjured, but many being dwarfed, and spreading or tillering at the ground, which was recognised at once as being caused by the fly. This was searched for as far as opportunity allowed, but was not found. The *larva* of the black fly (as is believed) was found in the form

of a small worm, either in the culm, or, where that was eaten through, in the sheath of the leaf. There was no indication of the joint-worm, which at present is so formidable in some parts of the United States.

The land for wheat is manured, as far as the manure will go. It is the coarse manure produced about houses and stables, and is worked into the ground in the preparation. Small heaps of it are deposited over the surface; which would be bad management, if not speedily incorporated with the soil, which, probably, is done. In some places, a yellow substance is sown or scattered over the ground, not unlike guano in color, and supposed at first to be marl, but, upon examination, it appeared to be sand from the sea-shore. Marl is said to exist on the island, and probably does. The yield is only moderate—upon an average, being about eight or nine bushels per acre, judging by the eye while growing. Some lots were very inferior, not beyond three or five bushels; the better portions might extend to ten or twelve, and a very few to sixteen or eighteen. This product is not such as the earlier growth would promise, for the heads (spikes) are short, and the grain small. That examined was red wheat.

Harvesting and the after management did not come under notice until it reached the mill. This worked by hand. The stones are of good quality, about a foot in diameter, some five or six inches thick, and the grinding surfaces regularly cut. An upright handle is inserted into a hole near the outer margin of the upper stone by which it is turned, and tolerably fair unbolted flour is made. Being unbolted, it is brown-colored, but is very glutinous, and makes light, sweet bread. Besides other uses to which wheat and rice straw may be applied, all the shoes or sandals used upon the island are made of one or both of them.

Barley (*hordeum distichum*), in small quantities, is cultivated in the same manner as wheat.

Millet, of two or three kinds, is found here. One (*holcus* vel *andropogon sorghum*) is like broom-corn, and is planted in rows, or grows in detached stalks; the other two (*setaria Germanica?* and *S. Italica?*) are either drilled or sown broadcast. The last named has a very large compound head or spike, composed of numerous smaller ones, and ought to be very prolific. None of them, however, appears to yield so much as the first named, when grown near Havana, in Cuba. The stalks of this sort are used by the islanders for making torches or flambeaux. They are bound together into a bundle of six or seven feet long and half a foot in diameter, which will burn for an hour, and give good light to travel by, or for other purposes—for example, fishing; and lights are often seen along the shores at night.

Sweet-potatoes, (*battatus edulis,*) of two kinds, the red and white, is the universal crop of the island, both as to season and breadth of land. It answers to our Indian corn (*maize*) in the southern and western States as the common food, and is always in season. The yield is by no means what might be expected from the importance of its production, and from its being assiduously manured while young with liquid manure and compost from the before-mentioned holes or reservoirs. This arises probably from the manner of planting, or rather of setting out the vines, for the roots themselves are never planted. The land being ready, and a number of vine slips at hand, a man with a small hoe reversed in his hand—that is, the hoe part next to his body instead of outwards—passes quickly along, carrying two rows with him, by inserting or pushing the hoe into the soft earth at intervals of nine or ten inches, raising the soil on its point by drawing the hand backward, with the hoe-eye as a pivot, thrusting the slip under the point with the left hand, allowing the earth to settle again as the implement is withdrawn, and, finally, pressing it close at the next step with the foot. This is a speedy process of procuring a growing potato-patch; and it is kept alive and flourishing by the liquid manure,

which is conveyed to it in Chinese fashion—in two tubs or buckets balanced at either end of a bamboo pole, carried on a man's shoulders. It is applied to each plant by dippers. But upon gathering the crop, only one or two tubers are found attached to each vine, and they generally not large. By the closeness of planting, and the quickness of growth, two or three crops may be taken in a year. The yield is possibly greater than with us; but this can scarcely be, from appearances. This is the principal article of support for the people. On two occasions I saw our carriers eating their meals, and on both sweet-potatoes were the bulk of the food, only assisted by a few very small fish in one case, and by a little salad, either pickled or prepared with grease, in the other—a frugal meal.

Sago (*cycas revotata*). Upon first seeing enclosures, I asked the interpreter what they were for? He replied: "The north country in Lew Chew very uncomfortable; the poor people have to plant pine-apples," meaning the sago plant; these being protected from wild boars, &c., in the forests. And truly, except in plains, valleys, and rolling uplands, they did seem forced to draw a scanty subsistence, by hand labor, out of an ungrateful soil.

In some places, where the mountains are free from stones, they are planted even to the very tops, some three hundred feet or more. The sides of some, too, rise at an angle of 75° nearly, if not quite; one of the party even suggested 80°. To prevent washings, or to make allotments, or both, *narrow strips* are cultivated from the bottom upwards, and the plants arranged in short zig-zag lines across these strips, by which means less water is accumulated on each division; and its descent, being retarded, is made gradual and equable. The ground is only kept bare until the plant obtains a start; when grass is allowed to grow, which is useful in itself, and an additional impediment to washings. Sago is not only grown in these "uncomfortable" parts, but is planted on many of the ridges and broken lands, and on rocky hills where there is enough soil and enough fertility. It seems to require several years to attain its most profitable size; and thus large quantities are in the ground at any one time sufficient probably to alleviate, if not prevent, a famine, should hurricanes and droughts conspire in the same year to destroy the hopes of the husbandman. Very much injury is doubtless inflicted, at times, by the former upon cane, millet, &c.; and by the latter, rice and wheat, beans and potatoes, may all be greatly reduced.

Various leguminous plants are very generally cultivated, and form an important item in the laborer's food. There are beans (*faba*) of several sorts; a species of horse-bean, one grown here and in Japan, and seen in China, having small hairy pods growing in thick clusters; and the genuine black-eye, cow, or Indian pea, found indigenous in the United States. The garden pea (*pisum sativum*) is of two varieties, one having a white, and the other a purple flower. They are sown in rows generally, and appear to be productive. The latter is also sown broadcast, and, with the others, are often grown as secondary crops. No supports or stalks are ever furnished the pea. Ground-nuts (*arachis hypogaæ*) are believed to be raised. An article of food is prepared from beans, very largely, and exposed for sale in all the markets, which so resembled cheese as to be mistaken for it. Possibly goat's milk may aid in its manufacture.

Turnips (*brassica rapa*), radishes (*raphanus sativus*), enormously large, and tasting like turnips when cooked; carrots (*daucus carota sativa*), very small, but long; gourds (*lagenaria*) of monstrous size, and used as a substitute for pumpkins; egg-plants (*solanum esculentum*), cymlings (*cucurbita verrucosa*), onions (*allium*), and other esculents, with peppers, (*capsicum annuum*,) fennel (*fœniculum vulgare*), &c., are cultivated commonly. Cucumbers (*cucumis sativus*) of immense size are very abundant.

No Irish potatoes (*solanum tuberosum*), no Indian corn (*Zea-mays*), were seen, or are believed to exist; although the latter is mentioned as being here, in both Hall's Lew Chew and Belcher's Voyage in the Samarang.

Tobacco (*nicotiana tabacum*), of a healthy, beautiful, and delicate kind, is raised. Enough is made for the consumption of all classes, and the people, from the highest to the lowest, seem equally to use it, and to be equally unable to do without it. On journeys they regularly call a halt, and, taking a few exhilarating whiffs from their excessively diminutive pipes, they resume the road with cheerfulness and mirth. There is nothing peculiar in its tillage; but in curing, it is unnecessarily or purposely exposed to weather and rain, and is, consequently, very weak. If properly managed, it would doubtless make delightful cigars, combining strength and mildness.

Grasses.—Only one worthy of special notice.

A coarse grass, somewhat after the *arundo* order, springs up spontaneously, and amidst it there are a few finer sorts, but very small; and also two kinds of dwarf clover with yellow blossoms, the lupuline (*medicago lupulina*), and hop trefoil (*trifolium procumbens*), called also sheep clover. This grass is cut from the borders and sides of the terraces, when sufficiently sloping, and from the untilled land, and fed green to the horses and stock. Tethering is sometimes practised. There is no large *trifolium*, (or clover,) no *poa*, no *phleum*, no *lolium*, no *dactylis*, or, if so, none practically useful, but has to be searched for by the botanist. There is, however, one grass that makes a beautiful border in the villages, and which struck me at first sight as being a magnificent poa. The leaves were like it in shape and length, and very green. Upon examination, the under surface of the leaf had elevated white ribs along it, no culm could be found, and the plant extended itself by rhizomas, and had tubers, or, rather, tumors upon the fibrous roots. It is a hardy plant, and would probably grow in the sandy soils and dry climate of New Jersey, Maryland, &c. Should it spread rapidly and stock be fond of it, it would be a most useful and valuable boon to those States. But it must be remarked, that however closely other grasses were cut and gathered for stock, this seemed to be always left untouched.

A few stalks, growing wild, were seen of what is believed to be the yellow lucern (*medicago falcata.*) It is coarser than lucern, and not cultivated, except in some poor soils in France and England. This was in a fertile spot and very luxuriant, with a coarse, woody stem. No use seems to be made of it, though it might be turned to a good account in soiling. Wild garlic (*allium vineale*) was seen infesting a few lots or parcels of wheat, "as thick as hops."

Fruits.—Little is known of them. A large and a small species of orange (*citrus aurantium*) appear in market, but are very indifferent. Peach trees (*persica vulgaris*), of large size and healthy, are met with in bloom. Water-melons (*citrullus vulgaris*), are abundant, but inferior. No other fruits are remembered. Apples, pears, cherries, strawberries, &c., would, no doubt, succeed.

A wild raspberry (*rubus japonicus*) was seen growing in various places on the hills of the north. The flower is white, and unusually large, resembling that of the blackberry or bramble (*rubus villosus*). The fruit is also very large, (for a wild plant,) but the flavor is not very decided, or, rather, is mild. It would be greatly improved by transplanting and culture, and is probably worthy of introduction into the United States. Four species of raspberries are mentioned by Thunberg as existing in Japan, with the description of one of which the above plant corresponds.

Another vine or shrub was found in like situations, which, at first, was mistaken for a grape,

so strong is the resemblance of the leaf, and even the stem; which, however, is more brittle. What kind of fruit it may bear is unknown, but the blossom is very like that of the above raspberry, or a strawberry, and grows at the junction of leaf and stalk, with none or a very short peduncle.

A wild fig-tree (*ficus*) was also seen, with two mature fruit upon it. It was a mere shrub, about twelve or sixteen inches high.

Banana (*musa sapientum*). This is not commonly reared for its fruit, if at all. Numerous patches are grown, the plants being very close together, and must yield very largely the material for which it is cultivated. The fibres serve instead of hemp or flax for manufacturing the cloth—perhaps mixed with cotton—universally worn. Paper, also, is probably made with it. Being thus the source of clothing for the inhabitants, it is a most important crop, second to few, if any, on the island. In this connexion, the cotton-plant (*gossypium herbaceum*) may be mentioned. It is cultivated in small quantities, in rows, and, like all their culture, on a small surface. The only exceptions to smooth or level culture are the before-mentioned potato-beds, in heavy, wet clays, and a small lot "hilled up," supposed to be in ground-nuts.

The clothing of the upper classes is always neat, light and cool in the summer, lined or wadded in the winter. The color generally blue. That of the working-people is coarser and commonly undyed. They are never allowed to wear stockings, nor do I recollect ever seeing them with sandals on. While at labor in summer, they are nearly naked; at other times, they are decently clothed. In rains they do not abandon their work, but, donning a broad-brimmed conical hat, and a loose, shaggy, short cape, both rudely made of the leaves of sugar-cane or banana, they labor on without intermission; at least this was witnessed in the moderate rain we had. Usually, no hats are worn by any of the people.

Dye-stuffs of some sort are extensively used, but what they are could not be ascertained. Can it be the dyer's buck-wheat (*polygonum tinctorium*) of China?

Granaries.—These are well worthy of note. Very numerous (supposed) public ones are prepared in the towns; as many or more than ten or twelve occurring occasionally at one place. Private ones have already been mentioned. They are raised from the ground some six feet, and supported by posts placed upon stones. The body (of cane interwoven or plank) is square, spreads outward on all sides as it ascends to the eaves, and is covered by thick thatch. One will hold from four hundred to five hundred bushels, or more. Rice, wheat, millet, &c., are probably deposited in them, which are kept perfectly cool and dry by the thatch and elevation from the ground, and completely preserved from vermin; a necessary precaution, as rats are numerous and of very large size.

Animals.—The horses are small, but active and strong. They are chiefly used for riding by the rich; some carry burdens to market, &c., but almost all such labor is done by men and women. I heard of horses being employed at the plough and sugar-mill, but never saw it. The cattle are universally black and short-horned. Bulls are not large, but are in tolerable order, and work as before indicated. They are harnessed by a strap crossing the breast, and leading to a rough wooden saddle, from whence it goes on as a trace to the place of attachment for draught. Cows are used for maintaining the stock. How the cattle are ultimately disposed of is not known. Goats are kept, probably, for their flesh, and it may be to assist with their milk in making the bean-cheese.

There are great numbers of hogs, two or three with pigs being kept in pens by every house in the villages. They are a small, black breed, rarely going beyond one hundred and fifty

pounds, but becoming very fat; not loose and soft, as in the China pig, but well laid on and compact. While young, they are ill-kept and ugly; but are well shaped when grown, with straight backs and bellies, good heads and bodies, and short legs. The introduction of a few pairs of these might be desirable in the United States, though less necessary from the number of China pigs already there. Pork appears to be the chief or only animal food for the people of Lew Chew. It is preserved by salting. The domestic fowl is raised, and in considerable numbers, but the consumption of it is probably confined to the upper ranks.

Manures,—seem to be assiduously collected and applied. It is furnished by the stables, cow-houses, pig-pens, and the compost holes in the fields. The animals being all soiled, large quantities ought to be obtained. Whether it is well preserved, or in what manner, cannot be stated. How night-soil is disposed of is not known; certainly it does not obtrude itself on the senses, as it does in China, nor is it applied in the same way. It is doubtless used in some way, by a people who avail themselves of every practicable spot for culture; and, perhaps, it is done in a compost.

Beside the retention and use of the alluvium, already spoken of, the lighter uplands are top-dressed with stiff clay from bottoms near by. This I saw near the centre of the island. Also, on an alluvial flat, where a stream falls into the sea, and which is subject to overflows by salt water, the following operation was witnessed: Large ditches had been cut chequerwise through it, to draw off the superfluous water, and, the intermediate spaces being dried, the earth was being removed and spread upon the adjoining fields.

Timber and fuel.—Most of the accessible primitive forests have been exhausted. Some cypress (*taxodium distichum?*) and hard woods are yet found in the glens. The present growth on uncultivated land seems to be pine and chapparel, *i. e.*, brush-wood of various kinds. Pine of two kinds (*pinus palustris?* and *P. Strobus*) appears to be the chief material for timber and fuel. It is transplanted on each side of public roads, affording shady avenues in the heats of summer; and each one being cut when matured, it serves for timber. Trees of all ages are thus found intermixed. It also borders certain open and level grounds found in populous neighborhoods, which seem to be designed as arenas for athletic exercises and games. These are some two hundred yards long, and some twenty or thirty wide, and, being perfectly level, are well adapted to racing, whether on horse or foot, wrestling, &c., and to ball-playing. This is probably a favorite amusement, as very many balls, highly decorated with bright-colored threads, were offered in the markets upon their New Year's Eve; and my carriers, happening to meet with one in the road, amused themselves for some time by keeping it going with their feet. The oldest and finest specimens of pines are around these places. It is also planted on lands exhausted of grain-forming materials by previous cropping, and in poorer districts, and is cut for fuel when four or six inches in diameter. This affords "rest" to the land, which is more or less renovated by the chemical changes effected within it in the course of years. Besides, though not generally known, the pollen of pine contains more phosphorus in it, brought up from the subsoil by long tap-roots, than any other vegetable substance; and thus a pine forest is one of the very best renovators of land—phosphorus being essential to grain-growing crops. Moreover, it is grown on rocky ridges, in some rich groves, &c. The pine seems to be sacred or reverenced, as was the miseltoe of old; all the villages, boats, and junks being ornamented at their New Year with its evergreen boughs. Other fuel is the dry sugar-cane and leaves, dry brushwood, coarse grass, &c.; and, being scarce, it is used most economically in small, well-shaped, fuel-saving furnaces.

Bamboo (*arundo bambos*), the larger sort, so useful for carrying burdens, and other purposes, is grown in plantations, which are very beautiful, with the long slender stems reaching aloft into the air, and the green grass making a thick sward beneath. Two or three dense groves of wood were seen, of four acres in extent or more, inclosed by three cords drawn around them a few feet from the ground. Were they sacred or tabooed?

A few general remarks may be made before concluding this subject. The present system of agriculture could scarcely be improved for the Lew-Chewans, considering the circumstances in which they are placed. The amount of meat and fish consumed seems to keep them healthy, and, were additional laboring animals introduced, they would require more of the fruits of the earth than their flesh would repay. Besides, the manual labor thus superseded could not find employment in manufactures, as they have not the raw material to work on, nor foreign commerce to demand their goods. Animals, then, would diminish population, by taking the places of men. A few plots of clover, lucern, tares, and even timothy, would be beneficial, as affording large supplies for soiling, and increasing animal food, and also by yielding additional quantities of manure, and granting to the land timely rest. The people manage their few implements very adroitly, and, perhaps, only a few could be added with advantage—such as better sickles or scythes, to gather in their crops more rapidly; a large hand-rake, to cleanse their mowed crops, as is done by our cultivators; and, may be, spades, shovels, &c. A few sheep, presented to them by Commodore Perry, may be useful in furnishing wool as well as meat; and they can be supported, in some numbers, on the existing grass-lands. Indian corn and Irish potatoes might be beneficially introduced, and also apples, cherries, and the like. And we might derive some advantage also, by transferring to our country their figs, the wild raspberry, the green border-grass, and the many-headed millet; and perhaps their dye-plant.

That the island has been peopled for many ages, is evidenced by the graded roads and deep cuts, the structure and manifest age of the bridges, the antiquity of the villages, the great amount of stone-work in the towns and in the fortresses—some old and dilapidated, some modern and in repair; but, above all, by the incalculable amount of labor done in grading the land for culture. That which is now so perfect, could only have been made so by degrees, like structures reared by the ant or bee. The population must have been, and is now, very considerable; probably 150,000—possibly 200,000. This will not appear beyond credence, when we remember there are nine towns in the north, and twenty-one (or twenty-seven) in the south—*i. e.*, towns with public houses (or kunquas) in them, besides numerous agricultural villages. These towns, including Shui and Napha, probably average 5,000, or 4,000 at the least; and the villages would increase the total to the above numbers of men, women, and children. Nor would these numbers appear to be beyond the sustenance of the island, when we reflect that man alone consumes almost all the produce of the land, which is further assisted by considerable supplies from the surrounding seas. The surface of the island is 400,000 or 500,000 acres, of which at least one-eighth, probably more, is in cultivation. There may be 4,000 or 5,000 acres of rice land, which, at 20 bushels, and with two crops per annum, would reach about 160,000 or 200,000 bushels. There are 5,000 or 6,000 acres in wheat, which, at eight bushels, would be 40,000 or 50,000 bushels. There are some 2,000 acres in sugar-cane; and the remainder, 30,000 or 35,000 acres, in potatoes, beans, taro, &c., &c., with double or triple crops annually, would yield very largely.

During the absence of the squadron in Japan, an effort was made by the officer in charge of the coal depot to raise Irish potatoes, Indian corn, and tomatoes. This trial unfortunately

failed. The soil used was a stiff, tenacious clay. Possibly it was well prepared in the beginning; but very soon after the plants came up, there was a heavy, beating rain, followed by hot, dry weather, which completely consolidated and hardened the earth. This appears never to have been again loosened or pulverized. The result was, that although the potato tops were large and vigorous, yet they yielded no tubers. Upon examination, the main stock had been pressed upon and strangled just below the surface, and was black and dead, together with all the roots below; and additional roots had been thrown out by the stem just at the surface, which alone preserved the strength and verdure of the vines. I regretted this failure, as it would probably deter the inhabitants from repeating the experiment.

The Indian corn was not more successful. From the same causes, it was stunted and dwarfed. In addition, hard winds prostrated it. The yield was a few small ears, imperfectly filled with grains. The interpreter informed me they were acquainted with maize previously, but that hurricanes prevented its cultivation.

The tomatoes succeeded rather better. Beside other unfavorable circumstances, the soil where they were planted was poor, being drawn and shaded by trees. But the vines, though much crowded, were of fair growth; and the fruit, though small, was quite abundant.

This report might be regarded by some as very long, and, for such, a mere enumeration of rice, wheat, sugar, &c., as the produce of the island, would be sufficient. But to give a proper idea of its agriculture, details are necessary; and these have to be as extended for a small country as for a large one, where the management and productions are the same. With this remark, it is respectfully submitted.

D. S. GREEN, *Surgeon U. S. Navy.*

To Commodore M. C. PERRY.

REPORT MADE TO COMMODORE PERRY

ON

THE BOTANY, ETHNOGRAPHY, ETC.,

OF

THE ISLAND OF GREAT LEW CHEW:

BY

CHAS. F. FAHS, M. D.,

ASSISTANT SURGEON U. S. N.,

ATTACHED TO THE U. S. STEAMER SUSQUEHANNA ON THE LATE EXPEDITION TO JAPAN.

REPORT

ON THE

BOTANY, ETHNOGRAPHY, ETC., OF LEW CHEW.

BY C. F. FAHS, ASSISTANT SURGEON U. S. N.

U. S. STEAMER SUSQUEHANNA,
Napha Roads, Lew Chew, February 5, 1854.

SIR: I respectfully submit to you the following report, the result of my observations on the island of Lew Chew, during the late expedition sent out for the purpose of making scientific researches.

In the short time allotted to us, it was of course impossible to make any very minute investigations upon all the subjects to which our attention was directed; and therefore, while this report is not designed to give full information, it is at least hoped that it may be the means of conveying some intelligence, and of contributing a small mite to the general fund of scientific knowledge.

My attention has been mainly directed to botany, and in some measure to ethnography; but I have also, at the same time, examined, to a certain extent, the geology of the island; indeed, it is almost necessary to investigate the latter to pursue the former intelligibly.

The geological features are certainly very striking, and cannot fail to interest any one engaged in the scientific researches of nature. The first peculiarity that strikes the eye, is the great masses of coral rock everywhere abounding, even on the tops of the highest mountains, four and five hundred feet above the level of the sea. The same feature presents itself in nearly every part of the interior of the island, and sometimes forms steep promontories along the sea-coast. The latter, however, as a general rule, is bounded by gneiss rock, extending back several hundred feet from the beach, where it is overlaid by high bluffs of coral limestone; at several places, I also saw strata of slate, though seldom near the sea-coast, which was likewise found more elevated than the gneiss and granite rocks. The latter I observed only at one point of the northwestern coast, and it appeared to be of a soft and inferior quality. The base of the island is undoubtedly composed of gneiss, granite, and slate rocks; and upon this the zoophytes built their mountain masses of coral, which, being completed, were elevated by subterraneous upheaval to their present height; and, in time, by the action of the elements, were disintegrated on the surface, so as to form soil, which, in the ages that have elapsed, became mingled with the decayed vegetable and animal remains; by which means, the present geological features

were produced. The island everywhere is broken up into innumerable rounded mountains and hillocks, at the base of which may often be observed strata of gneiss and slate rocks. The water, nearly everywhere, is soft, and almost entirely free from calcareous matter—a fact showing that the lower strata, through which it passes before being collected into streamlets, are not calcareous, as are some of the rocks which I have already mentioned. That such has been the manner of formation of this land, can scarcely be doubted; and, were it necessary, I might produce the strongest facts to prove my assertions. Having premised these few remarks upon the outlines of the geology, I will at once proceed to what I have to say in reference to the botany of the island.

From the beautiful aspect everywhere presented to the eye of the casual observer, he is led to infer that the variety of the vegetable kingdom is very great. But this idea soon vanishes upon close investigation of all parts; for there is a remarkable sameness pervading nearly the whole country, from north to south, which is only varied now and then, to a small extent, as you approach the gneiss, granite, and slate districts, and at considerable elevations above the sea. The Flora, in some measure, presents a tropical appearance, though not as much as might be expected from the position of the island, as compared with some others having a higher latitude. Some of the trees attain to a large size, and yield useful timber for building and other purposes. The most abundant, and those of largest growth, are several species of pines and the banyan (*ficus Indica*). The former, in many places, form forests of small extent; but the regularity of their arrangement into rows, affords a strong proof that they have been planted by the natives. They are also found growing along most of their highways, forming beautiful avenues to nearly all parts of the island.

Of the order CONIFERÆ, there is the genus *pinus*, having the species *P. mitis* and *P. strobus*. Several species of the genera *abies* and *juniperus*. The banyan (*ficus Indica*) is also found nearly everywhere, sometimes growing singly, sometimes in large groves, and very often it is planted on the tops of walls, when the branches are trimmed down so as to form beautiful square hedges. It does not grow to the same size here that it does in India; although now and then very large trees are found, which send down many epiphytic roots. It does not appear to be held as sacred by the natives, as it is in other Buddhist countries; for it is not found more frequently about their temples and tombs than other trees, neither is more attention paid to its cultivation. A species of *syphonia* is very abundant in the southern portion of the island, and sometimes of large size. In the northern districts it is found only in the villages, forming, when small, a very beautiful hedge. It appears to be of no other use than for ornamental purposes, for which it answers very well on account of its general beauty. The ivory-nut tree I saw at one place quite large and filled with fruit.

Of the EBENACEÆ, there was but one species that I observed—the *diospyros ebenus*, which was of sufficient size to make it of considerable importance. It is not very abundant, and is found principally in the southern and western regions.

Order EUPHORBIACEÆ, two species: Palma Christi (*ricinus communis*) or castor-bean, and boxwood (*buxus sempervirens*). The former grows quite abundantly, and quite large in many places. The use of the bean appears not to be understood by the natives, and therefore they are allowed to fall to the ground and decay when ripe. The boxwood also is very plentiful, particularly in the south, where it forms handsome evergreen hedges.

Of the MOREÆ I saw two species, the *morus rubra* and *nigra*; the latter, occasionally, as a large and handsome tree.

PALMÆ, two species: the cocoanut palm (*cocos nucifera*), and the fan palm (*corypha umbraculifera*); none of them very common, and seldom of large size.

CUPULIFERÆ, two species: the beech (*fagus ferruginea*) and the hazle-nut (*corylus rostrata*); the former occurring occasionally as a large tree, the latter as an undershrub and in hedges.

ROSACEÆ: The peach (*persica vulgaris*), apricot (*armeniaca vulgaris*), plum (*prunus domestica*), bay-laurel (*laurus nobilis*), are the principal. The peach, plum, and apricot are not found in any great abundance, and are only cultivated about the kunquas, and, occasionally, near the houses of the more wealthy people. I observed three species of roses—one of which, the dog-rose (*rosa canina*), was growing wild in the mountains, and the other two were pot plants.

AURANTIACEÆ: Genus *citrus* yields two species—the orange (*citrus vulgaris*) and the lemon (*citrus lemonum*), neither of which, however, is plentiful, and not much attention is paid to them by the natives.

MUSACEÆ: There are several species of this plant, and I am inclined to think they are not cultivated for their fruit, but rather for the fibre which they yield, and that *musa textilis* is the principal one. I think it is this that affords the material out of which the natives manufacture their coarse garments. The banana I never saw growing upon any of the trees, but I am informed there is an inferior variety sold in the markets.

CAMELLIEÆ: This genus affords four varieties of the *japonica*, all of them yielding beautiful flowers, and are carefully attended to on this account by the natives. I found a species of the *camellia*, which, I think, is not described anywhere, and have named it, from its numerous florets, *camellia polyflora*. It grows mostly where the gneiss rocks are found, and is from two to four feet high. It is decandrous; monogynous; sepals and petals 5, divided to near the receptacle; hypogynous; leaves alternate, oval, serrate, and coriaceous. Florets generally growing from the axils of the leaves; corolla of light-pink color.

LEGUMINOSÆ: The tamarind (*tamarindus Indica*), locust tree (*robinia pseud-acacia*), the kidney bean (*phaseolus vulgaris*), two varieties of the pea, white clover (*trifolium repens*), medick (*medicago*) are the principal species. The tamarind and locust are rare; but the beans and peas are among the most abundant articles of cultivation; indeed, the former may be seen in large tracts wherever the eye is cast, and forms one of the principal articles of food for the people; and pigs are also fattened with them.

AQUIFOLIACEÆ: Holly (*ilex montana*) is the only species I observed, and was very rare.

Of DAHLIA, there are several varieties.

CACTACEÆ: Observed four species—two very large and numerous, and two small, and found growing principally upon walls and forming hedges.

CONVOLVULACEÆ: Common morning glory (*convolvulus purpureus* and *C. albus*), sweet potato (*C. batatas*). The latter is cultivated largely over the whole island, and forms one of the chief articles of diet, particularly for the laboring classes. They generally boil a large quantity of them at a time, and make them last for several days, eating them cold.

SOLANACEÆ: Tobacco (*nicotiana tabacum*), bitter sweet (*solanum dulcamara*), and deadly nightshade (*atropa belladonna*;) the latter only found in dry and sunny places. The tobacco is cultivated in the southern portion of the island to a considerable extent, and produces very fine large leaves. It is all, however, very much injured by the manner of curing it which is adopted by the natives. As soon as the plants have attained a proper size, the leaves are stripped and put in the sun for drying, where they are allowed to remain for days exposed to the dew and

rain; so that by the time the process is terminated, all the volatile principles to which it owes its virtues are dissipated, and thereby rendered almost worthless.

MELIACEÆ, only one species—the *melia azedarach*, or pride of India. I saw it once in the fortifications of the old castle of Nagagusko, and once or twice in the open country, and it was of its usual size.

LABIATÆ: Sage (*salvia Claytoni*), cat-mint (*nepeta cataria*), and horehound (*marrubium vulgare*).

LILIACEÆ: Garlic (*allium sativum*), onion (*A. cepa*), leek (*A. porrum*), and a species of lily, growing in many places, which I think is the white lily, but I am not certain.

ARACEÆ: Taro and duckweed (*lemna minor*) are the only ones observed. The former is abundantly cultivated in the marshy lowlands for its tubers. The duckweed is also found in most fresh-water ponds.

PIPERACEÆ: Only one species, the black pepper (*piper niger*), was found, and this quite rare.

CHENOPODIACIÆ: Pigweed (*chenopodium glaucum*), beet (*beta vulgaris*), spinach (*spinacea oleracea*).

ALSINEÆ: Of the chickweed there are three or four different species.

RANUNCULUS: There are several species of the crowfoot, of which the principal is the yellow water crowfoot (*ranunculus Purshii*).

CRUCIFERÆ: Water-cress (*nasturtium officinale*), black mustard (*sinapis nigra*), radish (*raphanus sativus*), cabbage (*brassica oleracea*), and turnip (*brassica rapa*). The radish and turnip grow very large, but are almost insipid, from their rapid growth, which appears to be owing to the large quantity of ammoniacal matter with which the soil is manured.

HELIANTHUS: Jerusalem artichoke (*helianthus tuberosus*) was found cultivated on the western coast, apparently for esculent purposes; common artichoke (*cynara scolymus*) is everywhere abundant along the road-sides.

CICHORACEÆ: Lettuce (*lactuca sativa*), strong-scented lettuce (*L. virosa*).

OXALIS: Two species of this were found—common wood-sorrel (*O. acetosella*) and yellow wood sorrel (*O. stricta*).

VIOLACEÆ: Two species, of which one, the sweet violet, is very common all over the island.

MALVACEÆ: Marshmallow (*althea officinale*) and the hibiscus (*hibiscus militaris*) are the only ones observed; the former in damp and marshy places, the latter around and about houses, where the natives pay great attention to its culture on account of the beauty of its flowers. There are some varieties of hibiscus which are not here mentioned.

CUCURBITACEÆ: Water-melon (*cucurbita citrullus*), the pumpkin (*C. Pepo*), cucumber (*C. sativus*), are all very plenty in the markets.

GRAMINEÆ: Spear-grass (*poa*), several varieties; timothy (*phleum*), millet (*milium effusum*), barley (*hordeum*), wheat (*triticum*), rice (*oryza*), jungle weed (*luzula campestris* and *juncus filiformis*), of several species; sedge-grass.

CYPERACEÆ, of many varieties: sugar-cane (*saccharum officinarum*), bamboo (*bambusa arundinacea*) of two kinds, and the principal ones that came to my notice.

Barley, in the summer, is one of the principal grains planted, and yields very well. Wheat, as a winter grain, is grown in some portions of the island extensively, but does not appear to thrive well—more, however, on account of the manner of cultivation than from any other cause. Rice, here, as in nearly every eastern country, is the chief article of diet; and, consequently, more of it is grown, and its culture more thoroughly understood, than that of any of the *Gramineæ*.

Wherever the eye is cast, it may be seen, even in the smallest valleys between the hills, provided there be any means of watering it. It is, moreover, of a very fine quality, and, when boiled, becomes as white as snow. The jungle and sedgeweed grow very luxuriantly on the eastern shore. Sugar-cane in the south is quite abundant, but it is very small; apparently, on account of the great length of time it is allowed to grow in the same tracts without being transplanted. The land, however, in many places is admirably adapted to its culture, and, by proper care and attention, elegant and valuable sugar-plantations might be formed. Bamboo is as important, if not more so, than the rice to the natives. It serves them in numerous building purposes; as food; enters into the manufacture of their clothing; and, around the houses and along the streets of the villages, forms most beautiful evergreen hedges.

The cryptogamous class of plants is quite large, and affords some of the most handsome trees and shrubs to be found in the island. Of ferns (*filices*) I saw nine species, five of which are beautiful tree-ferns, and grow in great abundance in the northern and southern portions. The other four are small and herbaceous. The *algæ* are found in but few species. *Lichens* are only occasionally seen, and do not afford much variety.

Parasitic plants in some places abound to some extent, but I could pay them but little attention, and shall, therefore, say nothing more in relation to them.

This ends what I have to say of the botany of Lew Chew. It is, of course, a mere outline; but even so far as it extends, the arrangements and classification are not complete, for neither the proper means nor time were at my command to make it so. For the majority of trees and plants, the season had not arrived to allow them to be studied to advantage. Very few of them were flowering, and seldom could any be found containing seeds. In reference to the *Cryptogami* I have said but a very few words, for I had no means of investigating them properly; indeed, they are so numerous as to require the closest attention and a great deal of time to do them anything like justice; and I have, therefore, been content with merely mentioning some of the most striking. During our excursion over the island, I gathered about a hundred different specimens of plants, some of which are noticed in this report, but the majority have not been spoken of. They have been carefully pressed and preserved, and are now in charge of Dr. Morrow.

Having finished what I had to say of the vegetable kingdom, I proceed at once to the animal kingdom, or, in other words, to the ethnography of the Lew Chewans. This part of the study of nature is not less interesting than that which we have just ended; indeed, in some respects it is more so, for it has for its object the investigation of our own species—the natural history of man. The former, was the study of matter merely endowed with organic life; the latter, that possessed not only of this principle, but likewise of animal life, or the life of relation—in other words, of thought, and intelligence, and locomotion; those ennobling endowments which, in a manner, ally man to the Creator of all animate and inanimate matter. While the general characteristics of all races of men are the same, and lead us to the natural conclusion that they had a common origin, there are yet peculiarities sufficiently striking to show that, some time since the creation, some great cause has produced many divisions and alienations, so as to make some naturalists even doubt their original identity. It is my intention, now, to endeavor to trace to its origin a small branch of the great Mongolian division of man—a people hitherto but little known, and scarcely noticed by any writers upon ethnography. The only accounts we have of them are some general remarks made by the English officers who have, from time to

time, visited Lew Chew. It is, therefore, my object in these pages to make some more minute researches—at least so far as my opportunities of observing will permit.

This island appears to be peopled by two distinct races, judging from physical characteristics; and so it proves upon close investigation, for the one is Japanese, and the other Lew Chewan—properly so called. The peculiarity, though decisive, is not such as to make me doubt their origin in common; for I believe, and shall show, that they must have sprung from the same branch. There are not wanting, however, some persons who think they are closely allied to the Tagalla race. The latter are spread over the Philippine, Marianne, and other Pacific islands, and are sprung from the Malayan stock of eastern nations. They likewise speak a dialect of the Malay language. There is no affinity between the Lew Chew, Malay, and Tagalla languages; neither are the relations of their physical peculiarities such as to favor the above opinion. Their manners, customs, and religion are also very different. In some of the expeditions of exploration over the island, some remains of the ancient Hindoo idolatry were discovered, and some surmises were formed that possibly these people were a colony of Indians. Whether these are the relics of a people once existing here, previous to the present races, or the last vestiges of a religion of one of the races of this time, which has been supplanted by the wide-spreading Buddhism, is not very easily solved. That a colony of Hindoos may have, in remote times, emigrated to this country, and become lost among the natives in the course of ages, is not totally improbable; but I nevertheless doubt it, and rather incline to the idea that the religion was introduced either directly by priests coming from India as missionaries, or by means of the commercial intercourse which has in all ages existed between eastern nations. There are no other indications to prove such an emigration as has just been supposed; the language has nothing in its construction to give it any support, neither are the customs and habits of the people similar. Near the temples of idolatry, already mentioned, are some very ancient tombs, which the natives say contain the remains of devils. They, no doubt, were the people who worshipped in these sanctuaries; and their rites were such as to be condemned, and looked upon as devotions to the devil.

We now come to trace the relation existing between the Lew Chewans and Japanese, and hope to show conclusively that they are branches of the same stock. The former are somewhat more effeminate, and perhaps not quite as intelligent; but this is owing entirely to local causes. They have never had any intercourse with foreigners, of any account; they live in a mild and temperate climate; their wants are few; and nature supplies them abundantly, for the least exertion on their part; so that their ingenuity has never been taxed to invent means of subsistence, or to compete with rivals in commerce and politics. These causes have produced the slight differences of physical development observed between the people. They have the same height; their features are nearly alike; the head in both is oval, and approaches near that of the European; the frontal bones rounded, and forehead high; the face is oval, and the general expression mild; the eyes large and animated, though not as much so in the Lew Chewan as in the Japanese; the irides in both dark-brown or black; lashes long; eyebrows rather heavy and arched. The long, angular form of the internal canthus is seldom observed in either. The nose in most persons is rather handsome and well proportioned to the rest of the body; the root of it is not depressed, as in the Chinese and Malays, neither are the nostrils as widely dilated. The cheek-bones are not very prominent; and consequently there is not the broad, square face, which is so striking in most eastern people. The mouth is rather large; the teeth broad, and perfectly white; the chin of a neat form, and always has a strong black beard—

another distinguishing feature between them and the Malays and Chinese, for neither of the latter have any of sufficient growth to be mentioned. The other parts of the body have the same close relation to each other that has just been noticed. But it is not in the physical development and relation that we are to look for the stringent proof of the identity of origin; for sometimes the most dissimilar in external appearance can be traced by other means to a common stock. It is by the study of languages and dialects that we obtain more information and light upon the subject of ethnography than by any other means at our command. History and tradition sometimes afford a clue; but when minute information is required, they both fail us, and we are obliged again to fall back to philology to lead us through the labyrinth in which we find ourselves when endeavoring to unravel the complicated relationship existing among the innumerable nations and tribes of our species. To meet this desideratum, I have paid as much attention to the Lew Chew language as it was possible during our short stay, and have a sufficient number of words to form a short vocabulary, and have carefully compared it with the same terms in the Japanese tongue. I shall now proceed to give it in a tabular form:

	Lew Chewan.	Japanese.		Lew Chewan.	Japanese.
Water	mizee	mi-dsoo	Rice	kumee	ko-me
Tea	chaa	ts-ya	Sweet-potato	karaemu	ka-ran-da-imo
Sun	fee	fi	Pan	nudee	ko-na-be
Fire	fiee	fi	Wine	sakee	sa-kee
Moon	sichee	ts-ki	Tobacco	tobako	ta-ba-ko
Star	huzee	ho-si	Basket-chair	kagoo	ka-go
Wind	hadzee	ka-zee	Silver	nanzee	si-ro-goone
Chicken	nuatuee	ni-wa-ts-ri	Iron	titzee	tets'
Egg	tomague	to-ma-go	Cap	hachee machee	ba-oosi
Sea	oomee	oo-mi	Looking-glass	kagamee	ka-ga-mi
Eye	mee	me	Book	soomuzee	s'yo-mots
Hand	tee	te	Chair	yee	k'yokf'rokf
Nose	hanaa	ha-na	Stone	czaa	i'-si
Mouth	koochee	koo-tse	Swine	bootaa	boo-ta
Tree	kee	ki			

It will at once be seen, upon an examination of this comparative vocabulary, that two-thirds at least of the words are almost exactly the same; the only difference is the orthography, which, in some instances, is slightly different; but this is a matter of no consequence, so long as the sounds are alike. The spelling of the words of a language, which is written in unknown characters, is discretionary with the particular writers, who have the privilege of choosing such letters in the construction of syllables as seem to convey to their ear the most correct sounds.

Of the words that are not alike, a strong affinity can yet be found between them, and they almost always have the same roots, only varied in the main by local circumstances.

The few that do not agree in any respect, and which cannot be traced to a common derivation, I think most probably have been introduced by the Chinese, with whom they have been, for hundreds of years, associated in commerce. The above vocabulary has been collected in a miscellaneous manner, and, short as it is, will show the strong relation between the two languages, and demonstrate conclusively that they are dialects of the same tongue. The facts and arguments here presented I think are sufficient to convince the candid inquirer, and to solve the problem under consideration, or, in other words, that the Japanese and Lew Chewans had a common origin.

Having finished this division of the subject, I shall proceed to an account of their manners, customs, religion, dress, and other points of interest. I have already spoken of their physical peculiarities, in comparing them with the Japanese; but there are still some observations which it is necessary to mention. The chin, as already stated, is covered with a jet-black beard, and, in aged men, is white as snow, which is always in the higher classes permitted to grow to a great length, and is looked upon as a most honorable custom. The lower orders, or coolies, seldom allow it to grow long, being obliged, I think, to cut it by law. The moustaches are also worn by most men, but never attain any great length. The head is covered with a fine growth of jet-black hair; the crown is shaven to the scalp, and the locks, on the side and back of the head, are combed up to the top, where it is formed into a knot, which conceals the shaved part. In this they wear two metallic pins, which determine the rank of the person, according to the quality of the metal. The hair is always well oiled, which gives it a glossy and shining appearance. The ears are small, and rest close to the head; the neck is thin and rather long; the chest generally wide, and well developed; the pelvis in proportion to the rest of the body. Their costume is neat and well adapted to the climate, consisting of a long, loose robe, coming to the ankles, with very wide sleeves, and is fastened around the body with a girdle of silk or grass cloth; attached to the latter is a small pouch for tobacco and a smoke-pipe, neither of which is ever absent. The head-covering is a peculiar cylindrical cap, called by the natives hachee-machee, which appears to be made of two bands crossing each other in a "figure of eight" form. The higher classes wear a white stocking, and when they walk out have over this a straw sandal, which is always taken off before going into a house. The laboring classes always go barefooted. It is a remark, made by nearly all foreigners who have visited Lew Chew, that there are none of the people deformed; this must be attributed to their temperate habits, and the healthy climate in which they live.

The women are of small stature, and those that have come to our notice have no pretensions to beauty; but, of course, it would not be fair to draw general conclusions from the lower classes, the only ones allowed to walk out from their houses. The few of the higher order who have been seen are described as rather handsome and quite fair in complexion. Their faces are inclined to be more square, and their noses more depressed than in the men. They have their hair put up very much like the men, only the topknot is a little more in front, and to one side of the head. Their dress, also, is considerably like that of the men—a long, loose robe, coming to the ankles, but is not fastened by a girdle. They also wear sandals and stockings, like the men. As already observed, they scarcely ever leave their houses to walk out, and, when they meet the men on the streets, are scarcely noticed by them; a mark of disrespect which accords badly with their mild and amiable deportment when met by foreigners. They do not hold a high social position—in many instances, being the mere slaves of their husbands; differing very much in this respect from the Japanese, among whom they hold a much higher rank.

The government of the Lew Chewans appears to be an absolute despotism; nominally a dependency of China, but really tributary to a Japanese prince, (Prince of Satsima,) by whom it was conquered more than three centuries ago, and still is held in subjection. The policy and exclusive laws exist here as in Japan, and the people, therefore, are not permitted to hold any intercourse with foreigners. Numerous spies are always about to report any infraction of the laws. When we first arrived, the people ran away as soon as we came near them; and if any one walked through the streets of the city, they were cleared in a minute, and all the doors

locked. Several thousand persons selling and buying in the markets would desert their stores merely at the sight of any one. Their custom, formerly, was to supply vessels coming in with everything they required, but they would take no remuneration, and would tell them to leave. Most of these prejudices have been in a measure overcome, and they now are about as fond of the dollar as most people, and do not hesitate to dispose of their marketing. I do not believe that this fear is created by the foreigners, but rather that it is the result of the absolute and despotic laws operating upon them, and forbidding them to hold the slightest communication with strangers. The lower classes appear to be in a state of slavery, and are kept under the closest surveillance; the upper classes lead a most indolent life, and are apparently dependent entirely upon the former for all their wants.

They are a very polite people, and treat each other with the utmost courtesy at all times. When meeting, they close the two hands, and, putting them to the forehead, make a most profound bow; if to a person of high rank, they nearly fall to the ground. These marks of civility are extended to foreigners.

Here, as in all eastern countries, the Buddhist religion prevails; in some instances engrafted upon other idolatries. The people, however, appear to be indifferent to it, and do not seem to have much veneration for it. There are not many temples, and seldom are there seen any worshippers in them. Notwithstanding this apparent indifference, the bonzes or priests hold a higher position than they do in China, and consequently are treated with more respect, and are not looked upon as worthless and degraded as soon as they leave the precincts of the temples. Though their social position here is better than in China, it is by no means enviable, and they are the same bald-headed mendicants that they are there.

The greatest honor and respect are paid to the dead; they are put in coffins, and are carefully interred in large well-built stone vaults or tombs for a period of seven years, until all the flesh has decayed from the bones; the latter are then collected and carefully deposited in stone jars, which are placed upon shelves in the vaults. Poor people put the bones of the dead in earthern jars, and, generally having no tombs, place them in the crevices of rocks, where they are sometimes found exposed, being broken by accident. The remains of the dead are followed to the tomb by a large number of relations and friends. The body is carried in a coffin in a sitting posture. The women who accompany it as mourners wear long white veils over their heads and faces. Regular visits are, from time to time, paid by the relatives of the deceased, and offerings are made upon the tomb.

The literature is principally obtained from China and Japan, and many of the *literati* and professional men go to the former country to finish their education. The physicians all go there to pursue their studies, and remain several years, and then return prepared to combat the enemy.

They have no commerce of any note; it consists in a few Chinese and Japanese junks each year. They interchange such articles of clothing and provision as they require and can spare. They have no money currency of their own, but the Chinese *cash* supplies this in some measure.

The arts and manufactures are but little known by them, except some of the more simple, and these are in the most primitive state. The manufacture of sugar, a coarse kind of grass cloth, and an inferior kind of lacquered ware, are the only ones of any note. The sugar, when finished, is merely the juice of the cane pressed out by means of a mill, evaporated to a proper consistency, without any clarification; it is, therefore, very crude and dark, and almost unfit for use. The manufacture of salt must not be overlooked, as it is carried on quite extensively,

and forms an article of commerce. Large salt flats are found along the Bay of Napha, which produces occasionally considerable quantities, though of an inferior quality. Painting and sculpture have received but little attention; the former appears to be less understood than the latter, and it is very rare to find any paintings. Specimens of sculpture are seen about the tombs and temples, and now and then images of their gods; but they are all rude and without finish. Architecture is rather more advanced, as is seen by the old castles and the arched bridges found in different parts of the island. The bridges thrown over the creeks are all built of stone, and have one arch, and they are built upon correct principles. The walls of the castles and fortifications are really worthy of notice; for they are almost Herculean when the means are considered by which they were built. The old castle of Nagagusko is surrounded by a wall nearly a quarter of a mile square, from twenty to fifty feet high, and from ten to twenty feet in thickness. The stones used in its construction are sometimes large enough to weigh at least a ton, and must have required some more powerful means to elevate them than can at this time be discovered. The archways through them present a grand appearance, and show much skill in their construction. The houses are all built of wood, and generally covered with tiles; all around them are verandahs, and these are closed by means of blinds constructed of bamboo lattice. The floors are covered with handsome thick mats, upon which the natives sit in their peculiar style. The only other furniture in the rooms are some stools, sometimes a table, and tea-pots and cups. The houses of the poor are built of bamboo, without floors or any other comforts. In the cities, every house is surrounded by a stone wall or bamboo hedge. The highways are excellent, paved with flat stones or macadamized, and extend all over the island. Every twelve miles has a rest-house, or kung-qua, for the accommodation of travellers. They are neater than most private houses, and always have several relays of chair-coolies.

They have no arms or ammunition that we have seen; not even spears nor bows and arrows. The fortifications show no indications of having been built for the arts of modern warfare. We know that wars have been carried on amongst them in times past; but what the weapons of destruction were, is unknown.

This ends the second part of my report, and I have to regret that it could not have been made more concise; but, from the large amount of material which required notice, I found it impossible to do justice to the subject in fewer pages.

Very respectfully, your obedient servant,

CHAS. F. FAHS,
Assistant Surgeon U. S. Navy.

Commodore M. C. PERRY,
Commanding U. S. naval forces, East India, China, and Japan seas.

REPORT MADE TO COMMODORE PERRY

OF

A GEOLOGICAL EXPLORATION, ETC.,

OF

THE ISLAND OF GREAT LEW CHEW:

BY

REV. GEORGE JONES, M. A.,

CHAPLAIN U. S. N.,

ATTACHED TO THE UNITED STATES STEAM FRIGATE MISSISSIPPI.

REPORT

ON A

GEOLOGICAL EXPLORATION OF LEW CHEW.

BY REV. GEORGE JONES, CHAPLAIN U. S. N.

UNITED STATES STEAMER MISSISSIPPI,

Lew Chew, February 6, 1854.

SIR: In making the geological report of our recent explorations in Lew Chew, it may be well first to recapitulate, briefly, some remarks made on a former occasion, respecting the geology of the southern portion of the island.

Commencing at the southern end, we have uniformly an aluminous rock, sometimes pretty compact, and sometimes running into shell; from it comes all the clay or common soil of this part of Lew Chew. This rock or clay is pierced and overlaid by limestone of a most singular character, generally in belts, running N. about 60° E., and rising into pinnacled ridges, so much like ruins of ancient buildings, as to deceive the eye at the distance of only a few hundred feet. This portion of the island is, by far, the richest and best cultivated, and owes its fertility, doubtless, to the admixture of lime with the argillaceous soil. I will notice the limestone rock again, by-and-by.

About seventeen miles north of Napha, a very coarse gneiss begins to make its appearance, and soon becomes the prevalent rock, overhanging the sea-shore in bluffs of most contorted stratification, or running out in great ledges of jagged forms; the vegetation here changes, and the surface of the island rises into mountains so unfavorable to cultivation that the whole region is abandoned to pines and other forest-trees, except where the ravines open to the sea. The limestone rock is, however, seen yet occasionally, running slantingly across the island, in broken ridges, as before.

At forty miles from Napha, on the western shore, we come to a small extent of granite hills, piercing through the gneiss. It is the only granite that I have seen on the island; and, though having all the characteristics of that rock, is remarkable for being so soft as to be easily cut with a knife. It is white, and, when it is broken, the black mica is seen lying on the surface of the fracture, in regular elongated hexagons, finely contrasted with the white. Beyond this, the gneiss begins to be mixed up with strata of clay-slate, to which it at length entirely gives place; and at Farnigi, fifty-five miles north from Napha, on the promontory of Fort Melville, we came to a coarse conglomerate, which gave us the first promise of a possibility of coal. The conglomerate soon passed into a coarse, and then into a finer sandstone; and, in this region,

we were again in a good rich soil, and among grounds in the highest state of cultivation, with broad patches of flat land among the hills. The slate and sandstone continued as we advanced northwardly, and at seven miles from Farnigi, or sixty-two from Napha, we came to some outcroppings of the black bituminous slate, usually accompanying coal.

Three miles farther on, at Shah Nehatu, or "Shah anchorage," to which our attention had been particularly directed by Lieutenant Whiting, the outcropping of this black bituminous slate was on a larger scale, and of so decided a character as to give reasons for hoping for good coal beneath. While saying this, however, I wish to guard against too sanguine or certain expectations.

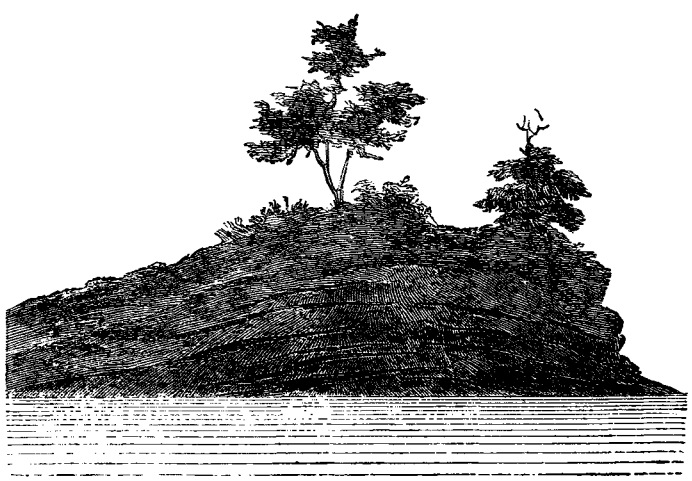
We found near the water's edge two bluffs, each about ten feet in height, with thin strata of this coal-slate cropping out in them, alternating sometimes with seams of iron-stone, in which were also nodules of the same. The lower strata of coal-slate were thicker than the upper, and near the water-line (mid-tide) they were eight inches in thickness, as well as of a better quality than above. Attached to this is a chart* of the bay, together with a sketch of the principal bluff. We also coasted all around the little island on which Shah village is situated, and found there the bituminous slate also cropping out near the water-line.

This slate does not pretend to the name of coal, but is what in coal districts at home generally immediately overlies the coal, and, in coal-mines, forms the roof of the galleries or mines. It will not burn by itself, but ignites and gives out heat when used with good coal; and, in Europe, is often so employed for purposes of economy.

In our own case, for steam navigation, it would be useless; and it is worthy of notice only as an incentive to further examinations, which may lead to the discovery of good coal. The island extends about twenty-five miles north of this, and, although the dip of these strata was northwardly (about 15° with the horizon), yet there is encouragement to give the remainder of it a careful exploration.

With regard to these sketches, please to understand that I pretend to no skill in drawing; but my own experience in reading has often shown me that a very coarse and indifferent sketch, provided it be accurate, is better than none at all.

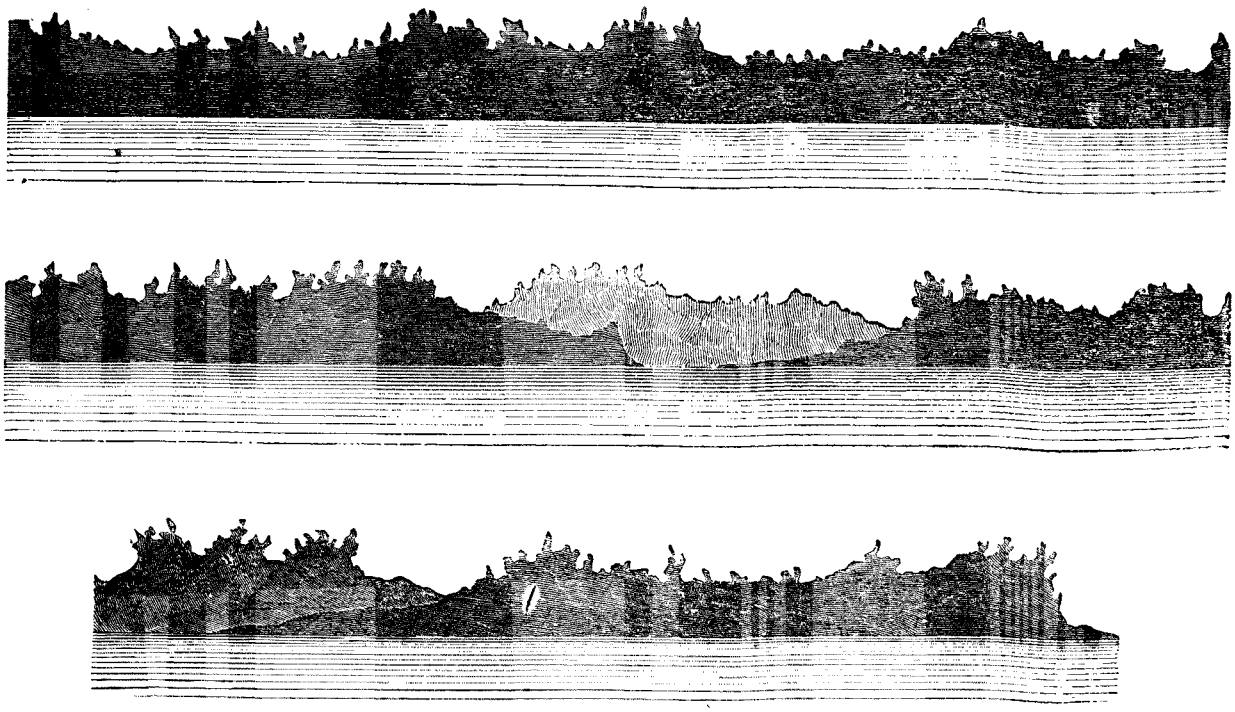
No. 1.



No. 1 is a view of the coal bluff at Shah bay.

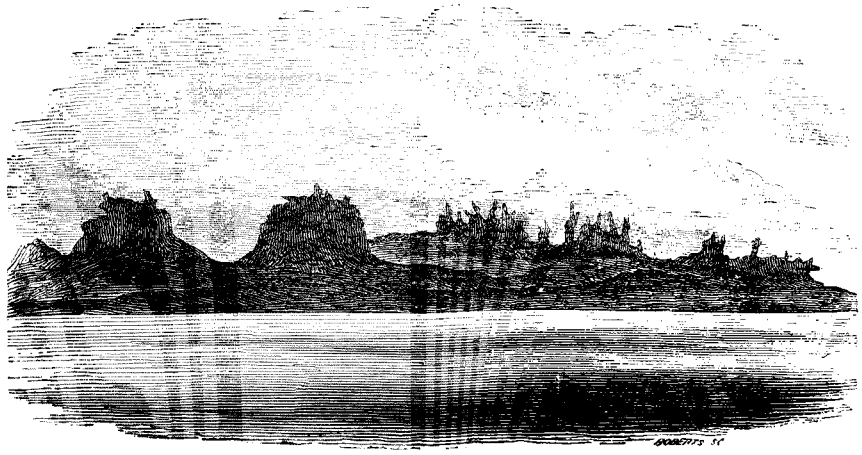
* For chart see atlas.

No. 2.



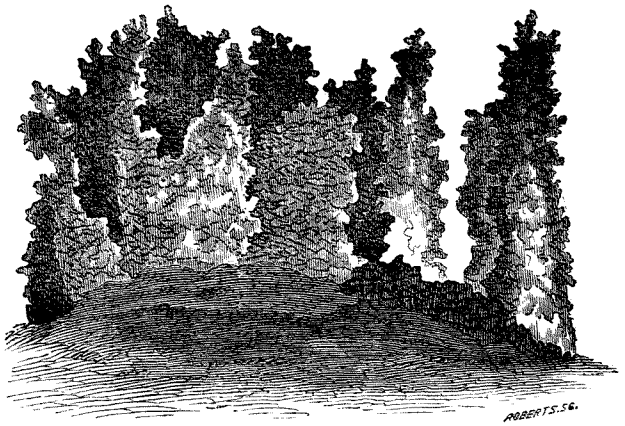
No. 2 is a view of this most singular limestone rock, as it stretches in a narrow ridge across the island, in a course about N. 60° E., commencing twelve miles from Napha. This view is from its northwest side; and, strange as it is, may be depended on for accuracy, as it was carefully made. This rock is highly crystalline, is full of marine petrefactions (generally small), and is vesicular to an extraordinary degree. It seems as if, when the rock was yet pasty, a vast quantity of gas had been disengaged, which not only caused these vesicles, but also forced its way through the superincumbent earth; thus creating sharp, pinnacle-shaped vacancies above, into which moulds the puffed-up rock was forced by the gas. The surface is generally blackened by time; but a fresh fracture shows a yellowish-white color. Many of the sharp pinnacles, when struck, give a ringing sound.

No. 3.



No. 3 is a view of the same kind of rock at Abbey Point.

No. 4.



No 4 is a close view of a portion of the same cluster.

Respectfully, your obedient servant,

GEO. JONES, *Chaplain U. S. Navy.*

Commodore M. C. PERRY, *U. S. N.*,

Commanding U. S. naval forces, East India, China, and Japan seas.

REPORT MADE TO COMMODORE PERRY

OF

AN EXPLORATION OF GREAT LEW CHEW:

BY

REV. GEORGE JONES, M. A.,

CHAPLAIN U. S. N.,

ATTACHED TO THE UNITED STATES STEAM FRIGATE MISSISSIPPI.

REPORT

OF

AN EXPLORATION OF GREAT LEW CHEW.

BY REV. GEORGE JONES, CHAPLAIN U. S. N.

U. S. STEAMER MISSISSIPPI,
Bay of Simoda, Japan, May 9, 1854.

SIR: My historical account of the expedition for exploring the interior of Lew Chew, in January and February last, must be from memory; as, until a few days since, I was under the impression that another of our company had taken notes for this purpose, and had sent in a report.

Our party consisted of five officers—namely, Dr. Green, as reporter on diseases and agriculture; Mr. Heine, artist; Dr. Fahs, as botanist; Dr. Morrow, collector in botany and agriculture; and myself, as geologist, and, by your order, as leader of the company; together with two seamen as cooks and baggage guards. My geological report has already been given in.

We landed at eight o'clock, at Tumai, where the native authorities had promised, the day previous, that at this time we should find baggage-carriers and bearers for ourselves, but where not the slightest indication of anything of the kind was now to be seen. However, when the officials who gathered around us found that we were determined to go, they immediately set to work to provide the means, and by ten o'clock we were fully accommodated and ready for a start.

The main object of the expedition was to examine some indications of coal at Shah bay, towards the northern end of the island; and, knowing that the journey would have to be a very rapid one, Dr. Green and myself had brought Chinese wicker chairs, to be slung between bamboo poles, so that we might be carried when tired with walking; and a very excellent relief they proved to be. The others of the party, though warned to make similar provision, had not done so, and started on foot. Our American feelings, at first, revolted against using our fellow-men so much like beasts of burden; but we soon became reconciled, on observing how much like a joke they themselves treated it, and how cheerfully and merrily they trotted on. Indeed, our whole company, at the outset, was a very joyous one. The weather, though on the 31st of January, was like that of a fine May day at home; our spirits were up and buoyant; the Lew Chewans, about thirty in number, seemed to feel that so large a gathering made quite a holyday for them, and followed on, chattering and laughing, and joking with everybody they met, especially with the women, who, Lew Chew fashion, started like frighted deer from the roads, and hid themselves as we approached.

The kung-qua* towns, which occur at distances of about twelve miles along the main thoroughfares of the island, are stations also for exchanging baggage-carriers and their official directors; and, on our arrival at those places, we always found new ones already prepared and ready to take us up. One man, however, Usi-Sati, kept with us the whole way as interpreter and guide, till on the third day he broke down, and had to be left behind.

Our route, on the first day of our journey, (Tuesday,) was mainly along the western side of the island, and was over the same road that we had returned by on our former journey; and the fine bridges, picturesque ravines, and rich cultivation of the first part of the way, together with the rough mountain scenery further to the north, I presume have all been described in Mr. Taylor's report.

We were hurrying on for the kung-qua of Peko, thirty miles from our starting-point, and night overtook us while we were still five or six miles distant from it; but at one of the villages we found our interpreter, who had preceded us, now waiting, with a good provision of torches (dry reeds tied in long bundles) and torch-bearers; and, with their help, we got on safely, sometimes by the sea-shore, sometimes by broken and tortuous paths in the interior. Our party came dropping into the kung-qua between eight and nine o'clock, the American part of it completely exhausted by the long and rapid journey; and, although our Lew Chew officials presently had eggs and live chickens provided for us, we voted, unanimously, that we were too tired to get or wait for a regular supper; and so, after a hasty extempore one, we tumbled on the thickly-matted floor, and gave rest to our exhausted limbs.

On Wednesday our course was still as in our former return journey, until about twelve o'clock, when we arrived at the village of Necumma, and here Mr. Heine and Dr. Fahs separated from the main party; our mode of travelling being too rapid to admit of sketching or careful botanizing, they here crossed the island, and returned by another route.

The southern portion of Lew Chew is gently undulating, and under high cultivation; then, going northwardly, we came to a very mountainous region, with specks of fields and villages only where the short mountain gorges open to the sea. Along the edge of this mountain-country our road still continued, after leaving Necumma, mostly on the winding beach, till about four o'clock, when we came to a region of a totally different character. We were now at the angle whence projects that long promontory, which, stretching out westward and then to the north, and curving round, forms, with its adjoining islands, the large bay, and, within that, the snug little harbor called Port Melville. This promontory itself is mountainous; but on the main island the mountains now sunk into hills, often sharp and conical, but cultivated to the summits, while every inch of the valleys between was turned to advantage in rice and other grains, the whole presenting a scene of active husbandry and great agricultural beauty. At the angle on the sea-shore we found the very pretty town of Nugah, with several junks at anchor in front. The town is beautiful, with green openings, over which, and along its streets, noble trees were casting their shadows; while the streets themselves, as is the case in most of the Lew Chew towns, were remarkable for cleanliness and neatness. We were taken to the kung-qua, where fresh bearers were found waiting; and as the populace, in their curiosity to see the strangers, crowded a little beyond the limits allowed them by Lew Chew etiquette, the island officials, by sound blows upon the backs of the intruders, soon restored them to their places; the blows being received with a patience and equanimity very wonderful to Americans.

* A kung-qua is a public building for the accommodation of travellers. Mr. Taylor has, no doubt, described them in his report of our journey in June of last year.

Our road from this village, crossing the promontory, was a very good one, overhung mostly by an avenue of pines, and lying through a rich and varied country, now beautifully tinted by the declining sun, while the softness and quiet of eventide were descending on the scene. Just before sunset we arrived at Farnigi, a kung-qua town perched upon the hills; and as it was expected that our journey would again extend into the night, torches and torch-bearers were here again provided to light us on our way. Proceeding on, we reached, about two miles from Farnigi, the waters on the north side of the promontory; and here our guide was taking us to the left, under a misapprehension that we wished to go to the town of Port Melville, six miles towards the west. We corrected his mistake; and as he declared that the road northwardly was so rough as utterly to forbid night travelling, and that there was no kung-qua in that direction nearer than Shah bay, we were reluctantly compelled to return to Farnigi; our reluctance softened, however, by the very agreeable impression just made on us by the clean kung-qua of that place, so inviting to our wearied and jaded frames. We were, indeed, very glad to stop and rest.

We this evening adopted a system, which we followed afterwards, and found very useful through the rest of this journey—namely, to cook enough provision in the evening to last for twenty-four hours. In the morning, a few minutes' warming for breakfast had it ready for use; and, at noon, we were ready for lunch whenever a green spot by a rivulet might offer itself. Thus, on Thursday, having roused our party at the earliest dawn, we had our breakfast, and had packed up and were ready for a start before the sun was up.

Passing once more to the Port Melville shores, our road curved around them to the northward, leading us for four or five miles over a fruitful and level country; but it then entered upon a region composed entirely of almost precipitous hills and ravines, where not a house or cultivated spot was to be seen; and this lasted till, at 10 o'clock, we reached Shah bay—this morning's journey having been the most fatiguing in the whole route. We had to walk nearly the whole distance, and our whole progress was by zigzags, up or down precipices, or by clambering around rocky headlands, when the tide would admit. This broken region of hills, given up to a stunted growth of trees, probably extends quite across the island, as does the mountainous country further to the south. Shah bay, which opened upon us at last, is a pretty spot; and if it had depth enough at its entrance, would be one of the finest harbors in the world. There is a village on an island at its mouth, and another, with a kung-qua, on its northern side.

The natives accommodated us with a boat, with which we visited the coal-bluffs (about which I have made a separate report), and then coasted around the island at the entrance, in search of further indications of coal. At the kung-qua we tried to hire a boat to transport us back to Melville bay, our jaded bodies revolting against a return by the morning's road; but a storm was beginning to send its warnings ahead, and the boatmen refused to venture out. So at 2, P. M., we started on our return, and reached Farnigi after sunset, having travelled the last six miles in heavy wind with rain.

Friday, February 3.—Our distance from the ships forbade any unnecessary indulgence in rest, and we were up at break of day, and soon ready for a start; having, however, to leave our guide and interpreter behind, as he had broken down in consequence of yesterday's fatigue and exposure to the rain. Dr. Green administered to him, and left behind some refreshing aliment for his use. A new guide had been provided, and we allowed him to choose his own way back. From Farnigi he struck at once across the island, slantingly, and our road soon entered a gorge

among the hills, down which a stream was brawling and foaming; the hills, though they soon became exceedingly steep, were cultivated, and (what was a new feature in Lew Chew cultivation) were crossed by *stockade fences*, intended, as we understood, to prevent the intrusion of animals—probably wild boars. We followed the stream upward, and its rocky bed at last became our only road; but, though rough to our feet, it led up a ravine where the eye was charmed by wild vegetation of the most luxuriant kind. The ferns were especially beautiful and in great variety; for this plant, which loves moisture and heat, found in this sheltered spot, and amid the drippings of the hill-sides, every advantage for its growth. The tree-ferns, often 25 or 30 feet high, and from 6 to 8 inches in diameter, were especially remarkable, forming, with their feathery tops, a canopy to each tree of 15 or 18 feet in width, of exquisite gracefulness and beauty. The resemblance between the marks of their fronds on the stalks or trunks, and those on the large fossil trunks in the strata over or below coal-beds in America, is very striking, though the latter show a colossal growth unknown in these modern times. I procured specimens of all these ferns, having, in our hurry, to pluck them almost at a run; and I tied them up carefully at the next kung-qua, enough to be a load for a man; but, on arriving at the ship, they were found to be so withered that we had to throw them away.

We reached, by-and-by, the dividing ridge, and descended into a fruitful valley, extending down to a town on the eastern side of the island. Leaving this town, we came soon after to a large indentation or bay, with a village on its shore; and here we were taken into ferry-boats, consisting of two canoes lashed side by side, and so were transported to the opposite shore. The hills here were wild and rugged, but were enlivened by great abundance of azaleas, their heavy clusters of large red flowers sprinkled thickly among the tropical foliage. Soon after crossing this inlet, we came again to a gently undulating and cultivated region, which grew richer and more pleasing to the eye, till, as darkness was setting in, we reached the welcomed kung-qua of Ching, which was to me an old acquaintance, having accommodated us the third night out in our journey in the summer.

Mr. Taylor has, doubtless, described this village, and also the road which we followed in the morning (Saturday) from Ching to the head of Barrow's bay; and, therefore, I will only say that, having started very early, we arrived about ten at the very pretty town on the hill just south of the head of that bay. Here we struck again on a road new to us, but old to the Lew Chewans; for it is the main thoroughfare between Shui and Barrow's bay; and is a road that, in our country, would be called handsome, and, for travel like that of Lew Chew, a good one. It is about twenty feet wide, passing in its whole length of about eighteen miles along an avenue of pines, and is kept carefully clean and in good repair. Where the pines are growing old, new ones are planted, to succeed them when these decay. The road also traverses a charming country, and, being generally on elevated though level ground, commands views, in all directions, of scenery where the picturesque is combined with the productive in the highest degree. A very curious spectacle, as of a ruined city extending for miles across the country, and in sight for a long time in our journey, is given in my geological report. Some time during the day (I forget exactly when), we came to a spot where the road widened out, with a grove of venerable trees on each side; and here were stone steps across, with a lofty triple gateway, as at the entrance of Shui, except that this was of wood.

We stopped to lunch at the kung-qua of Vicoo; changed our bearers, who had come the whole way from Ching, for a new set—a merry, but rather lazy one; struck off, about four o'clock, from the main road into by-paths leading to Tumai, and, at dusk, reached the boat-landing

there, gratified by our journey, but glad to be so near our ship-homes once more. Dr. Fahs and Mr. Heine had reached the ships about noon of the same day; they have given in their reports.

During the latter part of this hurried journey of one hundred and twenty-five miles in five days, those of our party who had not started provided with chairs, had to be furnished with the native "cago"—in this instance, a light platform suspended to a pole, and clasping the platform underneath. It is so small and shallow, that the person carried has to sit huddled up, with his head and neck turned to one side of the pole; and he holds on as well as he can. It is a light fragile thing, and is very uncomfortable, but to a tired-out man is still a welcome relief.

We found the natives, through the whole journey, very kind and friendly; somewhat shy—not naturally, but compelled to be so by our attendant officials; and never losing their good nature and cheerfulness, though the exactions from our rapid movements must have often put both to the test.

Each evening, when we arrived at the kung-qua, we made out a list of things needed for cooking; and, on handing this to the interpreter, they were furnished as promptly as possible, he keeping account and sending in his bill of expenses at the close of the journey. Such of the ship's provisions as we did not need, together with the cotton cloth which you furnished us for distribution, were given out, according to your orders, along the road, and were thankfully received. Some of the cloth we gave to the interpreter, whose services were very valuable as long as he kept with us. I was glad to hear on Monday that he arrived safely at home.

We stopped and examined for the gunpowder manufactory at the village mentioned by Lieutenant Whiting, but could not find any; and the natives professed entire ignorance of the existence of any such thing.

Respectfully, your obedient servant,

GEO. JONES,

Chaplain U. S. Navy.

Commodore M. C. PERRY, *U. S. N.*,

Commanding U. S. Naval Forces, East India, China, and Japan Seas.

REPORT MADE TO COMMODORE PERRY

UPON

THE EXPLORATION OF PEEL ISLAND:

BY

BAYARD TAYLOR, Esq.,

TEMPORARILY ATTACHED TO THE U. S. STEAM FRIGATE SUSQUEHANNAH.

REPORT

UPON

THE EXPLORATION OF PEEL ISLAND.

BY BAYARD TAYLOR, Esq.

U. S. Steamer Susquehannah,
June 18, 1853.

Sir: I have the honor to submit to you, in accordance with your instructions, the following report of an exploration of Peel Island, in the Bonin group:

It was arranged between Dr. Fahs and myself, that he should land at the northwestern extremity of Port Lloyd, and explore the ranges of hills which surround that bay, comprising the northern half of the island; while my party, landing at the watering-place, at the southeastern corner of the bay, should strike thence across the island to its southern extremity. I subjoin a sketch map* of the island, showing the route I took, and the topography of the interior, so far as my observations extended.

The party under my charge consisted of Mr. Heine, artist; Mr. Boardman, midshipman; Mr. Lawrence, assistant engineer; Mr. Hampton, purser's steward; Smith, marine; Dennis Terry, seaman; and a Chinese coolie. We left the ship at 5 o'clock on Wednesday morning, the 15th instant, and were put ashore on the beach near Castle Rock. At this point two ravines descend into the bay—one from the eastward, the other from the southward. The latter was pointed out to me by one of the settlers as affording the easiest access into the interior of the island. We found a hut near the beach, inhabited by a Kanaka, who refused to accompany me as guide, but pointed out a small foot-path, which he said led across the hills to another Kanaka settlement, about three miles distant.

We plunged at once into a wilderness of dense vegetation, which afforded a faint type of our experience for the rest of the day. The trail, so faint as hardly to be discerned, was steep and slippery; the plants were wet with a heavy dew, and the wild parasitic vines, which hung from tree to tree, continually caught us in their toils. The trees were principally palm, among which I noticed the true sago-palm, from which the sago of commerce is made. Further up, I found the *areca*, or betel-nut palm, and another variety resembling the cocoanut. The soil was a rich dark-red loam, composed of disintegrated trap rock and vegetable mould. The same soil prevails all over the island, except on the northern shore of Port Lloyd, where it is mixed with a greyish

* See map in Vol. I, page 197.

sand and gravel. Trap rock, of a coarse texture, appeared frequently on the steeper declivities of the ridge; and a variety of the *hibiscus*, with a large flower of a dull orange hue, grew abundantly in its crevices. The ground was in many places covered with a shower of white blossoms, which I afterwards found had dropped from a tree about thirty feet high, with a small glossy leaf, thick foliage, and a stout smooth trunk of a greyish color.

The forest became more dense as we reached the summit of the ridge. The thick luxuriant crowns of the palms above our heads kept out every ray of the sun, and, combined with the creepers swinging from trunk to trunk, made a shade so impervious, that it was impossible to see more than fifteen or twenty yards in any direction. The multitude of large brown land-crabs that scampered out of our path was truly amazing. The ground was alive with them in the moist beds of watercourses, and the largest were fully six inches in breadth.

The top of the ridge, an undulating tract furrowed with deep gullies, was about a mile and a half in breadth, after which we came upon a descent at so sharp an angle that we were obliged to swing ourselves down from tree to tree, to avoid tumbling into the bottom of the ravine. We found ourselves in a wild dell, completely shut in by precipitous mountains, every foot of whose sides, except the walls of naked rock on either hand, was covered with the richest foliage. A stream of good water trickled over the rocky bottom.

This dell opened to the southward into a narrow valley, which showed signs of being inhabited. Crossing the stream, we came upon a patch of *taro*, the plants of which were the highest and most luxuriant I ever saw. They were fully six feet high, and so drenched with the night's dew that we were soon wet to the skin. Finding the forest beyond impracticable, on account of its steepness and density, we followed the course of the stream, and soon reached an open space covered with patches of sweet potato, taro, pumpkins, tobacco, sugar-cane, and the *sida*, or Indian gooseberry, growing with unrivalled strength and luxuriance. Two huts, thatched with palm-leaves, stood in the centre of the valley. Finding them both deserted, though exhibiting evidences of having been occupied that morning, we fired our guns, the report of which was answered by a hail. Presently a South-sea Islander, in a coarse cotton shirt and pantaloons, and with one-half of his face tattooed a light-blue, made his appearance. He said he was a native of Nuka-hiva, in the Marquesas, and named "Judge." He conducted us around the corner of the mountain, where the valley opened westward to the sea. The stream became a creek deep enough for canoes, in one of which the Judge had just arrived, bringing a large turtle with him. He appeared to be in good circumstances, since, in addition to his hut, his plantation, and his turtles, he had four dogs, and as many pigs, of the same lean, black breed as we found in Lew Chew. The banks of the stream were studded with a shrub about 12 feet high, and covered with large blossoms of a chrome-yellow color, to which he gave the name of "trao."

"Judge" stated that the southern extremity of the island was three or four miles distant. There was no path, and he refused to accompany us as guide, but sent his boy for the owner of the other hut, who knew the way over the hills. The latter was a tawny native of Otaheite, and spoke very little English. He confessed that he knew the way, and was familiar with the wild-boar haunts, but refused to go unless the Judge accompanied him. To this the latter finally consented, and we set off again.

The valley was bounded on the south by high mountains, which appeared to us impassable, on account of the lines of mural rock, rising one above another to their very summits. The main valley, however, was not that into which we had first descended, but ran away to the east-

ward, whence the stream came down a long ravine between two peaks. The natives informed us that the sea was about half a mile distant, from which I should judge the entire length of the valley to be a mile and a quarter, with a breadth of a quarter of a mile at its base, expanding at its junction with its northern branch, and then gradually diminishing until it loses itself in the ravine. Its bed, therefore, comprises from 120 to 140 acres of the richest vegetable mould. All the vegetables planted by the settlers were unequalled of their kind, although no labor had been expended on their cultivation, beyond the mere planting. I saw several lemons in the Judge's hut, which he informed me were produced in the valley. The tobacco was five feet in height, and had the same pale-green, velvety leaves, which characterizes the famous tobacco of Latakich. The stream of water is sweet and pure, and the supply is constant in all seasons.

We proceeded in an E.S.E. direction into the ravine, which we ascended, following the watercourse. Large rounded masses of trap rock lay in its bed; and still farther we came upon nearly perpendicular cliffs of greenstone, from ten to thirty feet in height. This was the only place where I found the terraced form of the trap rock observed by Dr. Fahs on the northern side of Port Lloyd. In some places, beds of a coarse conglomerate, which had frequently an appearance of sandstone, rested upon the trap. But this evidently belonged to the same formation, since the only rock I found on the island was trap, running into greenstone occasionally, and taking a basaltic character in the vicinity of the sea, as in the caverns of the Southern Head, at the entrance of Port Lloyd.

The forest was very dense, and, from the moist, unctuous nature of the soil, our progress was exceedingly toilsome. The Otaheitan informed us we were in the neighborhood of wild boars, and we crept forward in silence. Two of the party, who were in the rear, started a boar, and shot at him, but unsuccessfully. After leaving the watercourse, we climbed the southern side of the ravine, by clinging to the roots of trees and the tough cordage of parasitic vines.

The party became scattered, owing to the absence of any path, and the impossibility of seeing more than ten yards in advance. Among the palms, I noticed here the *latina*, with the broad fan-leaves and leaf-stems, six to eight feet in length, the jagged edges of which wounded our hands. There was also a variety of the *pandanus*, with a single straight trunk, from near the base of which projected a number of shoots or props, which became roots after they reached the soil. There were frequently upwards of twenty or thirty of them, forming a conical basis to the slender column, which rose about fifteen feet in height, crowned with its leafy capital. We found several plants of a species of *morus*, or mulberry, with fruit six inches in length. The tree-ferns were of remarkable size and beauty. Some were upwards of fifteen feet high, with leaves eight to ten feet in length. In fact, the entire vegetation of the island is of a thoroughly tropical character, embracing many plants which are generally found in the neighborhood of the equator. Its dissimilarity in this respect to that of Lew Chew, which is one degree further south, must be owing to the fact of its being within the range of the north Pacific trade-winds, and without the influence of the cold currents and winds which sweep the coast of China.

While halting on the top of a ridge, the dogs commenced barking in a ravine on the other side. Two of the party, following the sound, succeeded in shooting a boar, about a year old, and of a dark brownish-grey color, with a long snout, resembling a Chinese hog. One of the party, overcome by the laborious nature of the journey, was taken sick at this juncture; but, as the Otaheitan stated that we were but two miles from the southern extremity of the island,

he determined to go on. In another half hour we had crossed the dividing ridge, and began to descend the other side. Through an opening in the foliage, I caught a glimpse of the sea, and climbed a tree to obtain a lookout. I found that we were on the brow of a very steep ridge, about fifteen hundred feet in height, looking down upon a small bay opening to the southeast. Beyond the southern promontory of the bay the sea was again visible, with the group of Bailly's Islands in the distance, a little west of south. The mountains descended in precipices to the water, so that access was impossible, except near the head of the bay, where two abrupt ravines, or rather chasms, showed a speck of sandy beach at their meeting.

The Otaheitan professed to know the way, and set off, creeping slowly down the steep, we following, until a sudden light broke through the leaves, and we found ourselves on the brink of a precipice, the height of which we could not estimate, though I afterwards saw that it must have been near two hundred feet. From its base, the mountain sloped away so steeply to the brink of other precipices below, that we seemed to swing in the air, suspended over the great depth which intervened between us and the sea. The guide, it was evident, had taken us too far to the right, and it was necessary partly to retrace our steps, in order to avoid the precipice. We clung to the strong grass which grew on the brink, and thus crept along for about two hundred yards, over a place where the least impetus would have sent us headlong hundreds of feet below. On this part of the mountain I found a shrub with a dark, glossy leaf, which diffused a powerful balsamic odor. In Klaproth's translation of the Japanese account of the Bonin Islands, it is said that a species of sandal-wood is found there, and it is possible that this shrub may have been mistaken for it. It appeared to me and to Dr. Fahs, who also found it, to be a variety of the *laurus*.

Finally attaining a point where the precipice ceased, we commenced going downward at an angle of about sixty degrees. The soil was so slippery, and the vines and horny leaves of the palms hung so low, that the best way of descending was to lie flat on one's back, and slide down until brought up by a thicket too dense to get through. With an infinite deal of labor we at last reached the ravine, or chasm, where the worst of our toils commenced. The ravine fell, by a succession of rocky steps, from ten to forty and fifty feet in perpendicular height, down which we clambered with hands and feet, often trusting the soundness of our bones, if not our very lives, to the frail branch of a tree, or to the firmness of a root dangling from the brink. As from the top of a tower, we looked down on the beach, lying at our very feet, and seemingly to be reached by a single leap, though still far below. Down, down we went into the depths of the chasm, in constant fear of reaching a wall which we could not pass, until, at the junction of another ravine, we came upon the hewn stump of a tree, and heard the roar of the surf at a few yards' distance. When I looked back, and saw from below the steep down which we had descended, I could scarcely believe it possible.

The guides called the place "Southeast Bay." They stated that it was frequently visited by whalers for wood and water, which accounts for the stump of a tree smoothly cut off with a heavy axe, and the presence of a patch of tomatoes, which we found growing in a wild state along the bank of the stream. The fruit was about the size of a cherry, and very fresh and palatable. The bay was not more than a quarter of a mile in depth, and enclosed, except at the spot we reached, by perpendicular rocks. As it was noon by this time, and we had reached the limit of our journey, I halted for two hours, to allow all hands time to bathe, rest, and take dinner. The guides said that there was no other way of returning except the ravine by which we came. We all shrunk from the idea, but there was no alternative. We climbed the preci-

pices again, in the heat of the afternoon, with not a breath of air stirring. The labor was so severe that Mr. Hampton became sick, and two other gentlemen of the party began to show signs of exhaustion. This obliged me to halt frequently, and we did not reach the native huts in the valley until six o'clock in the evening.

Instead of returning to the watering-place by the route we had come, I employed the "Judge" to conduct me over the hills to the Kanaka settlement, at the southern extremity of Port Lloyd. We were obliged to ascend the intervening ridge at an angle of near fifty degrees. Under the thick clusters of sago-palms was a dense undergrowth of fern, in which we could gain no foothold, and were continually falling flat on our faces. After gaining the summit, we passed over an undulating tract for a mile or more, and came upon the western slope of the island, overlooking Southern Head, and the entrance to Fort Lloyd. I now saw that a deep, picturesque bight made in below the Head, to the mouth of the valley we had left, and that probably the shorter and more usual route of the natives between the two settlements was by water. The sides of the hills we traversed were covered with a deep, coarse grass, waist-high, and so thick that we fairly waded through it. Fortunately for us, there are no snakes on the island.

It was dark when we reached the Kanaka huts, but, by climbing a cliff, and firing a few volleys, we succeeded in obtaining a boat from the ship. We were delayed a short time, waiting for one of the party who remained behind from exhaustion, and returned on board about 10 o'clock.

Notwithstanding the unsurpassed fertility of the island, the luxuriance of its vegetation, and the existence of a constant supply of the best water, there is very little variety in the animals and insects found upon it. I noticed but three or four species of birds—one of which was a crow; another a wood-bird, of a mottled-brown color, not unlike the robin; and a third, a dove. Mr. Heine has since shot upon Stapleton Island another variety of the dove, as large as the Chinese pheasant. We observed no quadrupeds except the wild hogs, which are sprung from some animals placed upon the island prior to its settlement. The iguana is said to exist, but we found no traces of it. Snakes and venomous reptiles of all kinds are apparently unknown. The coast, however, abounds with fish, among which are many rare and curious varieties. During the summer the settlers catch a great quantity of turtles, which they salt down for their winter stores.

According to the account given by the oldest residents, the climate is equable and exceedingly healthy. The Flora of the island struck me as being of more than ordinary interest; but as the flowering season of many of the plants and trees was just over, we were unable to procure many serviceable specimens.

Very respectfully, your obedient servant,

BAYARD TAYLOR.

Commodore M. C. PERRY, *U. S. N.*,

Commanding U. S. Naval Forces, East India, China, and Japan seas.

REPORT MADE TO COMMODORE PERRY

OF

AN EXPLORATION OF PEEL ISLAND:

BY

CHAS. F. FAHS, M. D.,

ASSISTANT SURGEON U. S. N.,

ATTACHED TO THE UNITED STATES STEAM FRIGATE SUSQUEHANNAH.

REPORT

OF

AN EXPLORATION OF PEEL ISLAND.

BY C. F. FAHS, ASSISTANT SURGEON U S. N.

U. S. STEAMER SUSQUEHANNAH,
June 18, 1853.

SIR: I have the honor of reporting the result of the observations on Peel Island, made by me and the party under my charge, on the subjects submitted by you for investigation. The part of the island explored by us is the northern half, or that extending from Square Rock, in a circular direction, to a line running from a point about one mile to the westward of the Paps to the eastern coast of Fitton's bay. We ascended all the highest peaks; took their measurement; examined their formation, vegetation, and other objects of interest; descended into most of the narrow valleys; penetrated the thickest jungle; crossed the sloping plains on the mountain-sides, and carefully noted their soil, mineral and vegetable productions, sources of water, and fitness for cultivation. Taking a general view of the island from the bay, or any other point, the impression is created that the whole is so rugged and rocky that it cannot be rendered fit for any use; but this is entirely removed after carefully exploring every part of it, and you are not only convinced that it can be cultivated, but that it is capable of supporting a large population. The small portions that have been tilled by the people living here, show that the ground is highly fertile and productive. It is true, only the plains on the bay have, as yet, been cultivated; but there is no reason for doubting that great portions of the remainder will be equally productive, for the soil is nearly the same everywhere.

Near the entrance of Port Lloyd, a plain about a quarter of a mile wide commences, and extends in a northeasterly direction one mile. The bed of it is an ancient coral formation resting on trap-rock; the soil is several feet thick, consisting of a dark vegetable mould, intermixed with fine sand of disintegrated coral and marine shells. The greater portion is under cultivation, and yields abundant harvests of whatever is planted, with the least possible toil. From this plain or valley the mountains gradually rise in the form of a circle; at some parts the ascent is sudden for 40 or 50 feet, giving the appearance of terraces; then, again, plains from a quarter to half a mile wide, sloping towards the summits, are formed until within 40 or 50 feet of the highest peaks. On the northern and northwestern sides the mountain terminates in a very abrupt and precipitous ledge of trap-rock, which is washed by the waves of the sea. The first peak on the northwest I have, for the convenience of description, named A; it consists of trap-rock,

and is rounded down as if it had been exposed to the attrition of the sea or some other cause it is 576 feet high from the level of the sea. From it, a high ridge called the Backbone extends to the head of the bay, and then branches out in several directions on the southern part of the island. Half a mile to the northeast is another peak (B), but it is not more than 250 feet high; its formation and general appearance are similar to the last. Near the most northeastern point of the island is a third peak (C), which rises rather more abruptly than the other two, to the height of 800 feet; it is covered almost to its summit with jungle-weed and a thick undergrowth of trees. From it a mountain ridge extends in an easterly direction towards Buckland island, and is the boundary to a plain which begins at the base of the peaks just described, and extending to the sea on the north. The plains sloping towards Port Lloyd are traversed at several places by deep ravines, which, during rainy weather, serve as outlets to the mountain-streams, but are entirely dry during the summer months. Most of them contain large conglomerate boulders, which at first sight appear to be sandstone, but on a close investigation prove to be several kinds of trap-rock. They, no doubt, were rolled down from the broken peaks, and were worn round by the attrition of the water and sand to which they have for ages been exposed. That portion of the island which is between the head of the bay and Buckland straits is not more than about one mile wide, and differs in some respects from that already noticed; it is not so fertile, the vegetation is less luxuriant, and the rocks present a different character. Near the central part is what I conceive to be the crater of an ancient and extinct volcano, as many facts tend to demonstrate. The form of the surrounding hills is peculiar; large masses of scoriæ and cinders are found all around; along the sea are beds of hardened lava resting upon each other, occasionally interstratified with layers of sand, scoriæ, and cinders. The trees are small and stunted, and the ground in many places barren and unproductive, in consequence of the soil being thin and readily dried out during long droughts. After this, small valleys, plains, and hills of various heights, extend to the east and north, when the island again becomes much wider. The two peaks called the Paps here rise, the one to 1,000, and the other to 1,100 feet above the level of the sea. On the one side, at the base, is a deep valley, which is about a mile in length and half a mile in breadth, and a stream of running water passes through the middle of it. On the other or north side is a very deep ravine, with precipitous trap-rocks rising up hundreds of feet, and at the bottom precipices 20 and 30 feet high, over which a small stream of water falls. On the southeast of the mountains large sloping plains are formed, which extend nearly to Fitton's bay, and are covered with beautiful forests of palms.

The whole island is, undoubtedly, of volcanic origin, as all the geological facts which can be collected tend to prove, and its general conformation and lines of hills give strong evidence. Ancient craters at this time can readily be traced; trap-rock forms its basis, and also the highest peaks; basaltic dikes passing through beds of sand; scoriæ and cinders, amygdaloid and greenstone, in considerable quantities, are found at many places; and I have succeeded in tracing strata of old lava along the sea-coast, and other parts where deep sections of rock were exposed. In a ravine, running from peak C, we discovered a sulphur spring, the odor and taste of which gave the strongest proof that it was highly impregnated with hydro-sulphuric gas. Iron pyrites (bisulphuret of iron) in abundance are also found at several places. The vegetation of this island is such as is found in nearly all volcanic countries under similar latitudes. Its luxuriance appears to be in consequence of the mineral ingredients, iron, potash, soda, lime, alumina, and silica, being in such proportions as to supply its demands.

From careful observation, I am inclined to believe that Port Lloyd was at one time the crater of an active volcano, which threw up the surrounding line of hills; and that the present entrance was a deep fissure in the side of the cone, through which streams of lava were poured to the bottom of the sea; and, when it had acquired a sufficient depth, the water came in, and has gradually been filling up its original central depth by deposit and coral formation. The deep excavations on the sides, of which I have already spoken, were, no doubt, the craters of smaller volcanoes on the declivity of the large one, as is seen in active volcanoes at this time. In this manner, I conceive, the hills more distant from the grand crater had their origin.

The soil is mostly vegetable mould, which has been forming for thousands of years, from the gradual decomposition of a most luxuriant vegetation; intermixed with it is the detritus resulting from the disintegration of trap-rocks, which for ages have been exposed to the influence of the elements, and which has been washed into the plains and valleys, until it has acquired a thickness, in many places, of five and six feet. At several places, near the summit of the peaks, it is of a reddish color, looking not very unlike iron-clay; this was particularly the case on the smaller Paps.

The springs in the northern half of the island are very few—only two that run constantly and contain fresh and palatable water. There are several others in the valleys; but the water is so brackish that it cannot be used, or they only exist during the rainy months. Most of the houses on the beach are supplied from wells, which generally are not more than ten or twelve feet deep. The only incidental sources of water are the heavy rains, which in some seasons fall and fill up the deep pools or caverns worn in the bottoms of the ravines, where it continues fresh and fit for use many weeks, by being covered by thick overhanging palms.

The Flora is tropical, and perhaps as beautiful as can be found under similar latitudes. In the valleys, and along the sea-beach, numerous handsome green trees are growing, called *crumeno* by the people living here. It attains a large size; the trunk is thick and short; bark grey, not very thick; grain twisted and tough; the foliage very dense; leaves large and oval, smooth, and of a bright-green color; petioles short, the leaves growing in thick clusters or whorls around the branches; and from the terminal ends of the latter the peduncles grow out, bearing beautiful clusters of white rotate, polyandrous, monogynous flowers. Ascending the mountain sides, dense forests of palms are seen, growing nearly to the highest summits. They stand so close together, that but few of them become of a very large size, and they also prevent the growth of nearly all other vegetation. There are six species on the island, of which the fan palm (*corypha umbracaulifera*) is by far the most numerous. Many of these trees seen growing in ravines had their roots above ground five and six feet, looking like branches growing downwards. A variety of *fraxinus* was at several places discovered, which had grown more than two feet thick, and was covered with several kinds of parasites. There is another species of large tree, in some respects resembling the dogwood, growing abundantly on the mountain. The trunk is two and three feet thick; grain twisted; bark grey and thin; leaves oval, petiolate, green color; flowers rotate; calyx greenish, polyandrous and monogynous. The largest of all trees found on any of the Bonins is the mulberry (*morus*), which in some instances is thirteen and fourteen feet in circumference. The other principal trees and plants seen, were one species of laurus, juniper, boxwood, tree-fern, banana, orange, pineapple, whortleberry (*vaccinieæ*), *vitaceæ*, and several varieties of undergrowth. The juniper, in a few instances, was found quite large, but generally it was small and dwarfish, particularly on the sides of the Paps. The *laurus camphora* was nowhere seen, although it was carefully sought after. The tree-ferns (*filices*) were

several times seen ten and twelve feet high. Lichens, mosses (*musci*), and other cryptogamous plants were found in abundance. There are very few kinds of grasses, and most of these are unfit for pasturage. The jungle-weed in uncultivated tracts grows so dense, that it excludes everything else. The sedge-weed (*cyperaceæ*) also grows very luxuriantly; mercury (*acalypha*), sorrel (*oxalis stricta*), convolvulus, —— ——? (a native term), and a few others, are the most important. The vegetables grown are sweet potatoes, Irish potatoes, yams, taro, radishes, onions, turnips, beans, peas, pumpkins, melons, &c. The sweet potato yields very abundantly, and grows to an enormous size. The Irish potato has been planted but a short time, and little is known respecting it. Indian corn is cultivated with much success. Nothing, however, appears to thrive better than the sugar-cane; it grows to a very large size, and requires scarcely any labor. There is no doubt that large portions of the island might be planted with it to great advantage.

Very few species of animals are found here, or on any other island of the Bonin group, and most of these have been imported since they have been inhabited by foreigners. The first hogs were put on Peel Island in the year 1827, from a whaler that was anchored near the entrance of Port Lloyd. Many of them have since run wild, and are hunted like other wild animals on the mountains. The goat, originally brought here tame, has also gone wild. On Stapleton Island, it is reported, there are six or seven thousand at present. The settlers have plenty of chickens, ducks, geese, and turkeys, but there is a great propensity in them all to free themselves from the restraints of domestic life, and to return to their original state. The only other birds in a state of nature are a few kinds of finches, crows, hawks (*milvus*), the terragra, sandpipers, and pigeons. There are no reptiles of any kind, except a small lizard (*lacerta*), tortoises (*chiloniæ*), and the iguana. The tortoise is of very large size, and is found in the greatest abundance.

The fisheries are excellent along the coasts of all the Bonin Islands, and the fish, perhaps, as good as can be found anywhere in the East. It is unnecessary to enter into the species that are found here, as they are too numerous, and it would, moreover, require considerable time to ascertain what they are.

Accompanying this report are several drawings* of trees, plants, flowers, and landscapes, made by Mr. May and Mr. Portman, to whom, and also to Mr. Hibbert, I am indebted for much aid during my laborious travel in exploring the island. In concluding these remarks, I have only to observe, that they are not intended to convey more than a general idea of the subjects investigated; and, if I have succeeded in this, I shall consider myself amply rewarded.

Very respectfully, your obedient servant,

CHARLES F. FAHS.

Commodore M. C. PERRY,

Commanding U. S. naval forces, East India, China, and Japan Seas.

* Not published.

REPORT MADE TO COMMODORE PERRY

UPON

THE AGRICULTURE OF JAPAN:

BY

DANIEL S. GREEN, M. D.,

SURGEON U. S. N.,

ATTACHED TO THE UNITED STATES STEAM FRIGATE MISSISSIPPI.

REPORT

UPON

THE AGRICULTURE OF JAPAN.

BY DANIEL S. GREEN, SURGEON U. S. N.

THE aspect of Japan is mountainous. In the portions visited by the squadron, at least three-fourths, perhaps seven-eighths, of the surface may be occupied by mountains or very steep hills. None of these seem to be cultivated—that is, in grain or food crops—at least, to any extent; on the other hand, the intervales or bottoms are in constant cultivation, and produce two crops annually—one of winter and one of summer grain. The bottoms are naturally level plains, or are made so artificially. They are very rich, and their fertility is aided by irrigation; facilities for which are afforded by streams from every vale. The more accessible parts of the sides of hills, as they recede from the plains, are also graded, often levelled; and, when water cannot be procured, are planted with such grain or vegetables as require no more moisture than that supplied by rains alone. But, whenever irrigation can be secured, there rice is also planted.

On looking over the western shore of the bay of Yedo, in the months of February and March, from the deck of a ship, one will notice a range of high hills or bluffs rising directly from the water's edge, and scarcely interrupted by even small and narrow vales. Beyond these is a rolling upland, more or less broken, bounded by a range of not very elevated mountains; and still beyond these, covered with a glistening canopy of snow, rises, in solitary grandeur, the cone of Mount Fusi, to the altitude of some 12,000 feet. This is a most conspicuous and beautiful object from almost every point, for sixty or eighty miles around.

At this early season, the margin of the bay is clothed with verdure; and the camellia japonica, here twenty or thirty feet in height, and the apricot or plum, are robed in blossom.

The face of the hills, except some gentle slopes, is mostly planted in pine. The plantations, however, are not nearly equal to some at the Cape of Good Hope, nor such as we may imagine in the highlands of Scotland. They are arranged in slips of various widths, running up and down the hill, as if in possession of different proprietors. The trees are seen in all stages of age and growth, are not preserved in any good order, but are obviously set out in rows, and appear to be cut systematically for timber or fuel. And here it may be observed, that a very large portion of the labor of the country must be employed in these plantations, in cutting and preparing the lumber and fuel, and in transporting them to supply the wants of the numerous cities and towns or villages throughout the land. The necessity for timber is very great, as the vast majority of houses are constructed of wood. The people profess to be able to build them of stone, if they wished; but they prefer wood, as being more secure during the earthquakes,

to which their country is so much subject. And this profession is, no doubt, true, from the specimens of beautiful workmanship that we saw in stone. We observed very extensive quarries, close by Simoda, that must have been recently worked, and perhaps are still open. The stone appears to be used for foundations, piers, &c.

Where not occupied by woods, the slopes are mostly set in a tall, coarse, strong grass (*arundo*), which was being cut during the winter and carefully made into bundles. No animal could think of eating this; it is, however, of great value, being used in thatching. A very considerable business is carried on in furnishing the cities with this article. Many houses are covered with tile, (and beautiful tile they have, too;) but by far the larger portion are thatched. It would be difficult to find a better material, and the thatching is very neatly executed.

On the remaining slopes, many patches of bright-yellow flowers may be seen. These are the blossoms of a kind of turnip, or cole, with either none or a very diminutive bulb at the root. Small lots of it are also sometimes cultivated in the richer bottoms. It is grown for the sake of its oil, expressed from the seeds, and this oil is used in lamps. The Japanese have candles, but of inferior quality and in insufficient quantities; and as, from their customs, they require many lights, this plant is of great importance to them; insomuch that, when they were requested to furnish the tops as a vegetable for the squadron, in a hygienic point of view, they declined, upon the plea of its great necessity to themselves.

Upon the uplands, extending back from the brow of the bluffs, I unfortunately had no means of making observations. But, by those who went there, I was told that the same patches of turnip or cole were noticed, and also fields of wheat. By the way, let it be remarked here, that fields in Japan are very different things from what they are in America. They may extend from a half or a whole acre up to several hundreds; these latter, however, being made up of any number of the former in juxtaposition. Each laborer, or family, seems to have a small allotment, or holding, divided from those adjoining by only a furrow, or even an imaginary line drawn from one landmark to another. These allotments are all very small, being from a half up to one or two acres, apparently.

While the climate was thus mild near the water, and the vegetation thus forward, the range of mountains beyond the uplands was covered with snow, which, from time to time, came down quite low towards the bay, but would speedily melt away.

I had an opportunity of landing at only one of the villages or bottoms on this bay, and that was adjoining the treaty-house, Yokuhama, about ten miles below the city of Yedo. The soil was a beautiful black mould, with some clay and gravel intermixed. It was in a high state of tillage, and had upon it principally cereal crops, with some cole or turnips, and other vegetables. The young wheat here was more thrifty and luxuriant than I saw anywhere else, or perhaps than I ever saw before. Like the other crops, it was drilled. The distance between the rows was about twelve inches. It had been recently worked with hoes or rakes, though I saw no rakes in the country, and probably also recently manured with liquid manure, or *guile*. The earth was light and well pulverized, and drawn towards the plants into small ridges. As already stated, the plants were in the most flourishing and vigorous growth. This lot of wheat (and the cole) was the only one I saw thus cultivated in Japan. The liquid manure is very conveniently situated for distribution, being held in vats or pits, dug at suitable intervals on the sides of paths and roads. These are sections of a tolerably wide and deep ditch, and are covered by light thatched roofs, which exclude too much heat and restrain excessive evaporation.

Upon our arrival at Simoda, in April, (where most of my observations were made,) the wheat

and barley were advancing toward muturity; and upon our return thither, from Hakodadi, in June, were being gathered or harvested. These crops are drilled, either upon level surfaces or upon narrow beds, from four to six feet wide, to suit the soil as to moisture. When sown upon beds, the drills appeared to be invariably across them instead of lengthwise. Besides the bottom-lands being completely occupied by these crops, there were numerous patches or terraces upon the sides of the hills, whose summits, too, were occasionally occupied by them. In the latter places the soil is a red clay, but poor, and the crops thin—not producing more than from 6 to 10 bushels per acre. In the plains, even, the yield is not very large, being, on an average, not beyond fifteen bushels. As to the produce of barley, I was not so well able to judge. The wheat is of two kinds, the awned and the awnless, but both red. The barley is also of at least two varieties—one, with a very short but very thick head (club-headed), and with short awns; the other, with a long, rather slender head, and with long awns; but both sorts are six-round. I noticed oats, but not as a crop. They had sprung up here and there accidentally.

Harvest-time seemed not to be a period of any unusual excitement or jubilee; each occupier having so small a portion as to be able to manage it readily by himself. There is no scythe or cradle, unless the little blade with a handle, about one foot long, may be regarded as a miniature scythe. It is not unlike a brier-hook, and with it the grain is reaped, close to the ground, without a straw being missed. This is done by men, and the straw is tied into bundles. These are carried to the homestead, or to some convenient place in the field, arranged for threshing out the grain. I saw this operation only once, and cannot answer for its being general. Upon the side of a hill an excavation had been made in the solid but easily worked rock, of about 7 feet by 10, and some 5 or 6 feet in depth. This room opened upon the face of the hill by a door at one angle, and was covered by thatched roofing. At the inner end there was a heavy beam of wood resting upon supports, with a brief space between it and the wall. A young woman was beating the sheaves of wheat upon or over this beam, and the grain was thus separated from the straw; another woman brought the straw in, and passed the straw out. Here the laborers were protected from the sun, and the grain from rain. As primitive as this may appear, the winnowing process is equally so. Many persons, chiefly females, were observed from the ship winnowing grain upon the beach, by pouring it from baskets held above the head, and allowing the sea-breeze to blow the chaff away towards the land. Small fanning-mills were also seen; but these will be mentioned more particularly presently. Other modes of separating grain from the straw are believed to exist, but I did not see the machinery of one of these in motion. Was it something of a trip-flail?

Barley is hummelled by beaters and mortars, worked either by hand or by water, and also by mills. The hand-machine is similar to the homony-beater of our native Indians; the pestle, however, being at right angles to the handle, instead of being in a direct line with it. The water contrivance is a trip-hammer, like one used in our country for pounding corn, &c., for feed for animals. In a shed, near a small stream, a beam of wood is suspended upon pivots near its middle, with a pestle arranged at one end for working in a mortar, and the other end is scooped into the form of a spoon. The water being turned upon this end, it descends so far as to allow the water to escape, whereupon the pestle falls heavily into the mortar, and this see-saw motion keeps up a continuous pounding. In the United States, a bucket is used with a tipping bottom instead of the spoon-like cavity. The mills are in small houses, which are divided into convenient compartments. The machinery is simple, and is worked by a large undershot or breast-wheel. The axle of this extends into the house, and upon it are a series of

levers, which, as it revolves, elevate a number of pestles, by catching under projections upon them; as these fall, they beat the grain, operating as in our old oil-mills. From time to time, as the beating proceeds, a pestle is thrown out of gear, and the grain is taken from the mortars, to be passed through a small fan or winnowing machine. It is again placed in the mortar, and this process is repeated as often as necessary, until it is thoroughly cleaned. The fan is very small, not being more than eighteen inches or two feet in length, and the same in height, and about six to nine inches in width. The barley, however, is neatly cleaned, and passes out into a bag at one side of the machine. Our expedition took out some of the best modern wheat-fans, as presents; but it is a fact, I believe, that we derived them originally from the east—China in particular. What an interval and what progress between the primitive and the developed manifestation of this implement! We also took out an improved cotton-gin, but we found domestic ones already in use. These, as I was informed by those who saw them, operated by smooth cylinders; and as the cotton was drawn through between them, the seed fell to one side, and the staple came out unbroken. A similar machine may have been tried in our own country.

There are several of the above mills in the neighborhood of Simoda, and, when the squadron arrived there, there was quite a large one in process of construction, with its race finished. But our treaty had a material influence upon it, causing the frame to be quickly taken down, and the race to be filled.

Rice is hulled after the manner of hummelling barley; of rice, there are many varieties grown. These are of every shade of color, from light yellow to red and brown, and black or deep purple. In a walk of half a mile, about the last of September, I have gathered samples of ten or fifteen shades, or upwards; and these grow, each to itself, of one uniform color, in separate lots or parcels, and not intermixed—thus indicating distinct varieties. Another difference is in the rice being awned or awnless; and this without reference to color, some of either being apparently of every shade; whether difference of color, depending upon the external covering, indicates any difference in the grain within, I am unable to state. But there are two kinds of prepared rice exhibited for sale—one, white, as with us; another, reddish or brownish, apparently dependent upon a film or membrane left upon the grain after the removal of the hull. The former was not noticed as having any peculiarity of flavor or otherwise, whereas the latter was unlike anything we had met with before. After boiling, it was somewhat adhesive, glutinous, as it were—not starchy; and in taste it was compared by some to grits, by others to barley, and was by many preferred to the other. It seemed to me that this would be more nutritious than ordinary rice; but it may be that all rice would possess the above properties if prepared in the same manner—*i. e.* by leaving the before-mentioned pellicle upon it.

In regard to its culture, little need be said after the details given for Lew Chew and China. The use of irrigation, together with grading of ground, the opening of drains for transmitting water to all parts of the plains, the transplanting from seed-beds, &c., being similar in all. By the way, it is sown broadcast in seed-beds, which are covered by shallow water, and the seed may be seen lying upon the earth, through this water. When drawn, the plants are floated by the drains to the place of planting. In preparing for this, a plough is used, the structure of which may be mentioned. Upon a beam to draw by, a large piece of wood is mortised very obliquely, so as to project well under the beam. This piece is scooped out upon one side with a long slope, forming a rude mould-board, and the point is shod with iron, as a share. The plough is drawn by a bullock or a horse, which is driven by one man, while the plough is

managed by another holding the handle. In light, moist ground, (and in such only did we see it operate,) it does pretty fair ploughing, turning the earth very well, but making a rather shallow furrow. In tenacious clays, not irrigable, as in terraced plats, the hoe seems to be used in breaking up the ground. Hoes are made chiefly of heavy wood, the cutting edge and sides being cased with iron. From this economy in its use, it would appear that iron is a rather scarce article. After the operation of ploughing, water is admitted; and the land being saturated, it is harrowed and cross-harrowed repeatedly, until completely dissolved. This is done by means of a small one-headed harrow with one row of long teeth, being, in fact, a large rake without a handle. There are two uprights with a cross-piece to hold by, and the implement is drawn by a bullock, with traces (not chains) attached to each end of the head-piece. The whole tool may be seen carried upon a man's shoulders, realizing the sculptured image of the Egyptian deity, (Osiris); but the plough is far too heavy for similar transportation. Next in order after this, comes a very peculiar and unique process. Coarse grasses, weeds, &c., are brought down from the neighboring acclivities, either by men or upon bullocks. When by the latter, it is placed on each side of them in wooden hooks, analogous to panniers, and almost completely envelops the small animal. This material is spread evenly and thickly over the surface of the prepared ground, which, it will be remembered, consists now of earth and water in a state of loblolly. A man then enters upon it at one side, with wide and long frame-work pieces attached to his feet. These pieces are of open work, for the passage of water and oose; if closed, they would be good snow-shoes, as used by the Canadians. The man passes, with short steps, from one side of the plot to the other, pressing deep into the mud, and concealing from view the scattered grass. Returning, he places the inner foot where the outer one passed before, and so on, until the whole is done; thus pressing twice upon every part and portion. The land is now ready for planting; but whether this is done immediately, or postponed until fermentation commences, I am unable to say, though there did appear to be some delay.

Of beans the Japanese have several sorts, as white and black, runners or climbers, and bush or snap beans; the black-eye or cow pea, and a peculiar hairy-podded bean, growing upon a branching stem, called commonly Japan pea; and also a diminutive one, not much larger than a lentil. From one of these the famous *soya* is made, a fermented condiment used for various dishes.

Tubers of the genuine potato (*solanum tuberosum*) were seen at Hakodadi, and a small lot of them was seen growing near Simoda; and a small lot of them upland, in the midst of an orange plantation, were in blossom. No tillage seemed to be used after planting, as the whole surface was covered with a thick coating of fibrous matter—in other words, was heavily mulched or gunneyized.

A few young plants of Indian corn (*maize*) were also observed; at least they were believed to be such, as contradistinguished from young millet (*sorghum*), and were stated to be such by the interpreters, from my description of corn. It was not cultivated to any extent, but apparently as a mere vegetable. I endeavored to secure a few ears, or even a few grains, but could not succeed. And here a characteristic fact may be mentioned. Whatever I was specially desirous of procuring through the officials, they seemed specially determined I should not get; not by refusing downright, but by procrastinating, and finally stating it could not be obtained. The Indian corn is an example, as also small camphor-plants and young grape-vines, and some other things. Of the camphor trees it was said, at first, they were abundant and easily to be procured not far from Simoda; and of grape-vines, there were probably many at hand. But,

finally, it appeared that the former could not be had, and the latter grew many miles away, at the foot of Mount Fusi.

This grape would be a desirable and important acquisition to our country. It is superior in delicacy and flavor, as an eating grape, to any of our natives, not excepting the cultivated Isabella and Catawba, to which it is about equal in size. While excelling these, it is inferior to the finer European varieties. Than those, however, it is doubtless far better adapted to our country, as being native to one similarly situated on the eastern side of an extensive continent, and having a climate approximating to ours in extremes of temperature. A few seeds were preserved, and a portion left at San Francisco and Valparaiso. The stems of the bunches seen by us were dried and wrinkled. They probably grew at the base of Fusi, as stated.

In addition to the vegetables mentioned above, several others might be referred to; but, beside being similar to those in the report on Lew Chew, none of interest are present to my mind, except that important article of food in Japan, the sweet potato.

No cotton or sugar-cane was noticed under culture. Other fruits, besides grapes, are limes, oranges, (mandarin,) apples, small and indifferent; pears, large but watery, and insipid; and peaches, plums, and apricots; none of which latter did we see ripe. Indeed, it appears that the Japanese consume them while yet unripe, either stewed, preserved, or pickled. They have the fig, too, a tree of which I saw, but the fruit was not quite matured, Golownin mentions raspberries, and Thunberg enumerates three or four kinds; but these they consider unwholesome, or rather, they told the former so when restraining him from eating them. There are nurseries of cherry-trees, and probably plantations; but whether for fruit or fuel, or for a light tenacious wood for lacquer-ware, is not known.

Numerous young standards (something like catalpa) are specially cared for; but for what purpose I know not. However, there were obvious and important uses for the multitudes of small mulberry-trees in hedge-rows and nurseries. Their use in rearing silk-worms is, doubtless, very considerable; and we saw the operation in progress of reeling off silk from the cocoons. A nearly equal, if not more important use, is the extensive, enormous manufacture of paper, of various sorts and qualities, from the inner bark of this tree. The paper is of every degree of fineness, from a thick, strong, tough article, down to a delicate silk-like texture. Much of a thin tissue-like quality is beautifully stamped with figures, and portions with colored figures. As the men use a coarse paper for handkerchiefs, it was suggested that this delicate material was for ladies' handkerchiefs; and this idea was readily received. But the true use of it, I have reason to believe, is to make light-shades, by being pasted upon wooden frame-work. These answer the same purpose exactly that glass-shades for candles do in hot climates. A stronger paper is used in the structure of every house. It is pasted upon large, light, sash-like frames. These are placed in grooves, and extend from the ceiling to the floor, and slide along the grooves upon little chinaware wheels. In many houses these form most of the partitions; and, by removing them, or the reverse, the apartments may be enlarged or diminished at pleasure. When forming the outside walls, they answer the purpose of windows, and the paper is protected from rain by the roofs projecting in the form of a portico. At night wooden shutters are placed against the wall, and the house is secured. All this paper is remarkably durable and tenacious, insomuch that, by cutting it into narrow strips and rolling it, it makes good strings.

A few years ago there was a great complaint in the United States about the deficiency of paper-making material. To judge from the abundance and cheapness of paper in Japan, the

mulberry would be an ample resource for us too; and, should the morus multicaulis answer the same purpose, another fever might spring up in its favor, and this time be no humbug.

The tea-plant grows in this vicinity, and we saw the leaves in the process of drying and preparation. It is probably of an inferior kind.

The Japanese are reported to have great skill in dwarfing fruit-trees; and, though we saw none of the fairy diminutiveness described in books, yet we did see a pear-tree, between twelve and eighteen inches in height, loaded with fruit. However, in the small and secluded valley of Simoda we had no chance to witness the wonders of their skill in this line; nor, indeed, to judge of the extent and proportions of their agriculture, further than as a small sample, like unto the toe of Hercules—*ex pede Herculem*. According to their pictorial representations, which are generally quite accurate, they prune plums, &c., very closely. The accuracy of their delineations might be doubted from the *outre* and unnatural appearance of fine trees, as seen in their pictures. But we had the living originals before us. They were skillfully distorted, and directed from their proper development. In some, the limbs are cut out at odd places, causing picturesque though unnatural shapes. In others, the lower boughs, and even the main stem are led out horizontally, and so maintained by suitable restraints, with here and there a leafy branch remaining, but all the rest of the stem completely denuded.

These leafy branches are wound into coils or circles, and so retained by hoops, replaced by larger ones as increasing growth requires. These trees have long and awkward arms, with curious detached clumps of foliage, and it would seem to require a perverted taste to admire these; yet Europeans and Americans have had evergreens clipped and worked into even more fantastic forms.

Here may be found two kinds of shrubs of lusty growth, admirably adapted to form ornamental hedges, or separated clumps, about a house. They are of graceful appearance, and literally clothed with blossoms white as the mock-orange, and even more delicate. A wild rose (the sweetbrier of Virginia) is also found here, and though with a smaller flower, yet with all its fragrance. But this is trenching on the province of the botanist. Let me, however, allude to the beautiful double-flowering cherries, &c., at Hakodadi, and to a remarkable coniferous tree in the temple yards at the same place. This has a short, soft, and most abundant foliage, enveloping each twig as with a dense fringe of the deepest green. The cone is very small and round; unfortunately, no seed could be procured. There were very few of these trees, and an idea got abroad that they had been brought hither from Kamschatka, by the Russians under Golownin.

In this place are numerous storehouses, not only for the safe keeping of other valuables, but also for the preservation of rice and other productions of the soil; and hence, are in part granaries. They are remarkably well built, and beautifully finished off, being as hard and nearly as smooth as our own hard walls made of plaster of Paris. These houses, though of only one story, are large and commodious, being about fifty by twenty-five feet, and the walls are from two to three feet in thickness. The material of which they are built is uncertain, being covered completely by stucco or plaster, but is probably of stone, brick, or concrete. They are fire-proof, having the tops made of the same material as the walls, which are protected from the weather by light wooden roofs.

At Hakodadi large numbers of horses were seen entering and leaving the city, used as pack-horses. They seemed to bring, chiefly, wood, charcoal, and dried fish, for exportation; and, returning, carried out manufactured articles and means of subsistence for the people, introduced from the southern islands. Indeed, the whole island of Yesso would appear to be a mass of

mountains, and incapable of culture; certainly such was the case as far as the eye could reach from the shipping, with very limited exceptions. In fact, even the horses seemed to be ill-fed and ill-conditioned. These were small, but not remarkably diminutive. Those seen near Yedo and Simoda were better kept, and, though not large formed, were fatter and stronger.

For the accommodation of horses and bullocks there are many stables, which are all constructed upon one uniform plan, as if enforced by the regulation of law. They are rectangular and oblong, about twelve feet by thirty, and are divided into three equal compartments with a loft overhead. The stables are very neatly and very well built, rivalling in these respects many of the houses. At one end is a room for provender, &c.; at the other, a place for receiving and composting manure; and the animal occupies the central division. From this equal allotment of space and shelter for provender, animal, and manure, an idea may be formed of the great importance attached to the latter by the Japanese. And, as manifesting this more strongly, it may be mentioned that there are numerous large pipes or hogsheads placed beside all the highways and byways about Simoda, for the reception and preservation of liquid manure. These are employed instead of the pits formerly mentioned, the soil being here too sandy and porous to retain the liquid portions. From these vessels, which have a light conical thatching, the odor is very offensive at times, but it is blown alike upon the noble and ignoble passer-by, and has to be borne by the former in consideration of its indispensable necessity in providing means of sustenance for them all. As in China, its application appears to be preferred in the liquid form; and, as in China also, it appears to be given to the young plant while growing, instead of to the earth as a preparation for the seed. I am persuaded there is much wisdom and philosophy in this practice, and it would be well for us to follow the example, could means and appliances sufficiently economical be devised.

Not much can be said about the animal food used by this remarkable people. It seems to consist in fowls and their produce, and of fish. To show to what small particulars they descend, it may be observed, they catch and dry and offer for sale little fishes, of which it would require at least six to be the size of a man's little finger. And this shift is resorted to, although they have great quantities of large and fine fish. It merely indicates the scarcity and value of animal food with them.

The books tell us they do not eat the flesh of animals—such as cattle, hogs, &c.—on account of their religious opinions; or, because as the bullock has to work, therefore he should not be eaten; or, as the cow has to suckle, therefore she ought not to be milked. But, be this as it may, they one and all ate freely and heartily of all kinds of meat set before them at our entertainments, of which the fattest pork seemed to be the most relished morsel.

There appeared to be quite a limited number of horses and cattle about Simoda; and there were no hogs, no sheep. We had one or two sheep in the squadron, and they were objects of much observation to the Japanese; and the more so, when informed that our cloth was manufactured from their wool. The cloth itself was a wonder to the females, who admired its texture, but still more its very great width.

Had I known from the beginning that these sketches were to assume their present form, they might have been prepared more worthily for publication. As it is, they have been arranged from notes written at the time, or from traces left upon the memory. Some errors there doubtless are, arising from partial views and limited observations, but in the main they are correct. It is possible they may afford some interest to our farmers, however incompletely handled, if from the novelty of the subject alone.

Respectfully submitted, DAN'L. S. GREEN.

REPORT MADE TO COMMODORE PERRY

UPON THE

MEDICAL TOPOGRAPHY OF JAPAN:

BY

DANIEL S. GREEN, M. D.,

SURGEON U. S. N.,

ATTACHED TO THE UNITED STATES STEAM FRIGATE MISSISSIPPI.

REPORT

UPON

THE MEDICAL TOPOGRAPHY OF JAPAN.

BY DANIEL S. GREEN, SURGEON U. S. N.

U. S. STEAMER MISSISSIPPI,
Simoda, June 10, 1854.

SIR: In obedience to your order of the 1st inst., I respectfully submit the following report. It is prepared from observations limited to the months of February, March, and April, and parts of May and June, in the bay of Yedo, and at this place; in parts of May and June at Hakodadi; and also during a short stay in the bay of Yedo last July; likewise, from what I consider may be the probable character of the climate at other seasons.

The port of Simoda is situated near the S.E. angle of the island of Niphon, on a long peninsula consisting of mountain ranges, and is itself surrounded by very high lands. These have numerous vales between, but there are no low, flat lands, except where the town is built, and in one small valley, through which flows a rapid stream of clear water. At this place it is never very cold near the level of the sea, there being seldom any ice or snow; but the elevated ridges are, doubtless, often covered with the latter, as are the mountains extending hence towards Fusi. Rains have neither been infrequent nor in excess, and fogs sometimes occur. Under these conditions, the climate is very variable in winter and spring, being, at times, clear and cold, or clear, warm, and pleasant, with changes to cold, raw, and disagreeable weather. The alternations of southerly winds from the ocean, with those from the snow-clad mountains, cause sudden contrasts, both in the temperature and humidity of the air; and these are calculated to produce acute inflammatory diseases, such as rheumatism, pneumonia, &c., unless prevented by proper precautions.

In the summer and autumn it is, doubtless, very hot in the day, when calm; but, from the features of the adjacent country, land and sea breezes are surely to be expected. The nights in Yedo bay last July were cool, or cold, accompanied by heavy dews; and the same may reasonably be anticipated at this place. Such nights with hot days may occasion sporadic cases of cholera morbus, diarrhœa, &c.; but there are no causes (apparently) existing to produce severe epidemic diseases, such as fevers and dysentery; the only places likely to generate miasmata being the low level town and valley before mentioned. But the former seems to be cleanly, and the latter is wholly occupied by cultivated plants, both in winter and summer, except during the brief intervals between one crop and another, when the land is undergoing preparation afresh.

Hakodadi is several degrees farther north than Simoda, and is, like it, surrounded by mountains, which are more numerous and lofty, though at a greater distance. These were conspicuously crowned with snow so late as June 3d. The climate is, therefore, much colder in winter and spring than at this place; and the fogs are frequent and dense. The contrasts of temperature and humidity are quite as sudden and more extreme; and hence it must be more subject to inflammatory diseases. The summer and autumn, it is presumable, are somewhat or very similar to the same seasons here—as, also, their accompanying complaints. Nor are there, probably, any sources of miasmata there, as the town is situated at the base and on the side of a considerable mountain, which is connected by a narrow neck of sand to the neighboring plains, extending to the mountains in the distance; and, as the Japanese usually drain, cultivate, and irrigate most carefully all marshy places and low level lands, it is more than probable that these plains, though having several small streams, have no marshes; but of this I cannot speak from personal observation, not having visited them.

Upon the whole, then, I consider these ports as free from all malignant diseases, and quite salubrious—the diseases incident to the season being capable of avoidance by due precautions as to clothing, exposure, &c. They may, therefore, be resorted to with great advantage by our ships-of-war on the China station, particularly at that period of the year when dysentery and fevers are usually prevalent there, viz: the latter part of summer and autumn. This opinion has reference solely to the climate of these ports. An equally important matter is the ability to procure fresh provisions in sufficient quantities to preserve health and to avoid scurvy. This disease is said to be very common in Matsmai or Yesso.* Nor is this remarkable; for, although not a disease directly depending upon climate, it is, nevertheless, caused by want of fresh provisions, especially of vegetables and fruit, which may well be scarce towards spring, where the winters are so long, and the apparent space for culture so small. Provision for such a state of things should, therefore, be made by vessels contemplating a long cruise to Hakodadi at that season of the year; but such wants are scarcely to be anticipated at Simoda.

The mineral water near Hakodadi, as it rises through the crevices of the rock, is considerably impregnated with sulphuretted hydrogen gas, as evidenced to the senses; is warm to the touch, and, when drank, sits lightly upon the stomach. Its gasses and odor are lost by being kept, even for a short time. It contains chloride of sodium, and probably some mineral sulphate or sulphuret. Medicinally, it is somewhat diuretic and very slightly aperient, and would, probably, be beneficial in some cutaneous diseases, and in some chronic complaints where the secretions are disordered or suppressed. Its utility in the former may also be inferred from the fact of certain natives making signs, at the spring, that the water was not good to drink, but to bathe or wash the skin with, and from their having erected a small statue upon a rock immediately above it. The efficacy of the water would be greatest if used at the spring, and copiously.

I have the honor to be, very respectfully,

D. S. GREEN, *Fleet Surgeon.*

Commodore M. C. PERRY,
Commanding U. S. Naval forces, East India, China, and Japan seas.

* Golownin.

HONG-KONG, *August* 29, 1854.—Since the above report was prepared, the following tabular statement of thermometrical and barometrical observations has been kindly furnished by Surgeon C. D. Maxwell, of the U. S. steam-frigate Powhatan, and is hereto annexed.

D. S. G.

Thermometrical and barometrical observations, made in Japan, A. D. 1854.

Date.	Ther.	Barometer.	Place.	Date.	Ther.	Barometer.	Place.	Date.	Ther.	Barometer.	Place.
	°	°			°	°			°	°	
February 13	45	29.90	Yokahama.	March 27	50	29.77	Yokahama.	May 8	68	29.98	Simoda.
14	43	30.00	"	28	50	29.90	"	9	71	29.88	"
15	43	30.12	"	29	48	29.80	"	10	72	29.68	"
16	48	30.12	"	30	46	29.95	"	11	65	29.75	"
17	50	29.35	"	31	52	29.80	"	12	71	29.75	"
18	50	29.70	"	April 1	53	29.70	"	13	70	29.80	"
19	50	29.92	"	2	54	29.88	"	18	56	29.75	Hako
20	55	29.72	"	3	62	29.78	"	19	57	29.60	"
21	60	29.70	"	4	65	29.62	"	20	60	29.85	"
22	51	29.35	"	5	53	29.78	"	21	60	29.96	"
23	38	29.50	"	6	55	29.95	"	22	62	29.90	"
24	40	29.80	"	7	50	29.65	"	23	66	29.85	"
25	45	29.86	"	8	55	29.70	"	24	62	29.68	"
26	45	29.93	"	9	52	29.85	"	25	54	29.76	"
27	47	30.00	"	10	56	29.90	"	26	51	29.80	"
28	49	29.72	"	11	57	29.75	"	27	55	29.68	"
March 1	50	29.64	"	12	58	29.50	"	28	54	29.85	"
2	46	29.75	"	13	55	29.90	"	29	55	30.00	"
3	45	30.00	"	14	53	30.00	"	30	51	30.05	"
4	40	30.00	"	15	55	30.00	"	31	54	30.00	"
5	40	30.00	"	16	60	29.89	"	June 1	55	29.91	"
6	50	29.70	"	17	62	29.91	"	2	56	29.65	"
7	52	29.80	"	18	64	29.90	"	3	53	29.45	"
8	50	29.95	"	19	62	29.92	Simoda.	8	74	29.75	Simoda.
9	50	29.96	"	20	61	29.45	"	9	70	29.95	"
10	46	29.80	"	21	59	29.44	"	10	70	30.00	"
11	43	30.12	"	22	64	29.70	"	11	71	29.88	"
12	40	30.25	"	23	65	29.80	"	12	72	29.97	"
13	45	30.08	"	24	63	29.38	"	13	73	29.83	"
14	53	39.74	"	25	62	29.60	"	14	75	29.81	"
15	52	30.05	"	26	64	29.95	"	15	75	29.82	"
16	45	29.85	"	27	67	29.90	"	16	75	29.80	"
17	45	29.73	"	28	69	29.80	"	17	74	29.60	"
18	46	29.87	"	29	66	29.77	"	18	74	29.70	"
19	47	30.13	"	30	65	29.72	"	19	71	29.55	"
20	58	30.06	"	May 1	58	29.99	"	20	70	29.55	"
21	62	30.03	"	2	65	30.00	"	21	70	29.80	"
22	57	29.99	"	3	62	29.80	"	22	73	29.85	"
23	50	30.05	"	4	63	29.41	"	23	73	29.85	"
24	49	29.90	"	5	66	29.73	"	24	75	29.50	"
25	50	29.95	"	6	65	29.77	"	25	76	29.85	"
26	52	29.45	"	7	70	29.83	"				

REPORT MADE TO COMMODORE PERRY

RESPECTING

A MINERAL SPRING NEAR HAKODADI,

ON THE ISLAND OF JESSO, JAPAN:

BY

REV. GEORGE JONES, M. A.,

CHAPLAIN U. S. N.,

ATTACHED TO THE U. S. STEAM FRIGATE MISSISSIPPI.

DESCRIPTION

OF

A MINERAL SPRING NEAR HAKODADI.

BY REV. GEORGE JONES, CHAPLAIN U. S. N.

U. S. STEAMER MISSISSIPPI,
At Sea, June 5, 1854.

SIR: I examined the mineral spring on the southwest side of the promontory of Hakodadi, according to your orders, and found no deposit from it, except a thin film of a whitish, slimy substance, with a few filaments of the same, seemingly derived from the action of the sulphurous gasses upon the alumina of the rock through which they are forced up. These gasses are tolerably abundant, and sometimes produce a whizzing sound in their efforts to escape. The water issues forth in several places, through small crevices, most of them under high-water mark; but there is one just above the reach of ordinary tides, where the discharge is largest, and the odor and taste are strongest, resembling those of the celebrated spring at the boat-landing near Castle d'Uovo at Naples, with about half the strength of the latter.

The isolated hill (or mountain), on the side of which Hakodadi is built, consists entirely of sienite, generally grey, sometimes reddish, in which the crystals of tourmaline are very distinct. At the spot where the mineral spring is, this rock seems to have been disrupted by some subterranean force, so as to make a crevice about 20 feet wide; and into this another rocky substance has been forced up, similar to the former, except that the tourmaline has disappeared, and the feldspar is softer and in distinct masses, so as to form a porphyritic rock. Up through this filled-up crevice the mineral water comes—probably from some region of volcanic action not far off.

On visiting the range of mountains stretching eastwardly and westwardly, commencing about 8 miles north from Hakodadi, I found them, as far as I penetrated their recesses, to be entirely of volcanic matter—either basalt, or, in other instances, volcanic tufa—the latter with rounded basaltic masses embedded in its hardened paste; so that the isolated mountain of Hakodadi is either in the midst, or on the edge, of a volcanic region; and it is not at all surprising to find there a sulphur spring. Close by this spring, but beyond the dyke or crevice noticed above, we found another stream; the latter from the sienite rock, and of pure water of the ordinary kind.

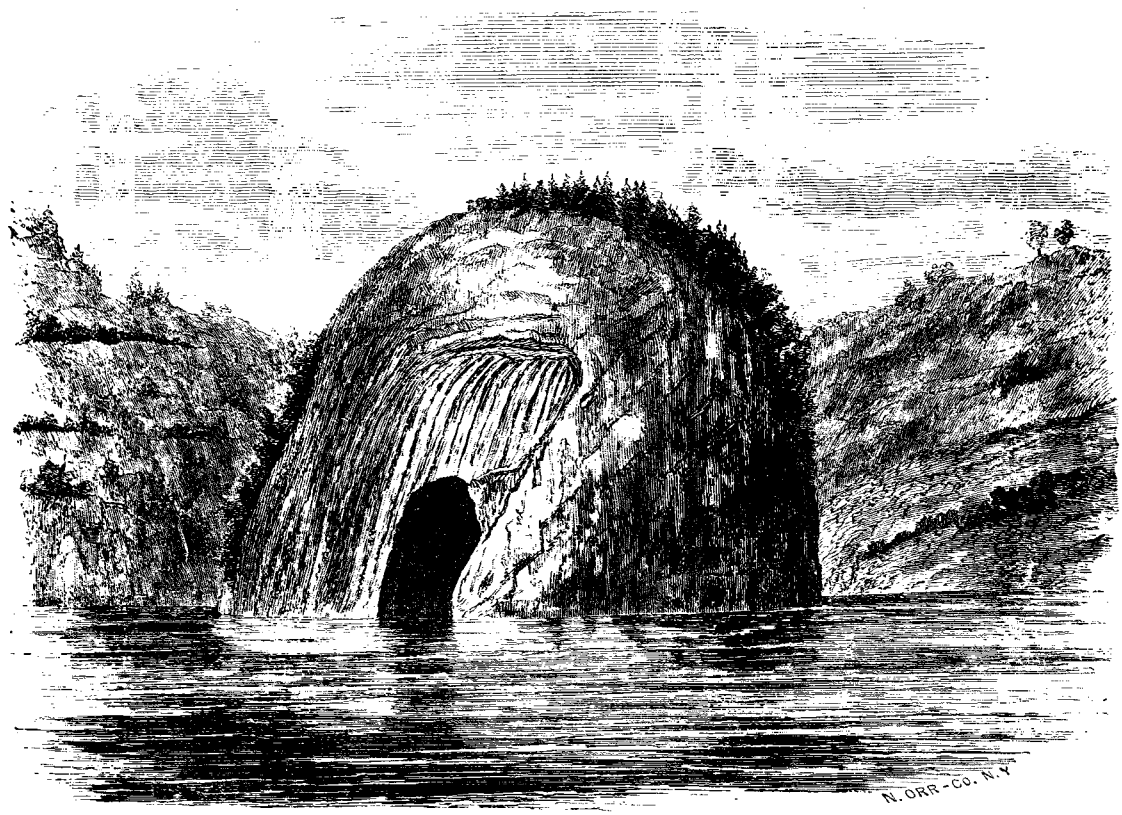
A few hundred yards westwardly from this fountain is a cave of a remarkable kind. It opens in the face of a projecting perpendicular bluff, and can be entered only in a boat. It is about 30 feet high, 10 or 12 in width, and the water at its entrance has a depth of about 20 feet. We penetrated it in our boat until the darkness became so great that we could no longer distinguish objects; but we found, by feeling along, that the cave there branched off right and left, with apparently still as great a depth of water below and the same height as at the entrance. There must be a horrible rush and roar of water in its recesses when the seas are high; but, on this occasion, its calmness, and the smoothness of its watery pavement, through whose clear depths we looked down on the white sand below, were a pleasing contrast to the cold wind and drifting mist which met us as we emerged.

The bluff itself, in which the cave opens, is remarkable for a columnar formation surmounting its arch, high above. This had so much the appearance of basaltic columns similar to those of the Giants' Causeway in Ireland, or to trap formations, that I thought, at first, they must be such; but the rock of the cave is all sienite, and so is, probably, that of the columnar arched rock above. I subjoin a sketch of this singular formation, and of the entrance to the cave.

Very respectfully, your obedient servant,

GEORGE JONES,
Chaplain U. S. N.

Commodore M. C. PERRY, *U. S. N.*,
Commanding U. S. Naval forces, East India, China, and Japan seas.



Mineral spring near Hakodadi.

REPORT MADE TO COMMODORE PERRY

UPON

THE AGRICULTURE OF CHINA:

BY

DANIEL S. GREEN, M. D.,

SURGEON U. S. N.

ATTACHED TO THE UNITED STATES STEAM FRIGATE MISSISSIPPI.

REPORT

UPON

THE AGRICULTURE OF CHINA,

BY DANIEL S. GREEN, SURGEON U. S. N.

My observations were so limited, as scarcely to justify the merest notice on the agriculture of China; but a few facts of some interest may be recorded.

On approaching the southeast coast of China, instead of meeting with alluvial plains or low lands, one is confronted by an iron-bound coast, consisting of long ranges of high mountains. These rise abruptly from the water's edge, without even a narrow belt of level land intervening; and the sea is dotted with numerous islands similarly circumstanced. Both are now destitute of forests, if they ever were clothed with them, but have some trees and underwood growing in valleys not altogether arid. The residue of the surface is either bare, or covered with weeds and short coarse grasses. The soil, to judge all by one, is a poor, gravelly clay—poor, chiefly from lack of moisture. In a few places, principally narrow strips at the bottoms of ravines, where irrigation can be practised, small portions of land are cultivated; but these can scarcely be seen in the great blank of barren wilds. And though China may well be called the "Flowery Kingdom," it here presents an uninviting and most unpromising exterior.

In ascending the Canton or Pearl river, which is very wide at its mouth, but gradually narrows towards the Boca Tigris, —— miles inland, either side continues to present the same appearances as the seaboard. In short, the river is here passing through the coast range of mountains.

Beyond the Boca, the land extends away immense distances, in flat alluvial plains. Some of the alluviums on the south side have been formed within the memory of man, and further extensions are now being deposited below the Boca. As these formations go on and acquire sufficient extent, embankments are thrown up, leaving channels or canals at suitable distances, for the admission of boats to all parts of the plain; and thus a large, perhaps the larger, portion of all the canals on tide-water have been constructed; which accounts for their great number at little expense. The earth thrown out from them, to form the limits of fields or enclosures, seems to form dykes; and to prevent the tides from wearing these away, rows of banana, bamboo, or other trees are planted upon them. Sluices are made by plank boxing or otherwise, by which water may be admitted or discharged, according to the tide, either for the purpose of warping or of irrigation.

This plain is of very great size, being some thirty or forty miles wide from the coast range to the next range of highlands, and extending between them as far as the eye can reach. Over

its whole surface, two crops of rice are produced annually, except where sugar-cane may be planted, and where culinary vegetables are raised for the supply of cities, villages, &c. The preparation for rice appears to be simple and inexpensive; nor did we at any time witness the great gangs of agricultural laborers that we had been taught to anticipate. At harvest-time, indeed, the cities seemed to pour out their denizens to assist the countrymen; and at least one fleet of boats passed us, with crowds on board, to participate in gathering the just ripening crops.

The land is prepared either by a plough or the hoe. The plough is drawn by a large, heavy, unsightly ox—the water-buffalo. It is a rude implement, scarcely a step, if a step, in advance of its ancient congener of Greece or Rome. The ground is wet, saturated while being ploughed; hence it is easily worked, and, as water is admitted upon it immediately thereafter, it is not injured by being baked by the sun. It is in the same condition when worked by the hoe, a large broad implement. A gang of these following each other, make a series of furrows, more resembling those of a good plough than do those actually made by the plough of China. After the earth is completely dissolved, or reduced by submersion—aided, perhaps, by harrows and other tools—the young rice (drawn from beds) is set out by hand, at regular intervals of about twelve inches. This is done by either sex, with bare feet and nude legs, wading in the water. The fields are regularly irrigated until the rice is about maturing, when they are laid dry. This is the great staple in China, constituting the main article of food, being a substitute for bread for all the numerous population of that country.

Besides rice, various other articles are cultivated in the neighborhood of Canton: tea to a limited extent; sugar-cane of good quality; several sorts of roots; numerous vegetables, as maize, potatoes, tomatoes, &c.; also fruits. Of these last, the most remarkable—and, if to be introduced into the United States, the most valuable—are the mandarin orange, small, but beautiful and well flavored, and possessing the peculiarity of a very thin, loose skin, removable from the pulp with the greatest facility, and without measurably soiling one's fingers; the hiche—a special favorite among the Chinese, and, in fact, very pleasant to the taste—which grows upon a highly ornamental tree, requiring a hot climate; and the persimmon, remarkable for the great size of its fruit, some being near three inches or more in diameter, and is mild and pleasant to the palate. This, however, would be more curious than valuable. The coolie orange, the banana, custard apple, &c., are also grown here. These trees are usually planted upon the dykes enclosing rice or paddy fields; and thus, in addition to preserving them from damage, and economizing space, contribute to relieve the monotony of a landscape of large, uniformly level surfaces.

The animal food of the Chinese of this section appears to be limited in variety and in extent, consisting chiefly of fowls and their eggs, fish, pork, and a modicum of coarse, inferior beef. There is some mutton, but this is brought from the north, at high prices, and for the foreign population.

In the management of fowls, except of ducks, there seems to be no special peculiarity. The eggs of these latter are hatched in great numbers at Canton. They are arranged in layers, with papers between, in large wicker-work baskets, the size of barrels, and set away in rooms, where, in due time, they are hatched by the barrel-full. I am not informed of the details, nor whether the rooms are artificially warmed; but one of the medical officers of the squadron witnessed the operation with admiration, and he thought that incubation was effected by the natural temperature—at least, when he saw it. So certain is the operation, that the time of

hatching is known within a few hours, and occurs in all the eggs of any basket nearly simultaneously, with few or no failures. When of proper size, the young ducks are sent abroad upon the waters in large *duck-boats*. One consists of a long central boat with wide platforms extending its whole length on either side, enclosed by slats and covered by coarse matting. In these boats ducks are accommodated to several hundreds in numbers, and are moved up and down the rivers, from time to time, for fresh feeding-grounds—the margins of streams and paddy fields. For their admission and exit, gang-boards are lowered to the water; and so well trained are they, that at a regular calling they hasten home incontinently; and so punctually is this done, that it is jocularly said, the laggards, or those last in, are whipped by the keepers to insure promptness. Numbers of eggs are found of a morning in these boats, which are duly forwarded to the ecclobeon establishments, or otherwise disposed of.

Many of the family-boats* also possess a pair of ducks, kept for the luxury of their eggs. A cylindrical basket, some two feet long, one foot in diameter, and closed at the ends, suspended horizontally by cords from the stern of the boat, contains them; and this is the full extent of fowl-yard and fowl-house together. They are lowered, at times, into the water, and are sometimes allowed the freedom of an excursion around the boat.

The fish-ponds are celebrated; they are numerous and productive, and, together with the rivers and sea, supply the people with a large proportion of their animal food, and, perhaps, the most nutritious portion. Our chaplain furnished a missionary with a synopsis of the recent French discoveries in pisciculture, and requested him to communicate the details to the Chinese. It is to be wished, and yet to be doubted whether they will avail themselves of the benefits promised by them.

The hog is the favorite animal, and his flesh furnishes the principal animal food. He is carefully reared by the Chinese, who, though in many respects a dirty people, keep their pig-pens with the greatest neatness. My attention was particularly drawn to this fact by a gentleman resident in Singapore (where a vast majority of the inhabitants are Chinamen), who stated that their pig-sties (pointing to one of them) were cleaner than their houses. Hogs are generally, if not universally, kept in close pens or houses; and such has probably been the custom for ages. Deprived of much exercise, and supplied with fattening food, such as refuse rice, vegetables, &c., they have, by long habit, acquired an aptitude to lay on fat and to reach maturity at an early age. There are here no long, lank, roving porkers, but all are compact, thrifty animals—rather inclined, however, to be pot-bellied and swag-backed. They are unsexed while yet young, so that it is difficult to procure breeding pairs for exportation; especially is it so to meet with a number to select from. Although ordinarily small, or not exceeding a medium, still some attain a very great size—not falling far below the immense masses of flesh and fat sometimes produced by high and long-continued feeding in England and America.

There are hogs preserved and fed within the precincts of temples, and, being sacred, (perhaps dedicated to deities,) they live there in ease and luxury until they die a natural death. Canton is in a hot climate, yet it may be remarked that I saw no hog-flesh there that was measley or tuberculous, as is not unfrequently the case in tropical America.

In feeding, the food is slightly fermented. Fermentation effects the same change in starchy food that boiling does; *i.e.*, it dissolves or ruptures the skin or pellicle of the starch grain. Corn and rice, and also potatoes, consist mostly of starch grains, and these are each and sev-

* *Family boats.*—A very numerous population in China live upon the water, in small boats. In them they are born, and live, and die. They carry in them all their household, with goods and appurtenances.

erally enveloped in a skin, in like manner with the whole grain—say of corn; unless this is ruptured, the grain of starch can be digested no better than the grain of corn when its skin is not broken; and this is often passed from cattle visibly undigested and unaltered. But as grinding ruptures the skin and breaks down the whole grain of corn, rendering it more digestible, and consequently more nutritious, so does boiling or fermentation rupture the pellicle and break down the grain of starch, and renders it, also, more digestible, and, of course, more nutritive.

The beef of this portion of China is coarse and lean; but, bad as it is, there is not much of it. The lands that might produce good beef by their fertility and moisture, are all under culture; and the uplands, from the heat of climate and their aridity, can only bear rough innutritious grasses or weeds.

From Macao the seacoast maintains its mountainous character, with slight modifications towards the northward and eastward as far as Ningpo; but beyond the high islands about Chusan, it becomes low and level. This is a portion of the great alluvial plain deposited by the waters of the mighty Tang-tse Kiang. Like the plains near Canton, it is intersected in all directions by canals, which occasionally assume the size and name of rivers. From these, where the tides do not rise sufficiently high for irrigation, water is raised artificially by simple and rude machinery. This consists of a main cog-wheel, worked by oxen, which turns a roller at the upper end of a trough; at the lower end of which, immersed in the canal, there is another roller, and over these an endless series of wooden boxes revolve. The boxes or boards fitting the trough elevate the water and pour it into the fields, over which it is distributed by open drains. The whole machine is readily moved from place to place, and the trough can be arranged at any angle to suit the inclination of the bank.

In approaching Shanghai, up the Woosung, in the month of May, the country on either side presents a most luxuriant appearance as far as vision can extend; and it has as varied and beautiful scenery, probably, as could be obtained on a dead level. This is occasioned by many hamlets and villages being scattered abroad, and environed by large and magnificent trees; also by multitudes of small mounds, which, together, break the uniformity of surface; and, added to these, the whole country is in a complete state of cultivation. Wheat and barley, near maturity, cover all the land, and spread out mile after mile, without end, and with no fences to interfere with the apparent continuity. It is truly a rich scene. A few laborers may be seen here and there, who seem to be weeding the crops.

Upon a nearer approach and closer observation, one is greatly disappointed in the anticipated skill and cleanliness of Chinese culture. The land presents a damp, moist, almost sobby state, unsuited to wheat; and the ground between the rows or drills is almost covered with grass and weeds. Wheat and barley are both in rows, as if drilled, or dibbled, or transplanted. The yield of wheat is by no means equal to what its appearance from a distance would indicate. Its heads are small and lean, and it would probably not exceed ten or fifteen bushels per acre; whereas, on lands of apparent similar quality in the United States and England, the produce would be twice or thrice that quantity. No opportunity occurred of examining its quality at maturity; but a sample of the preceding year was very inferior—would not have been considered "merchantable" in our country, and yet it was called "good wheat" by a shopman in Shanghai. It was a red sort, not well cleaned, and the grain was small, shrivelled, and light, and withal much weavil-eaten. If such be a fair specimen, there is no wonder that the Chinese do not like it, and greatly prefer their national grain, rice. This is as much preferred by them

to wheat, as that is to maize by the English. A few years ago, two Chinamen were sent some hundreds of miles into the interior, to procure a copy of the Hebrew scriptures from a fraternity of Jews living in a city upon the Hoang-ho. In the report of their journey they express the severity of their distress, almost amounting to famine, on the borders of that river, by stating that the inhabitants were *reduced* to the necessity of using "wheaten bread," the rice-crops having failed from excessive drought and scarcity of water.

Second crops are spread over all this region in autumn, consisting mainly of rice, with a proportion of cotton. The cotton is sown broadcast in the standing wheat, in May, by a man walking through it and casting the seed (one at a time) in front of him, and to either side. It remains uncovered, and vegetates where it falls. It is generally of the white kind, though nankeen-colored cotton is sometimes seen.

A third crop is also grown upon these cotton patches—a large, hardy kind of bran. This is sown as another intermediary crop, amidst the growing cotton-plants, and attains maturity in early spring.

It would thus appear that the Chinese obtain two grain-crops annually from almost all their cultivable surface—or, at least, of that which can be irrigated. And although the produce does not seem to be near so much as might be procured by better management, yet the *two yearly* grain-crops are sufficient to account for the lands sustaining so large a population. Nor is much of this grain diverted to the support of working animals, there being very few—indeed, comparatively none employed as such.

Besides the usual vegetables, there is one so common, so abundant, and such a favorite, that mention of it cannot be omitted. It is to the Chinese, what cabbage is to the Dutch, and, like it, is of the *brassica* tribe. The *petsai* (its Chinese name) seems to be a medium in its mode of growth, between the beet and the colewort, having long, rather narrow, and crisp leaves, and yields very largely in rich soil with irrigation.

In this region there is a small yellow clover of little value. But there is also another trefoil, which probably would be of great value in our middle, and more particularly in our southern States. It is thus spoken of by Dr. Wilson, a surgeon in the English navy, who was stationed some time at the island of Chusan during the opium war: "At the close of autumn, after the rice-crop is gathered, a portion of the soil is sown with a hardy variety of trefoil, which, notwithstanding occasional severe frosts, grows vigorously during the winter. (The range of the thermometer is from 88° to 28° Fahrenheit.) This, which is cultivated extensively, is used almost entirely as a manure, and no doubt possesses powerful fertilizing properties." After speaking of its quick growth, its being nutritious, and being agreeable to the eye, having a flush of dark-red flowers, he adds: "Its precise habits are not known, but it grew in a dry soil, and resembled, if it is not identical with, the plant called sanfoin in England." It would doubtless prove very valuable for soiling. I desired to procure seeds of this cultivated grass, but was unable. Endeavors were also made to obtain the seed of the dyers' buckwheat (*polygonum tinctorium*), but without success. This is said to be an abundant dye-plant in China, and, as such, would be exceedingly desirable to supply, in part, the increasing demand for coloring matter by our manufacturing establishments.

These people are so remarkable for their success in the use of manures, that some notice of them is necessary from the most transient observer; and such was I.

Green manuring has just been referred to, in an extract from Dr. Wilson. Alluvial deposits, from the margins and beds of rivers and canals, are spread over the land as top-dress-

ings; collections of offal of all sorts, and of all refuse matter, seem to be carefully made, and used when fermented. Whether urine or mineral manure of any kind is employed, did not come under notice; though doubtless it might be, with great advantage. In addition to the above, human excretions, both fluid and solid, are universally employed—perhaps to a greater extent than in any other country. No measures for deodorizing are observed; consequently, the effluvium, from its collection, distribution, and employment, is one of the most prominent disagreeables encountered by strangers, whether in cities or highways, or in the fields. In cities, there are receptacles at various distances, on the street side, resorted to by passers-by, and so open as to be offensive to the eye as well as to the nose. The contents of these reservoirs, and the same from private houses, are carried through the streets in open buckets, China-fashion, to boats for transportation—much to the annoyance of foreigners; though the natives, "to the manner born," exhibit a most stoical indifference. With this, and slop and mud, in narrow streets, it would be difficult to find a more filthy and disgusting place than a China city—Shanghai being the example. Conveyed to its place of destination, it is put into any capacious earthenware or other receivers, protected by light coverings from sun and weather, and reserved for the time of use—being sometimes watered. It is thus very like Swiss *guile*. The time of applying it seems to be one of the most important, if not *the* most important, peculiarity in its use—being applied either to the germinating or to the very young growing plant. This forces the plant forward at a critical period, upon which its whole subsequent development and maturity very much depend. This manure appears to be always used in a liquid, almost dilute state, and to be distributed, by means of small dippers, to each individual plant. Its powerful nature is too well known to require any enlargement upon its effects. In speaking of manures, it may be remarked, that the first idea produced by the numerous mounds (before mentioned) on the plains of the Woo-sung, was, that they were manure heaps, covered with earth, and reserved until needed; but their size and number, and the abundance of verdure upon them, cast a doubt upon this impression. They are the graves or cemeteries of the dead, which require to be placed upon the surface of the earth, in this low, wet region. Near Canton they are buried in excavations made into the sides of hills and mountains. Yet, although graves, they are not entirely without use in an agricultural point of view, inasmuch as the grass upon them is given as food to cattle. This is either cut and fed to stock, or the animals are tethered upon the mounds.

Domestic animals, like those around Canton, are found near Shanghai, including the water-buffalo. The milk of this animal is used, even by the foreign population. Besides the usual China hog, we meet here with an ugly little black pig, with a dished face and curiously wrinkled nose—of the Java breed, I believe. There are sheep, also, at Shanghai; they are of two kinds, the broad-tailed and a common sort, not very unlike, in shape and appearance, the Dorset sheep of England. Both make very good mutton; the first, however, the best. This meat is superior to any other we met with in China; and the mutton is sent from hence to Hong-Kong, for the foreigners, where it commands a high price—some 37½ cents per pound. These sheep are probably brought from the hill-country near Ningpo, where, according to some accounts, there is good grass for pasturage. The wool of the broad-tail is coarse; that of the other is coarse hair rather than fine wool. It is said there is fine wool in China: can this be it?

Ducks are not common here. They appear to have been superseded in popular favor by gallinaceous fowls. These are of all the various sizes found elsewhere; but the largest have

assumed, *par excellence*, the name of the place—Shanghais. Among these are mongrels of every degree. The best are well-proportioned, *i.e.*, have large bodies with short legs and necks, and are of solid or uniform colors, as white or grey, buff or yellow, and red, which show they are well-bred and of good strains. But better fowls, and more highly improved, may be found now in England or the United States, just as better merino sheep may be had in France, or Saxony, or in America, than in Spain. Nor need this breed be greatly desired, if judged by the flesh obtained at Shanghai. It was coarse in grain and insipid in flavor; this, however, may have arisen from the kind of food upon which it was reared.

In this neighborhood there is a hoe in general use, which consists of three or four prongs or teeth, instead of a solid blade—similar, indeed, to our dung-hoe. Its effects are the same as those of forking by our modern gardeners.

One or two general observations will conclude these brief notices.

It may be inferred, from what is written, that I do not entertain the exalted opinion of the skill and perfection of the agriculture of China that generally prevails. But it is obvious that enormous quantities of food must be produced to subsist her teeming population. How can this be effected without science and industry, knowledge and skill? Four means will answer this question: 1st. A climate remarkably favorable to vegetation, from its great heat in summer. 2d. The almost universal practice of irrigation, which, from the natural condition of the country, can be done with far less labor and to a far greater extent than is readily imagined. 3d. The great and general use of strongly ammoniacal manures, a knowledge of whose efficacy was attained by experience. 4th. The application of these manures to the germinating or growing plant—a skill acquired from routine practice. By these four great motive powers, immense results may be obtained without science or great industry, with not much labor, little skill, and less knowledge. And such appear to be the facts in China.

I had designed making some remarks upon the nutritive qualities of rice and vegetation thus forced; but, without entering into arguments or details as to their carbonaceous and aqueous conditions, the following extract upon "Excess in Irrigation," taken from a note-book, will sufficiently indicate my impression upon this subject, viz:

"In Valencia
Flesh is grass,
Grass is water,
Men are women,
Women nothing."

Respectfully submitted,
DAN'L S. GREEN.

PAPER

UPON

THE AGRICULTURE OF CHINA:

BY

G. R. WEST.

[FOR JAPAN EXPEDITION REPORT.]

PAPER

UPON

THE AGRICULTURE OF CHINA.

BY G. R. WEST.

THE Chinese are behind the age in the science of mechanics and machinery. But, considering they possess no theoretical rules for guidance in the construction of machinery, in the application of the mechanical powers, surprising ingenuity is displayed, and efficiency attained by them. All machinery employed by them for the accomplishment of various ends is exceedingly simple, and stamped with the impress of primitiveness.

In these rude contrivances (which have probably existed with the Chinese for thousands of years) are involved important principles in machinery, and in them may be recognised, by the theoretical mechanic, the types of many practically useful machines now in common use in western countries.

The Chinese operations in agriculture, as in the arts and manufactures, are upon a very limited scale. This accounts, in one particular, for their continued use of rude machinery, and pertinacious opposition to all foreign innovations. Under this limited plan of operations, their rude implements are more serviceable to them than would be the improved machinery of western nations.

For example, the plough is used by them for breaking up alluvial ground for rice cultivation, and it is not necessary that it should run very deep or possess much power. For breaking up hard ground, a peculiar hoe is used. The plough has but one helve or handle, but in other respects is the same in principle as that in use with us. It is provided with a metal share and an adjustable mould-board. (See figure 5, plate 1.)

The ploughing is conducted while the fields are flooded; the water-ox, the beast of burden in the south of China, draws the plough, reveling in the slush, followed by the cheerful farmer wading knee-deep in mud and water behind.

The plough is followed by a harrow with a series of iron blades arranged longitudinally with the frame, so as to divide the tenacious clods of alluvial earth. (See fig. 7, plate 1.) The tooth-harrow is then used. Of these there are two kinds; one, with a horizontal frame with short and strong teeth. The buffalo is yoked to this, and while in use it is pressed down by human or other weight, to increase its effect upon the ground. Figure 6, plate 1, represents a smaller one with a series of long teeth placed at an angle of 60° or 70° from a single beam provided with handles for conducting and pressing it in the earth. This is generally worked by man-power. There is also another harrow with short teeth projecting from a V-shaped log frame, that is pushed by hand. (See fig. 10.)

Figure 12, plate 1, represents the hoe for breaking up hard ground. It resembles more our pick-axe than garden-hoe, though much broader and thinner than the former. This serves the purpose of the spade with us. The ground is afterwards broken up and mellowed by a hand-rake which has four long curved prongs. (See fig. 2, plate 1.)

The winnowing machine in common use in China is a fac-simile of that hand-machine used in our southern States; and the question arises, is it original with the Chinese, or adopted? (See fig. 1, plate 1.)

The threshing is sometimes conducted in the field at harvest-time, and also at the farm-house, upon cement floors, with bamboo flails.

Harvest-time in China, as elsewhere, is one of rejoicing. Men, women, and children, all aid in this necessary or pleasant operation; and chickens and other domestic fowls follow them to the fields to pick up the loose grain that falls to the ground. The reaping of rice is performed with a small reaping-hook, or sickle, which is serrated on its cutting edge. The scythe seems to be unknown to the Celestials. Figure 13, plate 1, represents the sickle.

The Chinese are exceedingly ingenious in their contrivances for raising water for irrigating their fields. The chain-pump arrangement predominates, though various other mechanisms and methods are in use among them. Of the chain-pump there are three kinds or modifications of the same principle. One of these is operated by animal-power, the other two by man-power. The first is provided with a mechanism precisely the same, to all intents and purposes, as the horse-power in use with our farmers for accelerating the speed of power for threshing, hulling corn, and various other agricultural purposes. This piece of machinery is probably as old as husbandry itself in China, and shows that those people were early acquainted with the fact that power and speed vary inversely, or that power or time is gained according as the moving force is applied near or remote from the axis of a wheel. Plate 2 represents one of these machines, with the chain-pump attached. The pump consists of a hollow trunk formed of boards, having at each end a short axle provided with cogs, over which an endless chain, having a series of buckets upon it, passes. The trough is placed in an inclined position, with one end in the water to be raised. The upper axle being put in motion by its connexion with the power machine, (which is placed on the bank of the canal, river, or pond, and operated by a buffalo yoked thereto,) causes the endless chain to rotate. The buckets retain the water, and raise it to the end of the trough, from whence it flows on to the field.

The second description of chain-pump is worked by men operating upon a description of tread-mill, with the feet. The upper axle of the endless chain of pumps is extended to a long shaft on either side of the trunk, and provided with short radiating arms, serving as levers for the action of the feet. A rotary motion is thus communicated to the shaft and the endless chain of buckets. (See plate 3.) The other description is worked by a crank in the end of the upper axle of the chain-pump by hand-power.

Bread is an article of food unknown in China. Rice is the staff of life there. The little flour required for the making of pastry is produced usually by the aid of a small hand-mill; though rude mills, worked by buffalo-power, are sometimes met with in the country, by which the process of grinding is remarkably slow and imperfect. This domestic mill consists of two stones, the lower one being stationary, and the upper one movable on the face of the former. This is put in motion by a man or boy, by a connecting rod jointed to a short lever or arm fastened to the periphery of the upper stone. (See fig. 3, plate 1.)

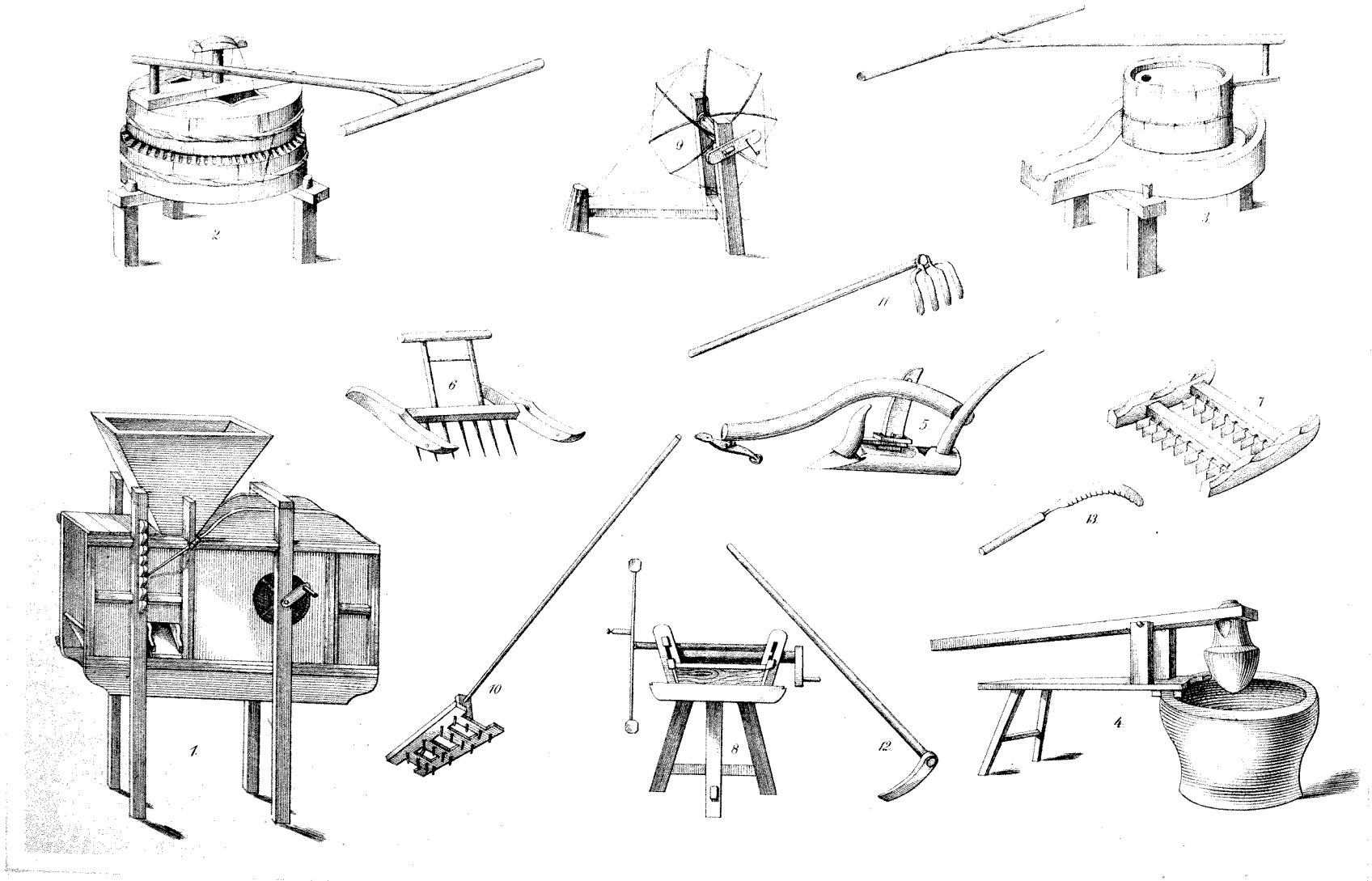
A large mill, worked by buffalo-power, used for grinding bones for manure, beans for making

oil, and substances for other purposes, is frequently to be met with in the southern provinces. This consists of a circular stone trough of forty or fifty feet in circumference, in which a heavy stone wheel rotates. By reference to the figures, plate 4, the construction and operation of this machine will be readily understood. The beam, to which the buffalo is yoked, is fulcromed to a stake driven in the ground in the centre of the trough, and the buffalo walks in a circle on the inside of the trough. The stone wheel, working freely on its axis in the beam to which the buffalo is attached, is not only drawn around on the circular trough, but continually rotates upon its own axis, crushing and triturating any substance placed in the trough.

The preparation of rice for market employs a vast number of persons in China; while with one of our improved rice cleaners and hullers, no hand labor worth mentioning would be required, and the work performed in a thousandth part of the time, and with vastly more efficiency.

There are several varieties of mills in use for separating the hulls from rice. Figure 2, plate 1, represents one of these. It consists of two wooden circular blocks, so adjusted together that the upper one is put in motion in contact with the surface of the other, by a boy or man, in the same manner as the domestic grist-mills, before described. The rice is thrown through the eye of the upper block, and passes out partially hulled at the peripheries of the blocks. This machine is imperfect in its action, and the rice has to undergo several processes after passing through it, to free the grains from husks, and make it marketable. Large stone mortars, and very heavy-pointed pestles, are used for this purpose. These pestles are either worked by the foot, (as in fig. 4, plate 1,) by hand, or by water-power, as the case may be.

The contrivance used for ginning cotton, met with in the cottages in the vicinity of Shanghai, though not worthy of the genius of an Arkwright, are still more efficient in removing the seeds of cotton than the old plan still practised in small country towns with us. It consists of a frame, having at one end of it two uprights, forming the bearings of two small horizontal rollers—the upper one resting upon the lower one with a slight pressure, so as to be rotated by motion communicated to the former, and at the same time yielding so as to allow the cotton to pass through or between the rollers. This is put in motion by a crank or leather strap, operated by one hand of a man or woman, seated on the bench part of the machine, while with the other hand the cotton is fed to the rollers. (See fig. 8, plate 1.)



VARIOUS CHINESE IMPLEMENTS

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CHINESE APPARATUS FOR GRINDING BEANS, BONES AND OTHER SUBSTANCES

REPORT MADE TO COMMODORE PERRY

OF

AN EXAMINATION OF VOLCANO BAY, ISLAND OF JESSO,

BY

LIEUT. COMD'G JUNIUS J. BOYLE,

ATTACHED TO THE UNITED STATES STORE-SHIP SOUTHAMPTON.

REPORT

OF

AN EXAMINATION OF VOLCANO BAY.

BY LIEUT. COMD'G JUNIUS J. BOYLE, U. S. N.

Instructions of Commodore Perry to Lieutenant Commanding Junius Boyle.

U. S. FLAG-SHIP POWHATAN,
Hakodadi, Japan, May 24, 1854.

SIR: When the wind and weather permit, you will proceed with the U. S. store-ship Southampton, under your command, to Volcano bay, and there employ yourself and all under your command in making as perfect a survey of the port as time and circumstances will allow, being careful to collect such specimens of fishes, shells, birds, plants, minerals, &c., as it may be practicable to obtain during the time you may be there.

During your stay in the bay you will endeavor to conciliate the kind feelings of the people, and it will be expected that you give some account of their appearance, habits, manners, &c.

Determine the positions of the prominent head-lands; note the time of tides, their set and velocity, and vertical rise and fall.

You will leave Volcano bay, weather permitting, on Thursday next, the 1st of June, and proceed thence to Simoda, there to resume your former anchorage. In your passage hence, and all the way to Simoda, you will make such observations with respect to the appearance and navigation of the coast as opportunities may allow.

I send you a tracing copy of Broughton's chart of Endermo harbor; but it is better not to trust to the chart of the vicinity, or, indeed, to any of the charts of the coasts and harbors of Japan, as they must necessarily be imperfect.

Wishing you a pleasant passage, I am, sir, your obedient servant,

M. C. PERRY,
Commander-in-chief, &c., &c.

Lieutenant Commanding J. J. BOYLE,
Commanding U. S. Store-ship Southampton, Hakodadi, Japan.

Report of Lieutenant Commanding Boyle to Commodore Perry.

U. S. STORE-SHIP SOUTHAMPTON,
Harbor of Simoda, Japan, June 12, 1854.

SIR: Having sailed in obedience to your order of the 24th of May, we arrived off the southern promontory of Volcano bay at 5 P. M., when it fell calm, and continued so until midnight; the roar of breakers being very loud; the nearest land, distant three miles; depth of water, 33

fathoms. In the morning entered the bay, the weather very thick, and coasted the shore along, 2½ miles distant; kept away for the harbor of Endermo, and shortly after meridian made the land ahead, which we approached within two miles, and ran along it in ten fathoms water, keeping off when shoaling that depth; the fog continuing thick, and the surf breaking far from the shore, could not see the entrance, which is quite narrow, and shut in by adjacent points. Having passed its position, continued along the land, running by the lead until 7, P. M., when we anchored off a small village. After night, it clearing a little, discovered three junks anchored near a large town, distant about three miles. During the night and all next day thick fog and rainy, with fresh breezes from E.S.E.; the land not in sight. At sunrise on the 27th the fog partly dispersed; weighed and stood for the eastern coast, sounding from a boat in 5 fathoms to within a mile and a half of the shore; also running a line of soundings with the ship, as we had previously done since entering the bay. At 11 the fog cleared off and disclosed to our view the handsomest country I have seen since visiting Japan. The hill-sides to the sea were covered with trees of a dark-green foliage, interspersed here and there with yellow spots, which I supposed to be under cultivation; villages and scattering houses were in sight in every direction near the beach, which is generally sandy. The bay abounds with sea-fowl, and has every indication of abundance of fresh water running from the ravines. At meridian the depth of water was 17 fathoms; running 9 knots east, for an indentation in the land, supposed to be the entrance of the port. The whole circle of this large bay in sight; the tops of most of the mountains covered with snow; and two volcanoes to the N.E. in a state of eruption. As we approached the land, we found the trees and shrubs looking less verdant than those on the opposite shore, and intermixed with a great deal of dead wood, both erect and prostrate. Continued on, and passed a small island, called after one of Broughton's crew; also a village of about twenty houses opposite, and found that we were standing up the channel of Endermo; keeping off gradually from east until $6^h\ 30^m$, when we anchored, heading S.W. A few houses abreast of the ship, on the port side, distant half a mile; a fortification on a hill south of us, and a shed near the water, where we supposed two guns were mounted. At 8 P. M., two Japanese officers came on board, rowed by Aino Indians; they had in a sheet of paper some rice and a small piece of wood; they made signs to know if we wished either, also water; and being told we wanted nothing, after asking the usual questions, they went on shore. At 7 P. M., the ship was visited by a functionary with many attendants; he was clad in the usual Japanese manner, but had, over all, a pelisse coat with a red collar and considerable embroidery. He was told that although we required nothing, we would pay for fish, vegetables, and eggs, if sent on board. He despatched his boat, which soon returned with a bundle of stems looking like the rhubarb plant; he said, owing to the bad weather, there was no fish, and only three chickens in the place. After refreshments, he, with his party, landed. I think he was a sort of military governor, and rather unfavorably inclined towards us. The preliminary arrangements having been made, the survey was commenced; the master, Geo. A Stevens, and Midshipman May being detailed for that duty with the necessary force.

At 2 P. M., a large party came off with the two officers that were on board last night, and another personage, with quite a showy dress, richly worked with gold thread and lace; he was a civil or political officer of some kind. They brought several bundles of vegetables, herbs, and a few salt fish; hauled up a net alongside, and presented us with the contents—about sixty flounders. Declining all pay, I made them a return present; when, after the usual refreshments, they departed in fine humor. A gang of hands employed clamming returned with a

mess sufficient for all hands; so ended Sunday. Monday set in pleasant; prosecuting the survey with vigor. A party on the beach in search of specimens of natural history, bringing on board in the evening a mess of clams and muscles, a variety of shells, and antlers of deer, and a few small snakes. I visited the small island at the entrance of the harbor, and found the grave of "Olason," buried there in 1796, by Captain Broughton, who named the island after him; a small joss house is erected on the spot, containing all the paraphernalia of mourning, showing by this that the inhabitants had respected his remains, and leaving us nothing to do to mark his resting-place.

A party from the northern village came on board, were entertained, and left the ship well satisfied; so closed Monday, with appearances of bad weather. Tuesday commenced with easterly winds, cold and foggy; few visitors. Surveying party hard at work, also a party clamming. During the night the mountains in the N.E. were brilliantly lighted up by a large volcano in full blast—making three seen from the ship in a state of combustion, but only this one issuing flames. In the morning thick, disagreeable weather; hard at work as usual, endeavoring to complete the survey before the weather became worse. At 4 P. M., inclining to a calm, got under way and stood down the bay; at 7^h 30^m picked up the surveying party, they having finished their labors. A thick fog coming on, continued in the bay, where we drifted with a light air during the night. At 1 P. M., June 1st, made the land on the western shore; tacked to the east, and at 4 P. M. took our departure from "Olason's" island, bearing N.E., distant 4 miles. On our arrival, the natives were seen hurrying off with back-loads of baggage; the village and harbor were at once deserted; most of the population we saw appeared to be Aino Indians—the fisherman being of that race. In stature they averaged less than Europeans, being but little over five feet, but well-proportioned, with intelligent features; their color dark, with very black, coarse hair, cut short behind, locks long and bushy, beard and moustaches unclipped and uncombed, and altogether filthy in their appearance. Their dress was a blue undergarment reaching to the knees, with a coarse brown sack, made of grass or skins, over all; leggins were not worn, their legs being quite hairy. In walking they turned their toes out, and in rowing pulled right and left alternately. On the morning after our arrival, we discovered that a calico screen or battery had been put up abreast of us during the night. The Japanese were similar in appearance to those of Hakodadi.

I will enclose the result of the reconnaissance of the bay, and a survey of the harbor of Endermo, the latter being the joint work of Messrs. Stevens and May, who are entitled to any credit you may be pleased to attach to it. Since being passed by the squadron on Saturday evening, we have experienced calms and head winds, with adverse currents, which delayed our arrival here until this time.

Hoping for your approval of my conduct, I am, &c., &c.,

JUNIUS J. BOYLE,
Lieutenant Commanding.

Commodore M. C. PERRY.

REPORT MADE TO COMMODORE PERRY

ON

OBSERVATIONS AND SOUNDINGS OF THE ISLANDS OF JAPAN,

FROM HAKODADI TO SIMODA,

BY

CAPTAIN JOEL ABBOT, U. S. N.,

COMMANDING U. S. SHIP MACEDONIAN.

REPORT

ON AN

EXAMINATION OF THE COASTS OF THE ISLANDS OF JAPAN.

BY CAPTAIN JOEL ABBOT, U. S. N.

Instructions of Commodore Perry to Captai Anbbot.

U. S. FLAG-SHIP POWHATAN,
Hakodadi, May 31, 1854.

SIR: Wind and weather permitting, you will proceed with the U. S. ship Macedonian, under your command, to the port of Simoda, Japan.

On your passage you will keep as near the land as prudence and safety will allow, in view o tracing the outline of the coast, and determining the positions of the prominent headlands, and otherwise improving the very imperfect charts of this part of the world.

It is important that the islands lying south of Cape King, including Fatsisio, should be sighted, and their positions marked by accurate observations.

Respectfully, your obedient servant,

M. C. PERRY,
Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

Captain JOEL ABBOT,
Commanding U. S. ship Macedonian.

Report of Captain Abbot to Commodore Perry.

U. S. SHIP MACEDONIAN,
Simoda, Japan, June 11, 1854.

SIR: Agreeably to your orders of the 31st ultimo, I left Hakodadi, island of Yesso, Japan, on that date, in the U. S. ship Macedonian, under my command, for this place, by way of the island of Fatsisio, and I have the honor to report my safe arrival here this evening.

I regret to have to state that the very unfavorable winds and weather have not afforded a good opportunity for a close continuous view of the coast of Niphon, nor to determine the exact position of its headlands or the numerous islands south of Cape King, having had but a very few reliable nautical observations. The first three days were attended with a dense, damp fog, during which but few glimpses of the land were had, and the whole passage has been attended

with a head wind, with the exception of about twenty-four hours. Notwithstanding which, a pretty close proximity has been had to the coast and the extensive chain of islands and rocks to the south of Cape King, on our way here, and frequent casts were had with the deep-sea lead; bottom was generally obtained on the coast of Niphon, at a distance of from three to five miles from the shore, in from 50 to 60 fathoms, generally sand and gravel. On one occasion, soundings were had in 26 fathoms, about five miles from the land.

Among the islands we have obtained soundings but once. When about ten or twelve miles from Fatsisio, toward South Island, which was in sight at the time about twenty miles distant, bottom was had in 90 fathoms water; dark, grey sand; but close to the island of Fatsisio, within two miles of the shore, no bottom could be found with 125 fathoms line. Various trials were had at different points. I will here remark, that Fatsisio is a beautiful looking island, and appears to have a numerous population, and to be in a high state of cultivation. A high, sugar-loaf looking island, of small base, about two miles from the main island, is cultivated to its very summit—a height, I should think, of 1,200 feet.

Fatsisio, instead of being inaccessible as regards convenient landing-places, on the contrary, has a number of fine landing beaches, upon one of which could be seen two boats hauled up. No boats were seen afloat at the main island; but the high sugar-loaf island, above spoken of, had several boats near it, apparently fishing.

The lack of observations, on account of the thick, stormy, and cloudy weather experienced on our passage, will allow but little to be said in regard to the position of the coast of Niphon and the adjacent islands.

The master's monthly report will contain such particulars as his observations will warrant, both as regards currents and position of places.

All which is respectfully submitted, by your obedient servant,

JOEL ABBOT,
Captain U. S. Navy.

Commodore M. C. PERRY,
Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

REPORT MADE TO COMMODORE PERRY

ON AN

EXAMINATION OF THE BONIN GROUP,

BY

CAPTAIN JOEL ABBOT, U. S. N.,

COMMANDING U. S. SHIP MACEDONIAN.

REPORT

OF

AN EXAMINATION OF THE BONIN GROUP OF ISLANDS,

BY CAPTAIN JOEL ABBOT, U. S. N.

Instructions of Commodore Perry to Captain Abbot.

U. S. FLAG-SHIP POWHATAN, YEDO BAY,
Japan, April 10, 1854

SIR: You will proceed with the United States ship Macedonian, under your command, to Port Lloyd, Peel Island, one of the Bonin Group, and there examine into the condition of the small settlement established at that place in 1830, and of which Nathaniel Savery, at the time of my visit to the island, was the only surviving white man of the first settlers.

I have strongly recommended the Port as a place worthy the notice of the government, it being in many respects suitable for a harbor of resort and refreshment for vessels plying between California and China, also for our whaling ships, and especially as a coal depot for steamers that will doubtless ere long be running as regular packets across the Pacific.

To this end, and to secure the only suitable location for a coal depot at Port Lloyd, I obtained by purchase from Nathaniel Savery a tract of land, which has been partially surveyed, and its boundary-lines established.

The object of your visit to this island will be of two-fold consideration. First, to render all suitable aid to this little settlement, and to the whaling ships usually found cruising in this vicinity—their boats frequently entering Port Lloyd for supplies. To take on board, unless he desires to remain, John Smith, ordinary seaman, who was landed in June last from the Susquehanna; and to pay off, and discharge from the books of the squadron, Nathaniel Savery, who has been allowed the pay of seaman, with one ration, for the services he has rendered.

Should Smith desire to remain on the island, you can discharge and pay him off.

The second object of your brief cruise will be, to give exercise to your officers and crew, and more particularly to make careful observations upon the winds and currents, in the track between this and the Bonin Group—a route which will be much frequented by vessels from the Pacific ports of the United States—and to mark the correct positions of any islands or rocks you may see in your passage to and from Port Lloyd.

You will more particularly notice the direction and velocity of a stream of moving water, running in a northeasterly direction, similar in many respects to the Gulf stream which traverses our own coast, marking upon the chart the outlines of its width and course; and noting, with great care, and at every hour, the temperature, as compared with that of the atmosphere.

You will not remain at Port Lloyd beyond the 28th, or, at farthest, the 30th instant; and will then proceed, on your return, to the port of Simoda, in Japan—one of those assigned by treaty as a place of resort for American vessels.

If you can obtain at the islands large or limited supplies of pigs, turtle, vegetables, or fruit, for the use of the squadron, you will procure what can be conveniently spared by the settlers.

When at the Bonins, in June last, I caused to be landed some bullocks, sheep, goats, and pigs, for breeding; and it is my desire that you will give strict orders forbidding the destruction of any of those animals upon either of the islands, as it is important that they should be left to multiply for some future object; nor will you allow the wild goats belonging to the settlers on the adjacent islands to be disturbed.

I send a few implements of husbandry to be distributed under your supervision to Nathaniel Savery, and others of the most industrious and exemplary of the settlers; also some seeds.

During your stay at the island, if time allows, you will make such observations and collections in the various branches of natural history as may be practicable.

Wishing you a pleasant cruise, I am, sir, very respectfully, your obedient servant,

M. C. PERRY,

Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

Captain JOEL ABBOT,

Commanding U. S. ship Macedonian.

Report of Captain Abbot to Commodore Perry.

U. S. SHIP MACEDONIAN,

Simoda, Island of Niphon, Japan, May 2, 1854.

SIR: In obedience to your orders of the 10th ultimo, for objects therein stated, I sailed the next morning in the U. S. ship Macedonian, under my command, for a brief cruise to the Bonin Islands, and back to Japan. In the performance of which, I have to report that I did not arrive at Port Lloyd until the afternoon of the 20th April, owing to bad weather, a rough sea, and strong currents.

Immediately on leaving the passage between Oho-sima and Cape King, there seemed to be a strong northeasterly current, and for two days there was every appearance of a gulf stream similar to that on our own coast near Cape Hatteras; the water, however, is not so warm by about 10 degrees, on an average, as the Gulf stream on the coast of the United States. The sea was very rough und irregular, boiling up, as it were, into heaps, and there was a continual hissing and roar of tide-rips—a perfect chow-chow, as a Chinaman would say. The weather was thick, stormy, and squally, and the wind very irregular—all round the compass—suddenly shifting from one side to the other, and taking the ship aback. Various whirlwinds were seen; one came near to us, and raised the water into a white foam as it passed along. Its extent and compass was small. I should judge there had just been a very heavy rotary gale. There was a rough, turbulent, agitated swell, nearly all the way to the Bonin Islands, and the winds very variable; and off those islands the current set very strong—sometimes to the northward and eastward, and sometimes to the southward and westward; the latter the most prevalent, I should think. The weather was such, after leaving the Japan coast, as to afford no reliable data upon which to determine the breadth or bounds of the stream, or the exact velocity and

sets of the current. I am inclined to think that it washes the entire eastern seaward coast of Japan; and that its breadth, southeasterly from Cape King, is about 90 miles, setting to the northward and eastward with a velocity of from 2 to 3 miles an hour, and for a considerable distance southerly in the same direction with less velocity. In latitude about 30° 40′ N. (it being calm), lowered a boat and found about half a knot westerly current.

In the hydrographical report of Mr. Walcutt, the master of this ship, will be found pretty much all that opportunities had will allow to be said respecting the winds and currents experienced, and the islands, rocks, &c., seen upon this short cruise.

I have visited all the settlers and residents at Port Lloyd, and distributed among them the vegetable seeds which you furnished for that purpose; also the agricultural implements, for which they appeared to feel very grateful to you, and properly to appreciate these benefits, as also all your other acts of kindness to them. Purser Allison and Dr. Gilliam, of this ship, have also distributed China fruit and vegetable seeds which they procured at Hong Kong.

Since your visit to Port Lloyd, the residents and settlers have formed a government or compact by the name of "The Colony of Peel Island," and established laws and regulations for their mutual welfare and protection—the government officers consisting of a chief magistrate and two councilmen. A copy of the instrument of their government, laws, and regulations, is herewith enclosed for your information; also, a schedule of the vessels that have touched at Port Lloyd for supplies, &c., since the Plymouth was there. These notes were taken by George Horton, a man who belonged to the Plymouth, but being very sick with the dropsy, and his time being out, by recommendation of the surgeon he was discharged by Commander Kelly, and left at Port Lloyd. Since he has been there he has entirely recovered his health, and has bought a good and comfortable place of a man who desired to leave, and has left, the island. Horton, though old, is a smart and serviceable man at the island, and makes an excellent pilot. He piloted the Macedonian in and out.

The settlers being desirous of hoisting the American flag, and having none of any kind to hoist, and as I thought it of importance to the many vessels touching there (principally American) that there should be a flag displayed when any vessel should be in sight, to identify the port, I loaned them one for that purpose, to be retained until called for.

I regret to have to report the loss of a bower anchor and thirty fathoms of chain-cable at Port Lloyd, by the parting of the chain or its getting unshackled; I suppose the latter, as the wind, although strong in puffs, was not sufficiently so (having two anchors down) to fairly part such a chain. In consequence of this mishap, it cost all hands two days' incessant labor in efforts to recover it, and I lament to say without success—the water being so deep and the bottom so rocky and foul. Eight anchors have been previously lost there, I was told, and none of them ever recovered. Notwithstanding this loss and hindrance, together with three days of bad weather, in which little or nothing could be done, the ship was filled up with excellent water, four or five cords of dry wood obtained, the seine a number of times drawn with good success. The great guns were exercised at target-firing, and most excellent shots made; the boat-gun was taken on shore and also exercised at target-firing, and the marines went on shore to drill and exercise in the same way; and most of the crew had liberty to land.

The residents furnished us with such vegetables as they could spare, which this season of the year affords—onions and sweet potatoes only—together with all the turtle they had on hand, and all that our short stay and the bad weather would allow them to take. The most of the turtle I have brought for the use of the squadron, one of which is a present to you from Mr. Savory.

Their fruits were not ripe, and they had recently supplied the whale-ships with all the pigs they could spare, which have been but few since the Russian squadron was there, in July and August. The fowls of the Shanghai breed with which you furnished the settlers are rapidly multiplying, and they will soon have chickens and eggs to dispose of. The sheep you left on Stapleton island, I was informed, were doing well, and that a second generation had been produced—*i. e.*, the first lambs brought forth there had also had lambs. All I could learn respecting the cattle was, that the bones of one of the bulls had been found. Since which, none of them had been seen, but some of them had been heard lowing. It was supposed that one of the bulls, in fighting with the other, got pushed over a precipice, from the situation of the bones that were found, and the circumstance that they began fighting soon after being put on the island. It is seldom that any of the settlers go to that part of the island on which the cattle are placed. I intended to go and look after them myself, but the bad weather and other circumstances did not permit of it.

On my passage to Port Lloyd, I fell in with three American whale-ships, from two of which I obtained a small quantity of sperm oil. The day I left, one arrived from which I got a good supply for the Macedonian, and two casks containing 287 gallons for the use of the squadron, which are now stowed upon the forecastle. The oil cost $1 25 per gallon.

My surgeons have either visited or prescribed for all the sick on board the whale-ships with which we have had communication. They also visited the sick at Port Lloyd—there being a number of sick men left there from whale-ships, upon one of whom they performed a surgical operation, and left him in a fair way of recovery; but for their timely aid and assistance, the man could probably never recover.

I left Port Lloyd, Peel island, in the afternoon of April 28th, the day you named. Our return passage has been characterized by nothing of particular interest except the discovery of a singular monumental-looking rock, several hundred feet high, which is not laid down on any of our charts, and which bears S. $\frac{3}{4}$ E., distant 54 miles from the island of St. Peters. The master's monthly report will contain particulars in relation to it.

All which is submitted by yours, most respectfully,

JOEL ABBOT,
Captain U. S. N.

Commodore M. C. PERRY,
Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

ARTICLES OF AGREEMENT

OF THE SETTLERS AT PEEL ISLAND.

We, the undersigned, residents and settlers on Peel island, in convention assembled, wishing to promote each other's mutual welfare by forming a government, have ordained and established the following articles, which we solemnly bind ourselves to support for the period of two years:

ARTICLE I.

The style of our government shall be "The Colony of Peel Island."

ARTICLE II.

The government shall consist of a chief magistrate, and a council comprised of two persons; and, by virtue of this article, we hereby unanimously elect and appoint Nathaniel Savory chief magistrate, and James Mottley and Thomas H. Webb councilmen; each to hold his said office of chief magistrate and councilman for the period of two years from the date of this convention. The said chief magistrate and council shall have power to enact such rules and regulations for the government of this island as by them, from time to time, may appear necessary for the public good. Such rules and regulations, to become binding on the residents, must have the approval and concurrence of two-thirds of the whole number of the residents.

ARTICLE III.

Until such time as the chief magistrate and council may be enabled to form a code of regulations, we hereby unanimously ordain and establish the following thirteen sections under this article, which shall have full force and effect until the adoption of others, and until the expiration of two years:

Section 1. It shall be the duty of any and all person or persons having claims and demands against each other, or who shall have any disputes or difficulties between themselves, which they cannot amicably settle, to refer the same to the chief magistrate and council for adjudication and settlement; and their decision shall be final and binding.

Sec. 2. All penalties in this colony shall be a pecuniary fine; and no penalty for any offence shall exceed the sum of ——.

Sec. 3. The chief magistrate and council shall have power to direct the seizure and sale of any property of any offender sufficient to pay the same against whom a fine has been decreed, wherever it may be found within the limits of Peel island.

Sec. 4. It shall be unlawful for any resident, settler, or other person on the island, to entice anybody to desert from any vessel that may come into this port, or to harbor or secrete any such deserter.

Sec. 5. Any person who shall entice, counsel, or aid any other person to desert from any vessel in this port, or shall harbor or conceal him to prevent his apprehension, shall be liable to a fine not exceeding fifty dollars.

Sec. 6. All moneys arising from the levy of fines upon offenders shall be a public fund for the use and behoof of the colony; and the same shall be placed in the hands of the chief magistrate for safe-keeping, and to be appropriated to such public purposes as the chief magistrate and council may deem necessary and proper; and a correct account of all expenditures of said moneys shall be kept by them, and a statement of receipts and expenditures published at the end of one year.

Sec. 7. All public moneys remaining unexpended at the end of one year shall be equally divided among the present settlers, unless otherwise ordained by a convention of the people.

Sec. 8. *Port Regulations.*—There shall be two regularly appointed and recognized pilots for this port; and, by virtue of this section, of article 3d, we hereby unanimously appoint James Mottley and Thomas H. Webb as such, for a period of two years from the date of this convention; said pilots may appoint capable substitutes under them, and it shall be unlawful for any other person or persons to perform the duty of pilot. Any one who shall, without the au-

thority of either of the appointed pilots, attempt to pilot any vessel into or out of this port, shall be liable to a fine equal to the amount of the established rate of pilotage.

Sec. 9. It shall be unlawful for any commander of a vessel to discharge any of his crew in this port without permission from the chief magistrate and council; and no commander of a vessel shall leave any sick or helpless man or men upon the island, unless he procure a house for him or them, and make suitable arrangements for his or their subsistence and comfort during his or their illness.

Sec. 10. Any person or persons not owning land upon this island, who may hereafter enter into partnership or trade with a resident and landholder, or who shall purchase an undivided interest in the land, if a resident, must enter into written articles of agreement, and obtain a written title to the undivided interest he may purchase in lands, stock, &c.; and in the event of dissolution of partnership or death of either party, partition of the property shall be made by the chief magistrate and council, whose duty it shall be to secure and take charge of the property and effects of any deceased person, for the benefit of his friends.

Sec. 11. Any person or persons who shall be guilty of trespass or waste upon the lands of any of the inhabitants shall be fined in a sum equal to the value of the damage or waste he or they may commit thereon, upon a proper adjudication thereof by the chief magistrate and council.

Sec. 12. The chief magistrate and council may, when they deem it necessary, call a convention of the people to propose new, and make amendments to the foregoing, rules and regulations.

Sec. 13. Any and all person or persons who shall hereafter emigrate to or settle in this colony shall be subject and held amenable to the foregoing rules and regulations.

All the above articles of government having been prepared, concurred in, and adopted by us in convention assembled, at the house of Nathaniel Savory, in Port Lloyd, Peel island, on the —— day of ——, A. D. —, we solemnly pledge ourselves to each other to support and carry out the same.

In testimony whereof, we have hereunto subscribed our names the day and year aforesaid.

(Signed by) NATHANIEL SAVORY,
And all the other residents of the island.

Report of Lieutenant Balch to Commander Kelly, respecting the Bonin Islands.

U. S. SHIP PLYMOUTH,
At Sea, December 6, 1853.

SIR: In obedience to your order of October 21st, I proceeded on the 22d with the launch and first cutter, the latter in charge of Lieutenant Cooper, to the Bailey group.

With the exception of Newport, on the west side of Hillsborough, formerly known as Fisher's island, and a small cove just to the northward of it, there is no place on the shores of any of the islands suitable for a coal depot; nor can Newport or the cove be recommended as places suited for such a purpose; they are both open from S.W. to N.W., the holding ground is not good, being sand and rocks. Vessels could, however, always get to sea on the approach of a gale, as there are two safe passages, and very plain.

Newport affords greater advantages for a depot than the cove; it would be necessary to cut away the bank where the sheds are to be placed, and extend a jettee out some seventy-five feet;

and it should be so constructed as to form a breakwater for the boats and lighters; it would be impracticable otherwise to discharge vessels.

Hillsborough island (the largest of the group) is seven and a half miles in length, by about one and a quarter in breadth. The greater portion of it is rocky and hilly, and unsuited for agricultural purposes. That portion of it which could be cultivated is a black loam, and produces sweet potatoes, yams, taro, and Indian corn, bananas, pine-apples, water-melons, and limes. Sweet potatoes form the staple support of the few inhabi ants of the island. I could discover no appearance of minerals.

There are several varieties of timber suited for mechanical nd ornamental purposes.

The only animal on the island is the wild hog. The birds consist of a few pigeons, blackbirds, and flying foxes.

Fish are abundant, and of excellent quality. Humpback whales resort to these islands from November till May, during which time they are calving.

Turtles are found in abundance in season, and are salted down by the inhabitants in lieu of beef.

Wood can be obtained on Hillsborough island. Water may be had in sufficient quantity, and of good quality. A small stream near the head of the cove furnishes an ample supply; but it would be necessary to roll the casks to the stream, or convey the water to the boats by a hose or pipes, which could easily be done.

The prevailing winds are from the northward and eastward from May 1st to December, when the westerly winds set in and blow until May; they do not, however, blow with the regularity of a trade wind or monsoon.

A chart is in process of construction from data obtained, and will be furnished as early as practicable.

I am, very respectfully, your obedient servant,

GEO. B. BALCH,
Lieutenant U. S. Navy.

Commander JOHN KELLY,
Commanding U. S. ship Plymouth.

INSTRUCTIONS AND REPORTS

IN RELATION TO A

VISIT TO MANILA AND FORMOSA,

BY THE JAPAN EXPEDITION.

INSTRUCTIONS AND REPORTS

IN RELATION TO

THE ISLAND OF FORMOSA AND MANILA.

INSTRUCTIONS.

Commodore Perry to Captain Abbot.

UNITED STATES FLAG-SHIP POWHATAN,
Simoda, June 18, 1854.

SIR: When the wind and weather permit, you will proceed with the ship under your command in company with the storeship "Supply," Lieutenant Commanding Sinclair, to the port of Kelung, in the island of Formosa.

The object of your visiting this island is to carry out the instructions of the Navy Department touching certain inquiries and researches to be made with respect to the fate of several missing persons, whose relatives and friends entertain a hope that they may still be alive and possibly detained in captivity, either in the islands belonging to the empire of Japan or in Formosa.

The enclosed copies of papers will give you all the information I possess with reference to this interesting subject, and it will be necessary that you base your course of action upon these data.

I think it better, therefore, not to put you under the restraint of restricting your movements or operations by any particular instructions other than to carry out the views of the Navy Department in a manner which you may think will be the most complete and effectual.

Besides the business of prosecuting the researches for the missing persons above alluded to, it is important that the coal localities of Formosa should be carefully examined, in view of ascertaining the feasibility of obtaining supplies from that island; the convenience of procuring and shipping it; the productiveness of the mines; the quality of the coal for steaming purposes; its cost per ton of 2,240 pounds at the mines; the convenience and cost of shipping, &c., &c.

The "Supply" is sent with you for reason of her light draught, and to be at hand in case of need; as also to take on board whatever coal you may be able to purchase.

If the coal is dear, say from $15 to $20 per ton, I request that you purchase not more than fifty, seventy-five, or one hundred tons; but if it can be obtained at a low price, say *ten* dollars per ton, it will be desirable that you purchase and put on board the "Supply" three hundred tons.

The general orders of the squadron respecting scientific researches will be carefully observed by all under your command during your cruise; and to assist in this pursuit, the Rev. Geo. Jones will be ordered to report to you for suitable accommodations on board the "Macedonian," and to act under your instructions.

After accomplishing the objects above detailed in the best practicable manner, you will despatch the "Supply" to Hong Kong, in China, and proceed with the "Macedonian" to the

port of Manila, in the island of Luzon, and there enter into communication with the United States consul and American merchants resident at that place, in view of giving to them such aid and protection as they may require; and after remaining there not more than eight days, unless some unforeseen and urgent necessity makes it proper for you to protract your stay, you will make the best of your way to Hong Kong, where you will receive further instructions.

It is desirable that you should be at Hong Kong by the 1st of August.

These instructions do not restrict your operations solely to the port of Kelung, in Formosa; if you deem it expedient and safe, you can resort to other ports of the island with the two ships, provided there be any information to make such course desirable.

Wishing you a pleasant cruise, I am, sir, your obedient servant,

M. C. PERRY,
Commander-in-chief U. S. naval forces,
East India, China, and Japan seas.

Captain JOEL ABBOT,
Commanding U. S. ship Macedonian.

P. S.—You will be in time if you are at Hong Kong by the 5th of August next.

M. C. P.

Commodore Perry to Captain Abbot.

UNITED STATES FLAG-SHIP POWHATAN,
Simoda, June 18, 1854.

SIR: I enclose herewith copies of certain papers received from the Navy Department respecting the procurement of plants of the sugar-cane, and have to direct that you advise with the United States consul at Manila as to the feasibility of obtaining desirable specimens in that neighborhood. His long residence in the country will enable him to give you every information upon the subject, and it is not improbable that his attention has already been called to the advantage or otherwise of sending plants of the cane from Luzon to the United States.

Chaplain Jones will aid in executing the wishes of the government, as well in this particular as in the collection of other specimens.

You will perceive that the letter of the Secretary of the Interior authorizes the disbursement of the necessary funds to defray the expenses of purchasing and securing the required specimens.

It is not desirable to have a great number from Luzon, as I propose to obtain specimens from other localities. Please make yourself acquainted with the best mode of preparing and preserving the plants on shipboard.

Very respectfully, your obedient servant,

M. C. PERRY,
Commander-in-chief U. S. naval forces,
East India, China, and Japan seas.

Captain JOEL ABBOT,
Commanding United States ship Macedonian.

Commodore Perry to Captain Abbot.

UNITED STATES FLAG-SHIP MISSISSIPPI,
Simoda, June 19, 1854.

SIR: Some time last winter I was informed by Mr. Charles D. Mugford, of Manila, of a most melancholy event, which had brought him in communication with the authorities of that place. I am yet quite ignorant of the circumstances of the case, but, in consideration of a promise made to that gentleman to bear the subject in mind, with the intention of inquiring more fully into the matter should it be in my power to visit Manila, I have to request that you confer with that gentleman, as also with the United States consul, Mr. Edwards; and if, by any just and proper application to the local government, you can, in your official capacity, contribute to the object Mr. Mugford has in view, I request that you may do so. Under any circumstances, you will be pleased to collect all the information you can upon the subject, and report to me for my further guidance.

Very respectfully, &c.,

M. C. PERRY,
Commander-in-chief, &c., &c.

Captain JOEL ABBOT,
Commanding United States ship Macedonian.

Commodore Perry to Charles D. Mugford, Esq.

UNITED STATES STEAM FRIGATE MISSISSIPPI,
Simoda, Japan, June 20, 1854.

MY DEAR SIR: I regret that the delays which have attended my present visit to Japan will, at least for the present, deprive me of the pleasure of visiting Manila; but mindful of the conversation which passed between you and myself, respecting the melancholy event related by you, I have instructed Captain Abbot, in command of the frigate Macedonian, to confer with you, to collect all necessary information, and to take such steps as may lead to a full understanding of the question, in view of calling for the further action of the commanding naval officers on this station, or of the interference of the government at Washington.

I enclose a copy of my instructions to Captain Abbot.

Very truly and respectfully your obedient servant,

M. C. PERRY.

CHARLES D. MUGFORD, Esq., *Manila.*

Commodore Perry to Captain Abbot.

UNITED STATES FLAG-SHIP MISSISSIPPI,
Simoda, June 19, 1854.

SIR: I enclose herewith copies of two reports of Lieutenant Commanding J. J. Boyle, which relate to the rescue of six colored persons, supposed to be natives of the island of "Silla-ba-boo," situated in latitude 3° 47′ north, and longitude 127° 11′ east.

These men, as you are aware, have been kindly treated, and retained in the squadron for reason that no opportunity has offered of sending them back to their native island, and they are now put on board the Macedonian to be taken to Manila, from whence they can doubtless find means of returning home.

Be pleased to consult with Mr. Edwards, and make such disposition of them as in your judgment may seem most suitable.

Respectfully, &c.,

M. C. PERRY,
Commander-in-chief U. S. naval forces, &c.

Captain JOEL ABBOT,
Commanding U. S. ship Macedonian.

REPORT OF LIEUTENANT COMMANDING J. J. BOYLE.

Extract of a report of Lieutenant Commanding J. J. Boyle, commanding United States storeship Southampton, attached to the Japan Expedition, addressed to Commodore M. C. Perry, bearing date United States storeship Southampton, Cum-sing-moon, China, August 29, 1853.

August 5th, at 9 A. M., the ship being in latitude 18° 46′ north, and longitude 124° east, a boat was discovered to windward; we were steering S.W. by W.; wind from the north and westward blowing a fresh top-gallant breeze, with considerable swell; after heaving to, &c., succeeded in getting on board six persons from the boat, which was hoisted in; her dimensions were 12 feet long, 4 wide, and 17 inches deep. The strangers were all males, four of them middle aged, and two boys, apparently about fourteen. They were healthy, of a dark color, hair cut close, not tattooed, and did not appear much exhausted; I thought they had been adrift two or three days; they had no water with them, about two or three dozen ears of Indian corn, and some prepared betel-nuts, a cask, with two gongs, an axe, a small piece of grass cloth as a sail, and a colored piece supposed to be a flag; no one on board can understand their language, the words used most frequently by them is Silla-ba-boo. The nearest land to us was Cape Engano, N.E. part of Luzon, distant about 100 miles. The Babuan and Barhio group were directly to windward, distant about 180 miles, where it is thought they belonged, but in beating through them, and passing near the principal ones, they saw them with indifference; when brought particularly to their notice, they shook their heads and made signs to the eastward, and said Silla-ba-boo, shaking their heads at the same time. There is an island by that name, described by Horsburgh, in latitude 4° north, longitude 127° east. Although the wind was from the northward and westward when we picked these persons up, we had a short time previous heavy southeasterly weather. After entering the China sea on the 9th, the winds were light, variable, and occasionally sudden squalls, winds mostly from W.S.W. to W.N.W. At 11 A. M., Sunday, 21st, took an outside pilot near the Great Ladrone; at 2 A. M., next morning, anchored in Macao roads, where having received your orders, got under way at 8 P. M., and anchored at Cum-sing-moon at 2.30 A. M. next day. Many have visited the ship; but nothing more has been found out respecting the persons picked up than I have stated. The Japanese from the flag-ship disowns them as countrymen of his. They have been taken on board of each

of the ships engaged in trade here, and out of the numerous dialects spoken none can understand them. There are Siamese here, whose language they do not speak. On board of the ship Bombay they dropped a few words which the captain thought he recognized as the language of the natives of the Bentinck islands; on their noticing it, they made their usual abject motions and salaams, and said Silla-ba-boo, and then remained silent.

I do not believe they wish to make themselves known, or I think they could do so by signs or language, where so many different castes and nations are assembled. Their usual habit of making off and hiding when strange persons come on board is singular to me. I also think they all act by direction of one of their number; they have a strange aversion to leave the ship, and have made no acquaintances. They have been made comfortable on board.

I remain yours, &c., JUNIUS J. BOYLE,
Lieutenant Commanding.

REPORT OF EXAMINATION OF THE SIX RESCUED NATIVES.

UNITED STATES NAVAL HOSPITAL,
Macao, October 15, 1853.

SIR: In compliance with your order of the 5th instant, requiring a careful examination of the naked bodies of the Indians rescued by the United States ship Southampton to be made, and a written account of their conformation, complexion, cast of features, and any peculiarities of physical development with reference to their ethnographic character to be furnished, we, the undersigned, have the honor to submit the following report, the result of our investigation:

In reference to their stature, we find they are of about the medium height, well set, with a moderate muscular development; body and limbs well proportioned; having but a small amount of adipose matter in their subcutaneous tissue, it gives a sharpness to their contour. Their heads are small and round, with a large, disproportionate development of the posterior part of the cranium. Their faces approximate the oval form, with a moderately high forehead; eyes black, but not very brilliant or intelligent in their expression; chins broad and rather massive; noses long and flat; lips somewhat thick and moderately prominent, so that their features resemble in some degree those of the mulatto. Their mouths are large, displaying strong and well-formed teeth; which, however, are much disfigured by the use of the betel-nut. Their skin is smooth and soft; the head covered with a profusion of coarse, black, and straight hair, generally worn short. On the other parts of the body where hair is usually found, it was small in quantity and thin. Their limbs lithe, hands and feet small; their complexion approximating that of the dark mulatto, with a tinge of the copper color. They do not exhibit any of the stern, strong features of the North American aborigines. They usually sit on their haunches; are very taciturn, and with a stolid expression of countenance.

Their language, when they were found conversing with one another, was soft and agreeable to the ear; yet, although it is supposed to be a derivation from the Malayan, it was not intelligible to those on board familiar with the ordinary dialect of the Malays.

From the position where they were found, and many characteristics about them, we are of opinion they are of Malay origin. It is probable that climate and other accidental causes have tended to modify and change them somewhat from their original stock. Their intelligence is of

a very low order. Various attempts were made with the language of signs to communicate with them, but without their acknowledging the least comprehension of it.

We are, sir, very respectfully, your obedient servants,

T. S. SMITH, *Surgeon of the Fleet.*

J. J. MESSERSMITH, *Passed Assistant Surgeon.*

Commodore M. C. PERRY,

Commander-in-chief Japan Expedition, &c., &c., &c.

REPORTS.

Captain Abbot to Commodore Perry.

UNITED STATES SHIP MACEDONIAN,

Kelung, Island of Formosa, July 22, 1854.

SIR: I very briefly inform you by the "Supply," that I succeeded in getting out of the harbor of Simoda on the morning of the 26th of June, in company with the "Supply," (she, however, disappeared the second day out,) and that I arrived here on the morning of the 11th instant, in the midst of a tempest, having had a strong opposing current and a head wind nearly all the way. The "Supply," greatly to my annoyance, anxiety, and regret, did not reach here until yesterday morning, ten days after us, which has somewhat prolonged my stay here. The first night here it blew exceedingly heavy, so as to have to let go the sheet anchor; since which the weather has been very moderate and pleasant, except exceedingly warm.

All on board have been constantly employed, and arduously so.

With a good deal of effort and labor, we have succeeded in watering ship with some good and some bad water; the latter I considered preferable to filling the tanks with salt water.

My mission here has been a successful one in all respects, except obtaining information touching the fate of our missing countrymen, respecting which I have gained no intelligence.

By the Rev. Mr. Jones's indefatigable searches after coal, he has discovered eight or ten very extensive and valuable coal-mines, the coal from which appears to be very pure and excellent.

By persevering efforts, in the face of opposing influence of Chinese officials, about twelve tons of coal have been obtained, and taken on board the Supply to-day, and three small junks have gone for more. The coal obtained here now, under disadvantageous circumstances, will probably cost about three dollars ($3) per ton. Mr. Jones is writing you on the subject of the coal mines, so I need say no more now myself.

Lieutenant Preble has perfected a good survey of the harbor, and an adjacent little harbor near one of the mines, that is protected against northeast winds and is almost entirely landlocked.

Mr. Jones has purchased a stone for the Washington Monument—the best we could find. If the wind and weather will permit, I shall sail early in the morning, leaving the "Supply" to get necessary supplies, and during which to receive all the coal that can be obtained.

Most respectfully, I have the honor to be your obedient servant,

JOEL ABBOT,

Captain United States Navy.

Commodore M. C. PERRY.

Captain Abbot to Commodore Perry.

UNITED STATES SHIP MACEDONIAN,
Hong Hong, August 26, 1854.

SIR: I have the honor and pleasure to report to you that I have safely performed the cruise, and successfully accomplished, as far as practicable, to the best of my ability, all its objects contained in your instructions of the 18th of June last.

On the morning of the 23d ultimo I left the harbor of Kelung, island of Formosa, for Manila, in the island of Luzon, leaving the "Supply" to sail soon for Hong Kong. I sent on board of her a despatch for you, giving a brief statement of my departure from Simoda, passage down to Kelung, and of our doings there; a copy of which will be herewith enclosed, should you not have received it.

In regard to matters at Kelung, I have only to remark in addition to what was there written, that respecting the melancholy fate of our missing countrymen, supposed to have been lost at sea or shipwrecked upon the shores of Formosa, or in its vicinity, I could gain no intelligence, although I made diligent inquiry through my Chinese steward of the mandarins and all other classes of persons in and about Kelung in regard to shipwrecks, and whether there were any American, English, or European persons in any part of their island; to which all declared that they had never seen or heard of there being any such, nor had they ever known or heard of any vessel being wrecked upon the island; but just as I was leaving Kelung I, was informed by the chief mandarin that he had made particular inquiries about shipwrecks, and learned that a ship, six or seven years ago, was wrecked forty or fifty miles from Kelung, on the west side of the island, having a good many black men on board; that the white men took the boat and went off to an adjacent island, and that the black men all died on board the ship; that he would send his war junks with me to show the place. This story was evidently made up with a hope of effecting what he had been a number of days endeavoring to do—that of having me accompany his war junks to a place on the west side of the island, that he said would only take four or five days to go and return, and assist them in driving off the rebels collected there, with which his forces had lately had a fight and been beaten, with the loss of thirty men killed and wounded. If I would thus go and aid them in dislodging the rebels, he would, immediately on my return, give me a large ship-load of coal and make a present of it. He also seemed to desire to prolong my stay at Kelung, in view of the safety of the place from any attack of the rebels while the ship remained there. Although I have no belief that any of our missing countrymen are alive upon the island of Formosa, my intention was, on leaving Kelung, to beat down the west side of the island and communicate with the Chinese villages, that my efforts might be as broad and searching as possible, though it would be attended with inconvenience and dangerous delay, and notwithstanding Commander Kelly had, some time since, touched at them for the same purpose, and was unable to obtain any information touching the fate of our lost countrymen; but soon after weathering the northern point of Formosa the weather became bad, and very threatening; in fact, we were upon the edge of a typhoon which, fortunately, carried us rapidly on our course to the southward of the south end of Formosa before it blew so heavy that we could not run. After the gale was over, my limited time and the small quantity of provisions on board would not allow of my running back for any purpose whatever, without giving up going to Manila; so I kept on, and on arrival at Manila had but two bags of bread on board. Although my passage to Manila was considered by the gentlemen there as a very quick

one for the season of the year, it was attended with the worst weather I ever experienced. We had a constant succession of heavy tempest squalls, with heavy, drenching rains, some of them peculiarly severe and frightful in appearance. The ship suffered more during this short passage in her sails and rigging than on her whole passage out from the United States.

I lament to have to state that on the 26th ultimo, while shortening sail in the border of the typhoon spoken of, Charles Wentworth, an excellent man, a foretop-man, fell from the fore-topsail yard overboard, and sunk immediately, first striking his head and breast upon the iron work of the lower studding-sail swinging-boom, splitting his head open, which must have killed him instantly. The death certificate required by regulation is herewith enclosed.

The Macedonian was brought to an anchor off the town of Manila, in tempestuous weather, late in the afternoon of the 10th instant. The next morning I saluted the place with twenty-one guns, which were promptly returned. After which I made an official call on the governor, or captain general, in company with our excellent consul, William P. Pierce, esq. We were cordially received, and subsequently dined with his excellency by invitation.

The public matters which you were pleased to confide to my care and judgment have been disposed of, as far as I am concerned, and have considered that I had the power to act, in a manner, I hope and trust, that will be acceptable both to yourself and to our government.

My correspondence with his excellency the captain general of Manila upon the subjects requiring to be brought to his notice is herewith enclosed—the copies of my letters, and the original official replies in Spanish, together with a free translation of the same, are all respectfully submitted, as also an original detailed statement of the bloody tragedy at Santa Mesa, addressed to me by Mr. C. D. Mugford, a brother of one of the murdered Americans.

By aid of Mr. Pierce, our consul, a quantity of sugar-cane cuttings, desired by the Interior and Navy Departments at Washington, and directed by you, have been procured, and are on board the ship, in careful keeping of Rev. Mr. Jones, who has, with his characteristic energy and faithfulness, attended to, and been successful in, the accomplishment of all the other directions contained in your instructions, as far as possible; and he will make report to you of all his doings, which I have no doubt will meet your cordial approbation and approval.

The young gentlemen, Passed Midshipmen Jones and Breeze, and Mr. Williams, master's mate, detailed by you from the Mississippi to aid and assist Rev. Mr. Jones, have, besides attending to his requirements, performed good service on board, having volunteered to keep watch, and have done so. Passed Midshipman Jones has also performed good service with Lieutenant Preble in the survey of the harbor of Kelung, the chart of which is in rapid progress of construction, and I think it may be relied upon for correctness. The chart by which I entered the harbor is very erroneous in many respects, and should give place to a better and more recent survey.

In taking leave of Manila, I should be wanting in justice and generous obligation if I should neglect to acknowledge the able assistance and friendly attention I received from Mr. Pierce, the newly appointed American consul, in my intercourse with the authorities and citizens of the place, and to make known his ready and careful attention to all the wants of the ship, together with his generous hospitality to myself and others, and to express my belief that his appointment to the consulate is a judicious and happy selection for our commercial interests, and for the protection of the rights and privileges of American residents within the bounds of his consulate authority and influence.

The consul, together with the American gentlemen at Manila, desired me to present to you

their grateful thanks for sending a ship-of-war to protect and look after their interests; and they also desired me to say, that they considered that the visit of the Macedonian would be of real service to the American interests at Manila. There seemed to be no regret on their part, and nothing wanting in the visit of the Macedonian, but your presence; and a strong desire and hope was expressed that you would yet favor them with a call yourself before your return to the United States. But little, however, could have been added to their hospitable attentions had you yourself been present.

Just before we sailed, the naval commandant and a number of army officers, together with the consul and most of the American residents and ship-masters, visited the Macedonian, and appeared highly gratified.

In regard to the coal-mines in Formosa, those already known to us are very extensive and valuable, and there are probably others in the vicinity yet unknown even to the natives. There is also good reason to believe that coal abounds in various other parts of the island, and from the mines of which more has been extracted than at Kelung. The mines we have already seen, if in the possession of an American mining company, would be exceedingly valuable; and I have no doubt they might be purchased for an inconsiderable amount. They are so situated that the coal might be transported at a trifling expense, by means of inclined planes and short railroads, which need not be expensive in their construction, and the coal dropped directly from the cars into boats and small vessels. About three miles from Kelung there is an admirable little harbor, in near proximity to the mines, on the seacoast, that is almost entirely land-locked and completely protected against northeast winds. At a small cost a railroad could be run from the mines to this little harbor, of which Lieutenant Preble has made a hasty survey, and attached it to his chart of the harbor of Kelung.

As the Rev. Mr. Jones will make to you full reports of a scientific and geological character in relation to the coal-mines and other matters, I do not feel it necessary or profitable for me to extend further remarks upon the subject.

After a stop at Manila of six days and a half—one of which being Sunday, and one a strict holiday, and two so rainy that but little could be done—and having obtained, as I considered, a safe quantity of bread and other necessaries to take us here, the Macedonian was underway at an early hour in the morning of the 17th instant for this place, at which I have the honor to report my arrival.

Our passage from Manila here has been characterized by a singular dissimilarity to the passage there from Kelung. The first five days out there was either a dead calm or light baffling airs and winds from the northward, and westward and northward, during which but little more than an offing from the land was obtained; since which, calms and moderate breezes have prevailed, and, what is very unusual, there has been scarcely any southing in the wind, and the weather has been remarkably pleasant, with the exception of one day.

With the sincere hope that this will find you in health and happiness, I am, most respectfully, your obedient servant,

JOEL ABBOT,
Captain United States Navy.

Captain J. Abbot to the Governor General of the Philippine islands.

UNITED STATES SHIP MACEDONIAN, *August* 12, 1854.

SIR: I am instructed by Commodore M. C. Perry, commanding the United States squadron in the East Indies, to seek information from your excellency relative to the murder of two American citizens, in the month of March, 1853, at the rope-factory at Santa Mesa.

The fact of the murder is undoubted, and the friends of the deceased are naturally anxious to know if the exertions of the police or other agents of the government under the dignified command of your excellency have been able to identify the persons of the murderers, or to get any clue which may throw light upon the dark tragedy.

The United States consul tells me that many persons were arrested on suspicion of being concerned in the murder, but that, according to his information, they have been liberated without having disclosed anything which would point out the actual perpetrators of the deed. He also informs me that it was proposed to your excellency's predecessor, General Urbistondo, at the time of the occurrence, by the Americans resident here, to offer a reward of such sums of money as might be thought adequate for such information as might lead to the discovery of the assassins. His excellency declined to entertain the proposition; but it is still the opinion of the consul, and of the Americans generally here, among whom is a brother of one of the murdered men, that the truth may be discovered by offering a reward which will induce some of those persons who have the information to betray their comrades.

I have to beg that your excellency will give me such information as you may be possessed of with regard to this subject, and inform me if it may be in accordance with your excellency's ideas of expediency to permit the offer of a reward, as proposed by the consul, through the agency of the alcalde or some other officer; or if it would be more expedient that such reward be offered directly by those more immediately concerned, the owners of the factory.

Another object Commodore Perry had in view in ordering the ship under my command to Manila, is to present to your excellency six natives who are believed to belong to some island of the group under your excellency's government, they having been picked up by the United States storeship Southampton, in the Pacific ocean, about one hundred miles from Point Engano, the northeast point of Luzon.

Enclosed I have the honor to present to your excellency a copy of the report of the commander of the Southampton, addressed to Commodore Perry; and I hold myself ready to deliver the men to your excellency's order.

As I am instructed to make my stay in Manila as short as possible, being in fact ordered to meet the commodore at Hong Kong in the present month, I hope to receive your excellency's reply at an early day, in order that I may have it in my power to report to my commanding officer, Commodore Perry, the result of my mission.

I propose to sail on the evening of the 16th for Hong Kong, and I hope to arrive in time to place letters in the mail which will go out on the 22d. And I take this opportunity to offer my services to your excellency, with the assurance that any mails or despatches which may be confided to my charge shall be carefully delivered.

I have the honor to be your excellency's most obedient servant,

JOEL ABBOT,
Captain United States Navy.

His Excellency the GOVERNOR GENERAL OF THE PHILIPPINE ISLANDS.

From the Governor General of the Philippine Islands to Captain Abbot.

[Translation.]

MANILA, *August* 14, 1854.

MY DEAR SIR: I have received your communication of the 12th instant, informing me that Commodore M. C. Perry, commanding the United States East India squadron, has confided to you, among other commissions, to procure information relative to the state of the case pending with reference to the assassination committed on the persons of two American citizens in the month of March of last year at the rope-walk at Santa Mesa, and asking of me that I would give you the information sought. Since the day in which this very sad affair took place, the courts have not ceased in their investigation and inquiries; arriving at such result that I am able to say to you that if it is true, as the United States consul has told you, that some persons have been put at liberty who were in the first place believed to be culpable, it is not less true that others have recently been legally condemned to various terms of years of labor, in chains, with other penalties included in the sentence. To my Queen's government, which, by royal order of 16th June of last year, demanded the result of the investigations which, with great zeal, were made by the courts, I have transmitted some time since the sentence passed by the supreme court of these islands, and I do not doubt that the government of the United States have already full notice of the same.

The indication which was made to my antecessor, as the consul has informed you, and which you now propose, respecting the propriety of offering a reward, to see if by this method may be apprehended the two fugitive criminals, you will understand that it could not produce better (more) results than is offered by an administration zealous for the observance of the laws and for the just punishment of criminals; and in this opinion have participated the countrymen resident here, and those allied to the victims, for otherwise they would have repaired as interested parties to the courts. These courts have established and judged the case. The judges have spared no legal method of investigation, and you may rest assured that they will continue to fulfil their mission for the punishment of the two presumed criminals, the only ones which they have not been able to find, but who will suffer the penalty they merit if they are still in the islands and have not escaped abroad.

I will not conclude without giving you my sincere thanks for the delicate attention manifested in your offer to take charge of such correspondence as I may have to send to Hong Kong for the mail, which leaves that port for Europe on the 22d instant.

God guard you many years.

EL MARQUES DE NOVALECHES.

Captain JOEL ABBOT,

Commander of the United States ship Macedonian.

From the Governor General of the Philippine Islands to Captain Abbot.

[Translation.]

MANILA, *August* 14, 1854.

SIR: I have received your attentive communication of the 12th instant, and with it a copy of the letter addressed to Commodore M. C. Perry, by the commander of the United States transport ship "Southampton," giving particulars relative to the six natives of these islands tha

were picked up at sea, saving them from the danger they were exposed to, and paying them on board of his vessel every care and attention.

Besides giving a full account of the whole affair to Her Majesty's government, subjoining a copy of the document from Captain J. J. Boyle above referred to, in order that Her Majesty may appreciate justly the services rendered on the occasion by the said captain to Her Majesty's subjects, it is my duty to express to the commander of the transport "Southampton," to Commodore Perry, and to yourself, my sincere thanks, in the name of my sovereign, in that of those natives, and in my own, for the humanity, philanthropy, and generosity you have all used towards those unfortunate people in saving their lives, and for the careful attention with which they were provided with everything that was necessary. It affords me great pleasure in repeating again my thanks, begging that you will transmit them to all those that have had anything to do on the subject in question, and I beg to request of you the favor to grant the necessary orders for the delivery of said natives to the captain of this port, who has got my orders to receive them.

Please receive the assurance of my high consideration and esteem.

Remaining, dear sir, your obedient servant,

EL MARQUES DE NOVALECHES.

Captain JOEL ABBOT,
Commander of the United States ship Macedonian.

Captain Abbot to the Governor General.

UNITED STATES SHIP MACEDONIAN,
Manila bay, August 16, 1854.

SIR: I have the honor to acknowledge receipt of your excellency's despatches, dated 14th instant, in reply to my letter of the 12th, and I beg to tender my thanks for the readiness shown by your excellency in sending replies thus early, which in a few days I shall have the pleasure of delivering to my commander-in-chief.

With reference to the case of the murder, at Santa Mesa, of the two Americans, it is with great satisfaction that I learn that your excellency's attention had been already given to it, and that the investigations of the courts have resulted in the condemnation of several persons participators in the bloody tragedy. The two still at large, of whom your excellency speaks, will, I hope, be brought to justice. My commander-in-chief, Commodore Perry, will, without doubt, be very happy to learn that the particulars of the case have been sent to the government of her Majesty the Queen, and probably already transmitted to the government of the United States.

The flattering compliments which your excellency kindly bestows upon the officers of the "Southampton" and the squadron generally, in the rescue and care of the six natives, already delivered to the captain of the port, in compliance with your excellency's expressed wishes, will be fully appreciated, accompanied as they are by the demonstration of your excellency's benevolence and goodness of heart in extending to these unfortunates your paternal care and solicitude.

I hope to be ready to sail for China this evening, and in leaving Manila shall bear with me the pleasing memory of your excellency's most gentlemanly kindness during my stay in port.

I have the honor to be your excellency's most obedient servant,

JOEL ABBOT,
Captain United States Navy.

His Excellency the GOVERNOR CAPTAIN GENERAL OF THE PHILIPPINE ISLANDS.

The Governor General to Captain Abbot.

[Translation.]

MANILA, *August* 14, 1854.

SIR: In your attentive communication, which receipt I have acknowledged in another letter, you kindly offer to take charge of any mail letters which I may conveniently send on board of the vessel under your command for Hong Kong, offering, besides, very kindly indeed on your part, to deliver them there to the person who may be appointed to receive them.

It gives me pleasure to observe in your offer to me a true proof of your distinguished sentiments, for which I beg you will accept my best thanks.

Please receive the assurance of my high consideration and esteem.

Remaining, dear sir, your obedient servant,

EL MARQUES DE NOVALECHES.

Captain J. ABBOT,
Commander of the United States Ship Macedonian.

REPORTS MADE TO COMMODORE PERRY

OF

A VISIT TO THE COAL REGIONS

OF

THE ISLAND OF FORMOSA:

BY

REV. GEORGE JONES, M. A.,

CHAPLAIN U. S. N.,

ATTACHED TO THE UNITED STATES STEAM FRIGATE MISSISSIPPI.

REPORTS

ON

THE COAL REGIONS OF THE ISLAND OF FORMOSA:

BY REV. GEORGE JONES, CHAPLAIN U. S. N.

REPORT I.

Chaplain Jones to Commodore Perry.

UNITED STATES SHIP MACEDONIAN,
Harbor of Kelung, Formosa, July 22, 1854.

SIR: I have been engaged so constantly in explorations and in duties connected with procuring coal, as to be unable to draw up a detailed account of this region and of events; and will ask your indulgence in this respect until our arrival at Hong-Kong, and will now only give a general statement of what has been seen and done.

We found both the mandarins and people disposed to be friendly, but exceedingly fearful each one of the person immediately above him, and thus in constant alarm lest some unknown danger to them might lurk in every piece of information we gained, or every scrutiny we made. To this may be added a system of lying and deception, from the highest mandarin down, in a degree that I never saw before, even in China. Nearly all that we have learned about the coal in this region has, therefore, been by pushing and persevering investigations, in the face of constant attempts of the inhabitants to mislead us or to blind us as to the facts. They have otherwise thrown no obstructions in our way. When they found we would go, they let us go; when they saw they could not cheat us, they yielded courteously; now and then we found a native willing, for a good reward and a promise of secrecy, to help us and to act as guide; and so we have been able to ascertain, I think, all the facts with regard to the northeastern portion of the island as respects its possessions in coal.

The coal is quite abundant. I have been at eight distinct mines, and have explored twelve drifts to their termination, in most cases getting specimens of the coal. The seams of coal are in no instance that I have seen more than three feet in thickness, (never less than twenty-eight inches;) but they are so easily worked that, probably without exception, it might with proper mining be delivered at the mouth of the mines for a dollar and fifty cents per ton of 2,240 pounds.

As to its suitableness for steamboat purposes, I fear that it burns too freely to make it rank among the best kinds of coal. But it is a perfectly pure coal; it does not cake or run in the least degree; it leaves scarcely any ashes; and if too free in its combustion when alone, it will probably be found valuable for mixing with anthracite or others of the more intractable kinds.

In almost every instance, the coal seams are remarkably accessible; from a number of the mines a railroad of two hundred yards would deliver it on the banks of a stream navigable at full tides and debouching in the harbor of Kelung, while at a spot three and a half miles east from this, a seam comes cropping out in a bluff rising immediately from the sea, or rather from the bottom of a shallow bay, where a railroad of two hundred feet from the mines down might drop the coal at once into boats lying in the safely-sheltered coves among the rocks below.

I have explored to an extent of seven miles east from this, and have found coal-mines, or indications of coal, over the whole extent. The country westward has exactly the same geological character as the east; but I have not had time to give it any examination.

The natives have done a little at mining; but it is in a slovenly way, and with indifferent results.

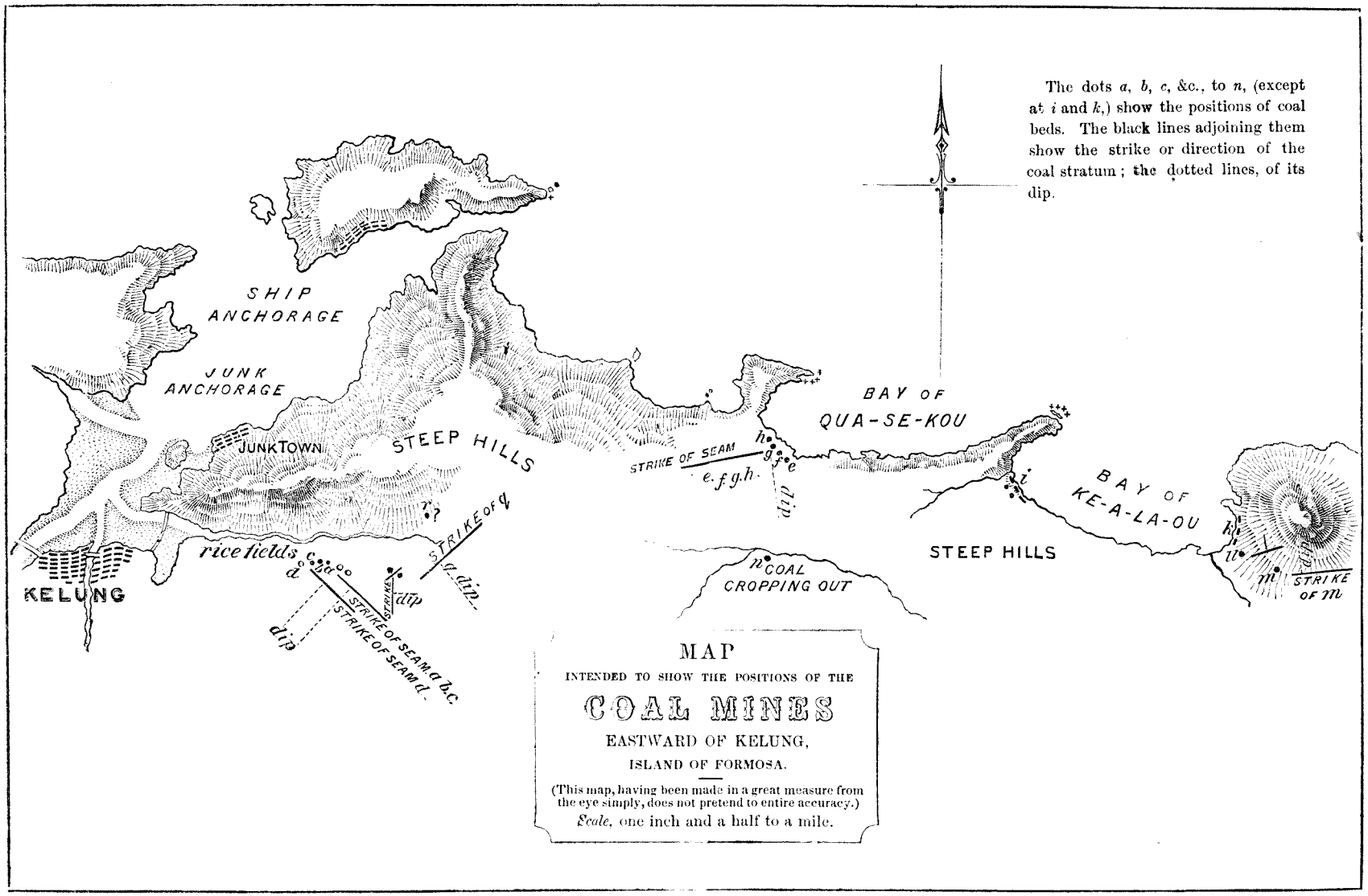
We have had great difficulty in getting a stone for the Washington Monument, the rock here being all a soft sandstone, entirely unfit for architectural purposes; but we finally purchased a granite stone, forming part of the quay at Kelung, which I hope will suit.

Captain Abbot has requested me to say that they have completed a good survey of the harbor, extended also to the coal seam at the east.

I remain, very respectfully, your obedient servant,

GEO. JONES,
Chaplain United States Navy.

Commodore M. C. PERRY,
Commanding U. S. naval forces, East India, China, and Japan seas.



MAP

INTENDED TO SHOW THE POSITIONS OF THE

COAL MINES

EASTWARD OF KELUNG,

ISLAND OF FORMOSA.

(This map, having been made in a great measure from the eye simply, does not pretend to entire accuracy.)

Scale, one inch and a half to a mile.

REPORT II.

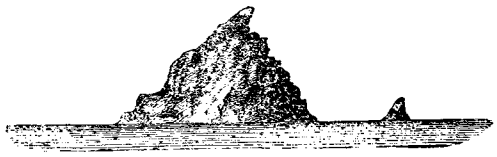
Chaplain Jones to Commodore Perry.

UNITED STATES SHIP MACEDONIAN,
At Sea, July 28, 1854.

SIR: As it is possible that the increasing steam navigation of these waters may, eventually, give importance to the coal region about Kelung, I have, in this recent visit, made as extensive researches as the time would allow; and I will now give a detailed report of them, adopting a succinct journal form, as this will show the disposition of the authorities and people of that neighborhood, as well as the results.

Monday, July 10, 1854. *Evening.*—In sight of the northern end of Formosa, and swept about by most violent currents. There are three small islands here, (Agincourt, Pinnacle, and Crag islands,) good landmarks in approaching from the northward, but somewhat dangerous amid these currents.

Tuesday, 11th.—The harbor of Kelung not easily made out at a distance, but a high, rocky islet, of this shape, stands out about three miles to the north of it, and will prevent any mistake. Leaving this a little on the east, and steering southwardly, the harbor will develop itself, and its entrance be readily seen. A native came out and offered himself as a pilot; his charge, $5.



Seen from the northward.

The harbor is about two miles in length, with pleasant scenery on its shores; a couple of hamlets on the west; halfway up, on the east, a village with quite a number of junks anchored off; above this village, nothing but bare flats, in low tide, with a channel through them navigable for flat boats. In full tide our ship's boats can go up to the town of Kelung, at the head of the harbor, by keeping in the channel.

In the afternoon, went ashore with the purser, Passed Midshipmen Breese and Jones, and Mr. Williams, (master's mate,) determined to commence our explorations before the authorities could suspect our object and throw difficulties in the way. Landed at Junktown. Near that saw the natives burning lime (from coral) with coal. In doing this, they use a blower like the fanning mills of our barns, worked by a treadle. Found a man from Amoy who could speak a little English and was acquainted with the neighborhood. He took us to a house in Kelung where was a large pile of coal, ten or twelve tons, but most of it dust. They offered to sell it at $2 21 a ton of 2,240 pounds.

Kelung is a town of about three thousand inhabitants. It is compactly built, and the houses have their roofs projecting in front, so as to form a covered way all along, on both sides of the street. Where the streets are narrow, these roofs meet in the middle and exclude the air, making the place very offensive to the smell. The town is protected at its two ends by walls and towers; and it has now a guard of soldiers, as they are in daily expectation of an attack by the rebels from Amoy.

Eastward from the town, a valley (a stream in it) stretches up for about two miles; and, as our information led us to expect coal in that direction, we now set out on an exploratory walk. Some people from Kelung followed us; but to our questions they protested that there was not any coal in that direction. However, I soon found some fragments in the path, and we continued

on; the natives still declaring that the search was useless, and we still finding bits of coal along the way. At a mile from the town we came to several piles of coal, on the bank of a stream we had been following up; and here our Kelung companions quitted us and returned back to town. We crossed the stream, and following a path which turned into a short valley branching off to the southward, with the help of some country people we soon, to our great pleasure, discovered some mines. Having no lanterns, or means of exploring them, and it being now late, we returned to the ship, gratified with our first day's work.

Wednesday, 12*th*.—Our Amoy man had promised to come early this morning, and to conduct us to some mines, which, he said, were far along the coast; and I waited for him a long time, but he did not appear.

Accompanied Captain Abbot, at his request, in a semi-official visit to the authorities on shore. In the afternoon, went with Captain Abbot and Purser Allison to purchase the coal (rejecting the dust) that we had seen in store in town; but the owner had now taken alarm at something or other, and refused to sell. Doubtless, the mandarins had interfered, and the man seemed almost afraid to speak to us. We were taken afterward to the house of a mandarin whose name *Le-chu-ou*, and title *Hip-toy*, said to be the chief mandarin of the place. He, as well as the owner of the coal, told us that it came from an island on the eastern coast of Formosa, one hundred miles from this. He expressed himself willing to have us purchase the coal.

Thursday, 13*th July*.—Started for a thorough exploration of the mines seen on Tuesday, the party consisting, besides myself, of Mr. Williams and four seamen, armed. Left Mr. Breese in Kelung, to endeavor to conclude the purchase of the coal stored there. The map appended to this will show the position of the mines visited to-day. We first went to those marked *a*, *b*, *c*, the letters indicating three openings into the bed of coal. These openings are about thirty inches wide and four feet in height, and bring us, at the distance of ten or twenty feet, to the coal seam, in which drifts are continued horizontally to the extent of about one hundred and twenty feet from the entrance. In miner's language, passages or cuttings *to* the coal are called "tunnels;" when *in* the coal seam, they are called "drifts;" and when there are two or more parallel drifts in the same seam of coal, the cuttings from one drift to the other are termed "*cross-headings*."

I soon discovered that the three openings or tunnels at this place all led to drifts in the same seam of coal, the two lower drifts having several cross-headings between them. The seam was three feet in thickness, its strike or direction was northwest and southeast; it had a southwest dip of 15°. The coal is remarkably pure, from its commencement at the floor to the roof; but it is mined in a most awkward and wasteful manner. Their only implement is a pick, with which they dig into it in such a way as to shatter it very much; the fragments are put into shallow baskets, and these on a flat board, and they are thus dragged over the mud to the entrance. All the coal which we saw, both at this mine and at the creek below, consisted of such small fragments; but, on trial with hammer and chisel, I found no difficulty in getting it out in large pieces, of which, as specimens, we brought away as much as we could carry. The floor and roof are both argillaceous rock; and the softness of the latter is the only obstacle to the easy working of this seam; the roof caves in if left to itself only for a few feet in width, and would need wooden supports constantly and carefully applied.

The whole character of this seam of coal, and its position, are well adapted to successful mining operations. I am told that in Great Britain a seam of three feet is considered as promising a further and more certain continuance than any other thickness; the extent of this I had

no means of judging, as the drifts reached but a short distance, about one hundred and twenty feet; the seam had the same thickness at the end as at the beginning, and the quality of the coal improved the further we advanced. Doubtless the stratum extends down below the valley, and far along among the hills. It requires only eight or ten feet of tunneling to reach it, and the dip is a very good one for drainage and cross-headings. A railroad of six hundred feet would bring the coal to the stream in the east and west valley, which is navigable for loaded flatboats in full tides; or, if thought best to carry it by railroad to Junktown, on the harbor accessible for ships' boats at all tides, a railway of two and a quarter miles, along level ground, would be sufficient for that.

These drifts are about sixty feet above the bottom of the lateral valley into which they open, or about seventy-five feet above the stream just alluded to.

Across this lateral valley, and at about the same elevation above it, (at the place marked *d*,) is another mine, which I also visited and explored. The tunnel at this place is a few yards longer than at the other, and is cut through a tolerably hard rock; but, at the distance of about twenty feet, we came to the coal seam, which also has a thickness of three feet, with a strike to northwest, and a dip to southwest of 15°. The roof of this seam is harder and drier than at the other, and the coal is firmer and not so easily shattered. They have penetrated here to a distance of two hundred feet, but there is only one drift; and although there is no ventilation, we found the air to be pure—a proof of the purity of the coal. This mine, however, is little used. Neither here nor at the other did we find any person at work.

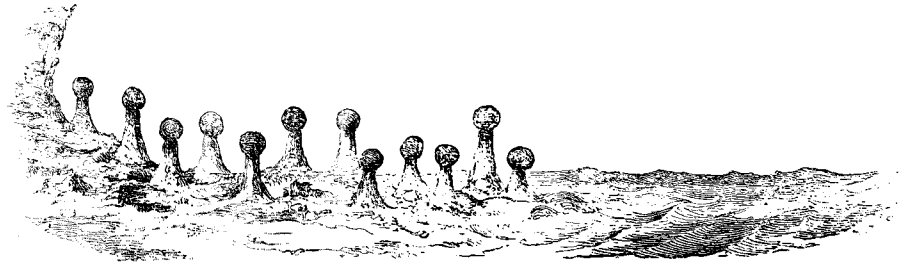
I thought, at first, that this seam must be a continuation of the other; but the strike and dip of the two lead to a different conclusion.

We hired a canoe at the creek below to transport our coal; the tide was at its lowest, and the boatman, after poling some distance, had to get out and push his boat over the mud.

Mr. Breese found the coal-merchant in town still unwilling to sell.

During the day the Hip-toy sent off some lower mandarins, with his compliments to Captain Abbot, and a present of a bullock and vegetables. When questioned about the coal-mine along the coast, these officers still affirmed that it was on an island one hundred miles off.

Friday, 18*th*.—On my bed, sick from yesterday's overexertion; the sun here dreadfully hot. In the evening, accompanied Captain Abbot to some islands at the mouth of the harbor, to look for a stone, such as you desired me to get for the Washington Monument. Did not find anything that would answer, the rock here being all a very soft sandstone, unfit for architectural



purposes. A singular effect is produced at those places by the wearing action of the waves, in spots where the soft yellow sandstone is interspersed with numerous round black stones, like boulders. These last have resisted the action of the sea, while the sandstone has yielded to it, so as to form a vast number of yellow columns, each capped by a round black head as above.

Our surveyors, from this circumstance, have named the point at the western entrance of the harbor, "Image Point."

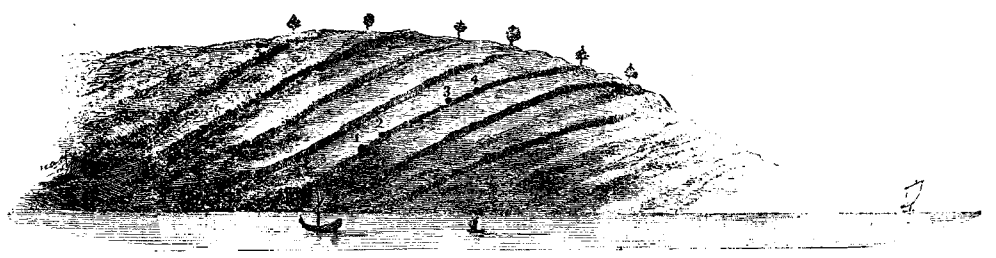
Saturday, 15*th*.—Captain Abbot wishing to make the Hip-toy a present in return for his of yesterday, requested me to accompany it, which I did. The mandarin was greatly pleased; and I said to him, "You see that our coming here has been of advantage to your people; they are finding a good market in our ship for everything they bring, and we are scattering a great deal of money among them. Now, if we can find coal here of a suitable quality for our steamers, it will be greatly to the profit of your country, making you rich and prosperous. A party of us desire to set out overland for the coal-mine you speak of, 100 miles from this, on the eastern coast; and we wish you to furnish us with four sedan-chairs and bearers for that purpose." He replied that the thing was impossible; that the region of country lying between is out of his jurisdiction, and is inhabited by savage men, who are cannibals; and that his own people have to steal the coal which they procure there.

At 3 P. M., the Hip-toy came in state to visit the ship, accompanied by four other mandarins in official costume. They were shown around the vessel, and seemed to be greatly pleased.

Sunday, 16*th*.—This afternoon a native came alongside in a shore-boat with coal for sale. He said he brought it 100 miles in his boat, which was evidently false, and we determined on exploring the coast ourselves on the morrow as far as our boats could venture from the ship.

Towards evening Captain Abbot's steward, a Chinaman, brought on board two natives, who offered, if we would pay them well, and keep the matter secret, to conduct us to the mines on the coast, which they said were distant five hours' pull in the boats. To make sure of them, we determined to keep them on board all night.

Monday, 17*th*.—Purser Allison, Mr. Breese, and myself, together with the two natives, started in a ship's boat at earliest dawn; our guides, at their request, disguised in sailors' dresses. We pulled through a channel between the main and a small island, at the eastern entrance of the bay, (called "junk and boat passage" in the chart;) thence on by a sharp promontory ("Sphinx Head") two miles distant; and, turning this, to our joy, saw the mines before us, only a little way off; so that the 100 miles of the mandarins and of the coal-merchant of Sunday, and the five hours' pull of our guides, thus resolved themselves into a distance of only three miles from the ship. The position of the mines was also everything that could be desired. They are represented on the accompanying map by the letters *e*, *f*, *g*, *h*. A steep bluff, 200 feet high, rises here almost directly from the water; its strata of various kinds distinctly marked along its face, and running down at an angle of about 15° with the horizon. One of these strata was marked by black coal-heaps along its front, and showed itself to be a coal seam, the several drifts opening to the right being evidently in a single seam. Their appearance is thus:



Entering the lower drift, which is about 20 feet above water mark, I found myself at once in the coal seam, here 32 inches thick, the strike E. and W., and dip 10° S. This drift reaches to the extent of only 100 feet.

Drift No. 2, higher up; similar to the last in all respects; the roof hard and good.

Drift No. 3, considerably higher than the last. The coal here crops out in the face of the bluff; is 28 inches thick at the entrance, and 32 inches further in; roof dry; strike E. and W.; dip S.S.E. 8° or 10°; roof hard at entrance; softer further in; the coal here not easily shattered, and 10 or 12 tons, in large lumps, lying at the mouth of the drift.

Drift No. 4, higher up; seam 30 inches thick; dip S.S.E. 8° or 10°; strike E. and W.; hard roof; coal crops out in the bluff.

These drifts extend in only 100 or 120 feet, and have few cross-headings. There are a few other drifts now abandoned.

This coal seam probably extends a great way into the hills, and doubtless also down beneath the sea; and the coal in all the drifts is remarkably pure throughout from roof to floor. The position is also one possessing singular advantages. Lieut. Preble has since discovered a small basin close by, (named "Coal Harbor" on his chart,) almost land-locked and pretty secure, where one or two vessels may lie and take in coal, which a railroad of a few hundred yards in length would transfer to their holds; or boats may find safety in a little cove among the rocks just below the mines, and thence transport it to the harbor of Kelung.

Their present mode of mining it is ruinous to the coal, breaking most of it into small fragments or turning it into dust; while from the upper drifts the mode of getting it down is by rolling it over the face of the rocks till it reaches a gentler inclination below.

After examining these drifts, I took some of the boatmen as protectors, and crossed the hills, intending to return by land and explore the interior. Our path soon turned to the eastward, and brought us to a village (*i*) on another bay; and the villagers here offered to conduct me to a coal-mine, one mile, they said, eastward from this bay. We started for it; and after half an hour's walk, came to a village (*k*) where, on the shore, were a number of heaps of coal, most of it fine and of a quality inferior to that at the other mines. I asked the villagers to take me to the place whence it was procured; but they said that this was far in the interior, 10 or 12 miles, and that I could not go there and return to-day.

The sun had now got towards the zenith, and was intensely hot; and as we were far from the ship, and my sailor guards were suffering from the heat, I gave up further explorations, an , hiring a native boat, returned to the ship.

Towards sunset made another attempt to find a stone for the Washington Monument, but did not succeed.

Tuesday, 18*th*.—Captain Abbot sent me to the Hip-toy to make arrangements for purchasing the coal which we had seen yesterday at the mouths of the drifts, and also that in town. This mandarin replied that "we could go and purchase it if we wished." I answered that "the owners always referred me to him, and told me that they could not dispose of it without his permission; that, as he was willing to have it sold, I now wanted a written permit from him which I could show, and so obviate all difficulty." He said that "such a permit would not avail unless it were an official one, with his official seal; that this seal was kept locked up, and another mandarin had the key; that for him (the Hip-toy) to get it, and pass through the usual formalities, would be to betray himself, and that then he would be punished by the authorities at Pekin; but that if I would bring the owners of the coal to him, he would give them orders orally." He had several times before hinted at danger from Pekin if he were to assist us in our doings, or be thought favorable to them.

Wednesday, 19*th*.—Captain Abbot has concluded not to proceed further in coal negotiations till

the arrival of the store-ship "Supply." We went in the afternoon to the rocky, precipitous island of Kelung, three miles out from the bay. It appears, singularly enough, to be a mass of sienite, stuck up like the sharp end of a wedge through these formations of sandstone and coal.

Thursday, 20.—Captain Abbot being desirous of seeing the coal bed at *e, f, g*, I went with him, intending to search for the mines back of *k*. We started at earliest dawn, and I asked Captain A. to proceed at once to *k*, and to put me ashore with two seamen as guards, and an interpreter. When there, a native, caught by the offer of some cotton cloth which I held out to him, agreed to conduct me to the mines, but was forbidden by the other villagers, and, persisting, brought upon himself a storm of angry words, with which they pursued us to the edge of the village, and as much further as they could be heard. But he talked as loud as they, and stalked on, leading the way along a valley, and then up a ravine that struck upward towards the top of a high isolated mountain on the east. We had proceeded little more than half a mile from the village, when we came to the mines, (*l*,) a distance which their lying tongues had magnified to 10 or 12 miles.

Entering, we proceeded by a tunnel 40 feet long, and then struck the coal seam, the drift thence continuing 400 feet, with 20 inches in thickness of coal; the strike E.N.E., and dip N. 60°. Beyond this, the dip changed to 40° northward, and the seam grew thicker. Its thickness was 3 feet at the end of the drift, which was altogether 700 feet in length. The roof in this mine was firm and good; but the coal is not so good as at the other mines. It is rather dull, somewhat earthy, and is mixed with sulphuret of iron; the higher inclination of its dip will also be a difficulty in working this seam. Yet the mining here has been carried much further in than at any other place visited in this region of country.

Descending once more, we quitted the ravine, and crossed the valley; and now, at about a quarter of a mile from the village, came to another mine, (*m*.) It lies W. $\frac{1}{2}$ S., a quarter of a mile from the former one, (*l*,) and may be a continuation of the same seam; but the coal is much better in quality. The strike is W. $\frac{1}{2}$ S., and the dip N.N.W. 70°; the roof good and firm. The drift extends in about 300 feet. It would be an easy matter to construct a railroad from this mine to the village, as it lies only a few feet above the valley debouching at that place.

After finishing our explorations here, we returned across the country to Kelung, a distance of about seven miles. The whole region lying between the two places, hilly and broken, is probably filled with coal. Along the streams, the natives, in order to make terraces for rice fields, have had to dig down along the steep hill-sides, and at *n* we came to coal cropping out in one of these escarpments. It was mixed with earthy matter, but the fragments were good, pure coal, and the seam appeared to be worth following up. Here and there we saw other indications off the path, but the day was dreadfully hot, and my guards could scarcely drag themselves along. We were all right glad when we got from the stifling air of the tortuous ravines along which our pathway had led, and found ourselves once more in a boat enjoying the breezes of the bay of Kelung.

Purser Allison left Captain Abbot's boat at the mines, (*e, f, g*,) and also crossed through the interior to Kelung.

Friday, 21.—The "Supply" was seen early in the morning making for the harbor, and I went ashore, at Captain Abbot's request, to procure native boats or junks to bring the coal from *e, f, g*. The captains of the junks expressed a willingness to do so, but then drew back, and said that they could not without permission from the Hip-toy. So I went to see this officer, determined now to have action instead of words. He said, "Yes, we could have the junks."

I replied that their owners referred me to him; and when he began to shuffle and prevaricate, I told the interpreter to say to him that "he had trifled with us, had lied, and tried to deceive us from the beginning, and that we would be trifled with no more; that if he intended to let us have the junks, he could easily send for the captains and give his orders or permit; and that if he did not so intend, to say no, and I would go and make a report of it to Captain Abbot, but that I would not go away without something decisive." On this he called an attendant, and sent him for the captains of the junks.

The Supply had now got in and anchored, and I went and brought Captain Sinclair, of that ship, to see the mandarin, and so have the whole matter transferred to his (Captain S.'s) hands. The Hip-toy had in the meantime seen the junk owners, and they were to come down at night and anchor by the Supply, so as to be ready to start early in the morning.

In the afternoon I went with Captain Sinclair and some of his officers to the mines, (*e*, *f*, *g*,) to show them the coal, and, by Captain Abbot's directions, to purchase all that was sufficiently large for our purposes, which I did at $16 for each hundred piculs. They demanded $20. The Hip-toy had said that we ought to give but $12, and $12 is probably the regular price; but we thought it cheap at $16, and were glad to get it at that. The junks came down after dark, and, anchoring near the Supply, took the coal bags on board.

Saturday, 22.—Passed Midshipman Breese went over with the junks to attend to getting the coal, and during the day they came back loaded with part of our purchase.

I was desirous of following up some other indications towards the head of the valley eastward from Kelung, and went off in the forenoon prepared for explorations. We visited three mines, marked *o*, *p*, *q*—all, however, abandoned, and with the roofs fallen down. At *o* we could not penetrate at all; *p* has a strike north and south, its dip towards the east; at *q* the strike is northeast, the dip southeast. At the last mine we came at once to the coal, no tunnel being necessary. The water at the bottom of this mine was strongly impregnated with iron, but the coal seemed to be of good quality. There is also a coal-mine somewhere about *r*, on the opposite side of the creek, but where I could not discover.

A native sent Captain Abbot word to-day that he would bring him a boat-load of coal from town if it would be received at night.

The Hip-toy, referring to our success in these explorations, told the captain's steward (a Chinaman) that the authorities must have been sold to us by some one on shore.

Sunday, 23.—The Macedonian sailed, leaving the Supply to finish with the coal.

I wish to express here my obligations to Captain Abbot and his officers, especially to the first lieutenant, Mr. Avery, for the facilities they have given me in these explorations. Purser Allison has always assisted in them personally when his duties on board would permit. Passed Midshipman Breese and Mr. Williams have given me essential aid.

During our stay at Kelung the ship was abundantly supplied with meats, fruits, and vegetables by the boats alongside, or from the markets on shore. Chickens, ducks, and geese were abundant; bullocks were brought off when we desired it; pineapples, large and of good flavor, mangoes, lichees, bananas, and pears were plentiful; sweet potatoes of an excellent kind, and vegetables of a variety of sorts, could be had in any quantities, and all were at moderate prices.

Navy buttons were taken in exchange, four small ones being valued at $1, and two large ones at $1 25. One of the seamen told me that he catered for his whole mess during our stay with navy buttons, getting a fowl for a small button, and fruits and vegetables in proportion.

There appears to be abundance of sulphur and alum accessible from Kelung, but where I could not learn.

An English miner on board the Macedonian, who accompanied us in some of those visits on shore, says that he can deliver this coal at the mouth of the mines at $1 25 per ton.

Respectfully, your obedient servant,

GEO. JONES,
Chaplain United States Navy.

Commodore M. C. PERRY,
Commanding U. S. naval forces, East India, China, and Japan seas.

BROOKLYN, *July* 6, 1855.

I had already mentioned, in a brief letter to Commodore Perry, that this coal is bituminous, and burns almost entirely away, leaving no cinder, and scarcely any ashes. In burning, however, it gives out a thick smoke and very offensive smell. It burns rather too freely for steam purposes, but would do well if mixed with anthracite, which latter is said to be procurable on the opposite coast of Amoy. G. J.

REPORT

OF

A COMPARATIVE ANALYSIS

OF

CUMBERLAND, FORMOSA, AND JAPAN COAL:

BY

PROFESSOR B. F. BACHE,

DIRECTOR OF THE UNITED STATES NAVAL LABORATORY, NEW YORK.

COMPARATIVE ANALYSIS

OF

CUMBERLAND, FORMOSA, AND JAPAN COAL.

UNITED STATES NAVAL LABORATORY,
New York, March 1, 1856.

IN a technical analysis of coal for practical purposes, it is desirable to have a standard of comparison for the value of the coal analysed; and an analysis of the standard coal selected precedes that of the coal to be judged by it.

The standard adopted in this analysis is the Cumberland coal used at the navy yard of this station. It is the coal of the Cumberland Coal and Iron Company, and comes exclusively from what is known as "the fourteen-foot or big vein." The specific gravity of this coal is determined from an average of sixty fragments from various parts of a large pile; and the powder for analysis was obtained by taking portions from many parts of the pile with a shovel, and therefore represents the coal as it is used, and not as it might be selected.

This coal is black, with smooth shiny surfaces. The fracture is crystalline, with plane cleavage surfaces, well defined angles and edges, and the fragments are cuboid. It is easily broken down into a soft, smooth powder, free from grittiness, of a jet-black color, soiling and adhering to surfaces with which it is brought in contact. This powder, after having been freed by exposure at ordinary temperatures, is peculiar in the property that it gains in weight on being dried at 280°, probably by the oxidation of some of its constituents. The streak left upon drawing this coal over white paper is of a clear umber-brown color, with sharp well-defined edges.

The Formosa coal is of a more dingy brownish-black color, with smooth tarnished surfaces. The fracture is somewhat laminated, with plane cleavage surfaces, well-defined angles and edges, and the fragments are rhomboid. It is much harder than the Cumberland coal, freer from dust, and much less easily rubbed into powder. The powder is of a brown tinge, but black in color, is rough and gritty, heavy, not dusty, and does not soil or adhere to surfaces like that of the Cumberland coal. The streak is paler, of a dirty fawn color, and somewhat less defined at the edges. Some fragments of this coal are altogether dull in appearance, very friable, and of a fibrous or striated texture and fracture.

Upon a casual inspection of the Japan coal, of the several parcels, two varieties of it were distinctly noticed. These were found to differ so widely as to require separate analyses.

The first variety of the Japan coal has the appearance of a mined mineral, and is of a deep claret or purplish-brown color. The lumps are amorphous, and the fracture irregular, altogether dull and unlike that of coal. It is harder than the Cumberland coal, but softer than the Formosa, and rubs down into a smooth powder, of a dark snuff-brown color and purplish tinge. It adheres to and soils surfaces slightly. The streak is of a yellowish-brown color, less dingy, and better defined than that of the Formosa.

This variety has a small admixture of heavy lumps of mineral that gives sparks with steel, and is not coal.

The second variety of Japan coal has the appearance of outcrop or surface coal, which, from long exposure, may have had all the softer portions disintegrated and washed away. It is of a dull greyish-black color like slate, and the cleavage planes are interspersed with small resin or amber-like tears or grains, which, separating in the same planes, leave a portion attached to each fragment. The lumps are very much fissured in three principal directions. The fracture is laminated, slaty, with plane cleavage surfaces and well-defined angles and edges, the fragments being generally trapezoid. It is not quite so hard as the Formosa coal, but has a toughness which renders it less easy to powder. The powder is heavier than either of the others, is of an olive, grey-black color, sabulous and clean, not adhering to or soiling surfaces. The streak is of a lighter umber-brown color than that of the Cumberland, but has a yellow tinge, though less yellow than the last two varieties.

The Cumberland is a very soft semi-bituminous, caking, coking coal. It is easily kindled, burns freely with a moderately long voluminous smoky flame, fuses partially, and aggregates into lumps in the fire, but does not cake to a very great or injurious extent. It yields a large spongy compact coke, and a reddish-grey light ash.

The Formosa is a hard bituminous, splint, semi-caking, coking coal. It is much more easily kindled, and burns more freely than the Cumberland, and yields a longer, less luminous, and more smoky flame. It fuses partially and aggregates slightly into lumps that are very friable, and scarcely cakes at all in a free fire. It yields a richer, granular, more friable coke, and a small heavier ash of a dirty ochrey yellow color.

The Japan coal, first variety, is a soft bituminous, caking, coking coal. It is more easily kindled than the Cumberland, but does not burn so freely nor so rapidly, and gives a shorter voluminous smoky flame. It fuses as it burns, and cakes so badly that the whole fire becomes fused into a single mass, and the draught very much obstructed. It then burns much more slowly until draught openings are effected by the combustion, when it brightens into a steady hot fire. It yields a very large and bulky friable coke, and an ash of a redder tinge than the Cumberland.

The Japan coal, second variety, is a hard bituminous, cannel coal. It is more easily kindled than the Cumberland, and burns as freely, with a large, clear, luminous, and but little smoky flame. It does not fuse nor cake at all in the fire, and in this respect burns much like anthracite coal. It yields no coke, properly so called, but after dry distillation has the same form and appearance as before. It yields a clean ash of a very light grey, almost white color.

The quantitative results of the analysis may be best exhibited in a tabular form, as follows:

Variety.	Technical.										Elementary proximate.				
	Specific gravity.	Loss by drying at 280°.	Hygroscopic properties of the dried powder gains in 41 hours exposure.	Yield of coke, per cent.	Yield of fixed carbon, per cent.	Yield of ash, per cent.	Color of ash.	Yield of volatile matters, per cent.	Parts of lead reduced from litharge by one part of coal.	Color of streak.	Carbon.	Hydrogen.	Nitrogen.	Sulphur.	Oxygen.
Cumberland.....	1.330	(Gains 0.071)	0.027	81.813	73.717	8.096	Reddish grey.	18.187	30.02	Brown.....	81.674	5.583	0.411	1.482	2.754
Formosa.....	1.254	3.774	1.410	47.875	43.467	4.408	Yellow.....	52.125	27.10	Fawn.....	73.013	6.313	0.330	1.087	14.849
Japan 1st variety..	1.268	0.203	0.036	63.130	42.224	20.906	Red grey.....	36.870	23.40	Brown yellow.	66.034	5.175	0.201	4.198	3.486
Japan 2d variety ..	1.471	7.347	2.230	.....	20.871	38.091	Light grey...	41.038	14.08	Yellow brown.	43.039	4.297	0.115	0.039	14.419

The carbon and hydrogen were determined by combustion with oxide of copper, metallic copper, and oxygen gas, by a modification of the method of Dumas and Stass.

The nitrogen was determined by Dumas' method, and the sulphur by Liebig's method in the dry way.

Some of the deductions from the analytical results may be stated as follows:

The most desirable qualities of coal for sea steamers are—

1st. High heating or evaporative power.

2d. Compact structure, so that the greatest quantity may be stowed in the smallest space.

3d. Ready inflammability and quick action, that steam may be got up easily and quickly.

4th. Infusibility, or absence of the quality of caking, so that the draught may remain free, and the combustion perfect.

5th. Freedom from sulphur and other substances injurious to the metal of grate-bars, boilers, and chimneys.

6th. Small residue after combustion; and this residue infusible or indisposed to form clinker, so that it may pass the grate-bars with the least possible labor and interference with the combustion.

7th. Not smoky, so that the fires may be kindled or kept without disclosing the circumstance to an enemy.

The amount of carbon in a fuel forms the best single indication of its evaporative power, though the hydrogen must give additional value to the fuel that contains it in greatest proportion, everything else being equal, because it produces great heat and a long flame. Therefore the 1st of the requisite qualities is deduced from the proportion of these two elements.

The 2d requisite quality is deduced from the specific gravity.

The 3d, 4th, and 7th are estimated from separate practical observations.

The 5th is deduced from the proportion of nitrogen and sulphur.

The 6th is deduced from the proportion of ash and from separate practical observation.

The deductions may be tabulated from these data, so as to indicate the comparative value of the coal examined, by the difference in the sum of the advantages calculated per centum.

In the requisite quality number.	Cumberland coal has the per-centage advantage over Formosa.	Formosa coal has the per-centage advantage over Cumberland.	Cumberland coal has the per-centage advantage over Japan, (1st variety.)	Japan coal (1st variety) has the per-centage advantage over Cumberland.	Cumberland coal has the per-centage advantage over Japan, (2d variety.)	Japan coal (2d variety) has the per-centage advantage over Cumberland.	Cumberland coal would have the per-centage advantage over a mixture of equal proportions of Japan.	A mixture of equal proportions of Japan coal would have the per-centage advantage over Cumberland.
1	8.6	----------	15.6	----------	38.6	----------	27.1	----------
2	8.	----------	6.	----------	----------	14.	----------	4.
3	----------	2.	----------	1.	----------	2.	----------	1.5
4	----------	1.	15.	----------	----------	5.	8.	----------
5	----------	0.5	2.7	----------	----------	1.4	1.3	----------
6	----------	3.7	12.8	----------	30.	----------	21.4	----------
7	2.	----------	----------	----------	----------	2.	----------	2.
	18.6	7.2	52.1	1.	68.6	24.4	57.8	7.5
	7.2		1.		24.4		7.5	
	11.4		51.1		44.2		50.3	

Thus, the Cumberland coal has the aggregate advantage in value—

Over the Formosa coal, of	11.4	per cent.
" Japan, (1st variety,) of	51.1	"
" Japan, (2d variety,) of	44.2	"
" Mixture of Japan, of	50.3	"

As far as chemical analysis and examination can go, the ratio of these numbers expresses the comparative value of these varieties of coal in their application to sea steamers only, for it is in this connexion alone that they have been examined.

From the fact that varying proportions of the carbon of fuel escapes combustion, or is only imperfectly burned, it becomes impossible to establish the actual value of any fuel for any given purpose by chemical analysis, or by any other method than by practical application on the large scale. And even then, the economic value as applied to one purpose, and obtained from one furnace, flue, and chimney, will be no better index of value for other purposes, with other furnaces, flues, and chimneys, than a chemical analysis to the general purposes to which fuel is applied.

B. F. BACHE,
Director Laboratory.

REMARKS OF COMMODORE PERRY

ON THE EXPEDIENCY OF

THE EXTENSION OF FURTHER ENCOURAGEMENT

TO

AMERICAN COMMERCE IN THE EAST.

REMARKS OF COMMODORE PERRY

UPON THE EXPEDIENCY OF EXTENDING

FURTHER ENCOURAGEMENT TO AMERICAN COMMERCE IN THE EAST.

In the general increase and extension of the commerce of the world, and the necessity of employing the constantly accumulating capital which the mines of California and Australia are annually yielding, it is important that the government of the United States should turn its attention to the expediency of opening new avenues of trade, by the accomplishment of treaties of amity and commercial intercourse with those people of the East, who are, wholly or in part, independent of the control of the powers of Europe, and are looked upon as of sufficient importance to be entitled to sovereign rights.

Though England and the government of the Netherlands, as principals, and France, Spain, and Portugal, in a more limited degree, have extended their sway over large portions of the territories of the East, there are still left, in comparative independence, extensive areas of cultivated and populous lands, which have so far escaped the grasping policy of those powers; and though these lands are ruled over by half-civilized despots, nature has given to them advantages which, if properly directed, would render them available in contributing by their products to the general resources of commerce.

With the flourishing kingdoms of Japan, Lew Chew, and Siam, we have recently negotiated treaties, from which important benefits will undoubtedly be obtained. Though up to this time but little interest has been manifested by our government in availing itself of the means thus placed at its disposal, the day will however arrive, and at no distant period, when political events, and the unanimous and urgent appeals of our commercial men, will make it obligatory on the United States to look with greater solicitude to our eastern commerce, and to extend the advantages of our national friendship and protection, as well to Japan and Lew Chew as to other powers but little better known to western nations.

I may refer to Siam, Cambodia, Cochin China, parts of Borneo and Sumatra, and many of the islands of the eastern archipelago, and more especially to the island of Formosa.

It may be interposed as an objection to my proposition, that either one or more of the European governments already mentioned may claim jurisdiction over these countries, and consequently the native princes would be excluded from any right to enter into treaty relations with us. But the right of sovereignty should, in these enlightened days, be admitted only upon proof of the power of the sovereign claiming jurisdiction to enforce his assumed prerogative, the same as with respect to the belligerent right of blockade, which should be recognized in national law only when it can be sustained by competent force; and I maintain that the government of the United States cannot justly be debarred from entering into treaty stipulations with either one or all of the native governments or communities of the East that are known to be *de facto* independent of any other established power.

It should not be admitted, because England, Holland, or Spain may hold an insignificant part of a kingdom or province, that their lawful sovereignty should extend by consequence over the whole country. And so in regard to Borneo and Sumatra; have we not the same right to negotiate with the native princes as England and Holland claim to have?

But, deferring for the present any further remarks upon those islands, let us speak of Siam, Cambodia, Cochin China, and Formosa—the three former independent sovereignties, and the latter a nominal dependency of China.

A treaty with Siam has recently been arranged, and it may not be out of place here to refer briefly to the resources of that country, which, unlike China, has been rather inclined to encourage foreign commerce, though certainly under restrictive regulations. The government of Siam has at this day many well-equipped ships, and other square-rigged vessels, which trade to the neighboring countries. I met one ship at Ceylon, and two at Hong Kong, and in the course of time we may expect to see the Siamese flag flying in our own waters.

The soil of Siam is exceedingly fertile, producing bountifully and in great perfection all those fruits of the earth which are common to intertropical latitudes.

The principal staples, however, are sugar and rice; but cotton, tea, coffee, tobacco, indigo, pepper, and various other valuable products, are grown with but little labor, as also the most delicious fruits.

Various descriptions of drugs, ivory, beautiful fancy woods, and teak timber, are exported in vessels chiefly belonging to the Siamese king and nobles, who monopolize all the foreign trade, employing vessels mostly built and equipped after the European fashion; and in this respect the Siamese are in advance of the people of China, who still adhere to their misshapen, unwieldy junks, which are incapable of making any way against the prevailing monsoons, and they rarely, if ever, venture the attempt.

Cambodia and Cochin China (the latter, if not both, sometimes called by the general name of Annàm*) are the intermediate kingdoms between Siam and China proper; and though capable of sustaining by their products and other resources a flourishing commerce with strangers, have little trade beyond a limited intercourse with the ports of Siam, Singapore, and those of China. Though some feeble attempts have heretofore been made by England and France to establish a friendly understanding with these countries, they have met with indifferent success, and probably by reason of injudicious diplomacy; and, to make matters worse, two French frigates, in 1847, came into armed collision with the authorities at Touron bay, by which the native flotilla was destroyed, with the loss of the greater number of their crews; and though Sir John Davis, then governor of Hong Kong, visited, with two British ships of war, the same place shortly after the occurrence of this event, in the hope of effecting for England some friendly arrangement with the Annàmese government, he was obliged, after a disagreeable and perplexing delay, to depart without being admitted to an audience, or allowed even to visit Huè, the capital.

Now, the evident causes of the failures to bring these prejudiced and conceited people into any terms promising useful results, may be chiefly ascribed to the course of mistaken policy pursued by the western powers, whose agents invariably approach them as superiors, demanding *nolens volens*, and with little ceremony, concessions in the way of trade, the free exercise of religion, &c., &c.; of the advantages or disadvantages, or ultimate bearing and consequences of

* Sir John Davis, in his account of China, remarks: "It might be as well if the latter unmeaning designation, (Cochin China,) the authority for which is very obscure, were abandoned, and the true name, Annàm, adopted.

which the native princes must necessarily be ignorant; and in the fear of granting too much, or even admitting amongst them strangers, of whose grasping propensities and love of encroachment they have full knowledge, they adopt the extreme course, and doggedly refuse all communication whatever; and in their failure to recognize those rules of diplomatic courtesy which are held sacred by more enlightened nations, and which they have never been made to comprehend and appreciate, some unwonted and perhaps unintentional insult is given, and then follow collision and shedding of blood, and the door is more firmly closed against peaceful negotiation. Besides, these people are too sagacious to be influenced by specious arguments or propositions of friendship, unless those professions are accompanied by corresponding acts.

It is not intended here to speak of the treaty relations of the western nations with those of the East, with which treaties do exist; all the world knows how frequently these compacts have been violated; but it will not be amiss to argue the possibility of these people being brought into a more liberal and friendly intercourse, by a system of policy based as well upon *practical* as professional good faith. We Christian people, claiming for ourselves greater advantages of civilization and moral cultivation, seek, unasked of them, commercial and social intercourse, upon the principles which inculcate reciprocity of rights, and recognize the contracting parties as equals, and yet we practically treat them as inferiors; and if perchance difficulties arise, growing out of local disturbances, mistakes, or misinterpretation of treaties, or causes probably originating with ourselves, we immediately force upon them the alternative of submission to our view of the case, or chastisement.

It would seem to be more consistent if the western governments were to set the example of national probity before undertaking to coerce those of the East, with whom we have treaty relations, into a subserviency to our demands.

It is true that, in all negotiations with China and other eastern nations, the display of a respectable armed force is necessary to satisfy those people of the power of the foreign contracting party to protect its rights and enforce its just claims; but, in most cases, the mere presence of such force will answer all the purposes desired; and being thus backed by this *mediatorial power*, the negotiator may, with befitting grace, prosecute his object with a greater degree of kindness and liberality—a course of diplomacy always calculated to beget reciprocal good will and confidence.

But in any aspect of negotiation, humanity as well as sound policy enjoin that all peaceful means of equitable arrangement should be exhausted before taking the dernier resort of hostile action; and when once this alternative is adopted, there should be no peace until the object for which hostilities have been commenced shall be attained; for it is plain that, upon every principle of humanity and positive expediency, whether brought about by peaceful or hostile means, these vast territories should be opened to a more general and enlightened intercourse with the world, and the great aim should be to accomplish these inevitable results by a course in all respects just and honorable.

I cannot bring myself to believe that the Chinese and their neighbors are entirely devoid of generous impulses and honest convictions; and though it is their wont to practise deception in their relations with strangers, no one who has mingled much with them can truthfully say that they do not possess many redeeming qualities, and especially are these favorable traits observable in the conduct of the more respectable classes engaged in trade.

It has been generally conceded that the operations of the English in what has been called the "opium war," though brought about by causes not to be commended, yet in their consequences

have resulted greatly to the benefit of China and the whole commercial world; and it may truly be asserted that England, when possessed of unbounded control over the destinies of that singular nation, retired from the contest without availing herself of the advantages which the fortunes of war had thrown into her hands. This forbearance, more generous than wise, redounds certainly to the humanity of the then ministry and the officers in command; but it would have been the more sagacious course, and perhaps tending to mercy in the end, if the occasion and opportunity had been seized upon to establish throughout the empire a more liberal form of government, and to insist upon the unconditional recognition of those reciprocal interchanges of just and friendly intercourse which subsist between all civilized nations in time of peace—the admission of foreign ministers at the court of Pekin; protection of the persons and property of foreigners throughout the empire; the free exercise of civil and religious rights, when not conflicting with the reasonable laws of the land, &c., &c. All this could have been accomplished by a continuance of the war another year, and probably without additional bloodshed; and all this *is yet to be done*, as a measure of paramount necessity, in view of the suppression of the terrible state of anarchy which at present distracts the whole land, and the ultimate reorganization of the political condition of the empire; and inasmuch as the government of the United States and those of the European powers generally would be equally interested in the consummation of a measure alike beneficial to China and the civilized world, it would be the undoubted policy of all to unite in bringing about a revolution, civil and military, (and it might be a bloodless one,) which would place China upon a footing with the most favored nations.

China proper, once disenthralled, Japan, Lew Chew, and the other countries already mentioned in this paper, would enter of necessity into this new family of commercial, or, at least, trading nations; and the commerce of the East would be improved ten-fold by the impulse thus given to the advance of civilization and the industrial arts; and the benefits resulting from such change—religious, moral, and political—could not be correctly estimated. The end would therefore unquestionably justify the means; and if ever an armed interference of one or more nations with the political condition of another could be fully justified, it would be, as I have stated, in bringing by force, if such result were necessary, the empires of China and Japan into the family of nations, upon the basis of equal international *duties* as well as rights.

In further illustration of my argument, I may briefly quote from two communications of mine, published a few weeks since in the New York Courier and Enquirer: "The equivocal and unsettled relations of all Christian nations with the government of China, notwithstanding the obligations of existing and pending treaties, render intercourse with that empire unstable and difficult to be managed. The weakness of the reigning dynasty, the insurrectionary spirit of the people, and the consequent injuries inflicted upon the agricultural and manufacturing interests of the country, tend greatly to the derangement of its outward trade; and it requires the talents and energies of strong-minded men (and such are *most* of the American and English merchants resident in China) to comprehend the mysteries and overcome the obstacles which stand in the way of all mercantile transactions with a people well enough inclined, but so stultified by national forms and prejudices as to make them, in many essentials, obstinate and impracticable; and even when disposed to act fairly and aboveboard, their government has not the power to protect them from the extortions of the provincial officials, or the

depredations o the myriads of pirates who swarm upon the coasts of the empire; and hence the necessity of providing suitable vessels of war for the protection of its foreign commerce."

Again: "The foreign commerce of China, under its modern aspects, has as yet been but imperfectly developed, nor will it be established upon any satisfactory basis until its government is compelled, either by its own efforts or aided by other powers, to enter into a just and liberal intercourse with its sister nations to receive at its capital diplomatic representatives, and to protect throughout its vast dominions whomsoever may, for business or pleasure, visit its cities and provinces."

"The unsocial, I may almost say insolent, exclusiveness which its people have hitherto practised with regard to strangers, should no longer be tolerated. They should be made to understand, as have been the Japanese, that their beautiful country was not intended to be closed forever to the people of other nations, with whom a free and untrammelled intercourse could not but contribute to their advantage."

"Such large and productive portions of the earth could never have been designed for *their* exclusive benefit; and though it is not pretended that strangers have any positive right to encroach upon their privileges, social or political, it *is* maintained that all foreign nations would be fully justified in *constraining* the governments of China and Japan to recognize the great essentials and fundamental requirements of international law."

"Whatever may have been the justice or morality of the English war with China, it resulted in comparative benefit to both nations; and the only mistake was, that it did not continue until those ignorant and besotted people had been made more fully satisfied of their own weakness, and the consequent folly of assuming to be superior to all the rest of the world."

"China should be more thoroughly Europeanized. The people do not want for civilization in *their* way, but they require a more practical form of government, and, as before remarked, a less restricted intercourse with the world. Until these desirable ends can be brought about, it would seem to be the interest, indeed the duty, of all commercial nations, to urge upon them, in such manner as will prove effectual, the necessity of a more enlightened policy."

"The existing treaties of the United States and France with China are imperfect; and though they are based upon the one with England, and are quite as advantageous as could have been expected under the circumstances in which they were negotiated, they require revision, and should be remodelled on the first favorable occasion; and in all future treaty arrangements there should be provision made for the mutual enforcement (if need be, by armed intervention) of all the stipulated obligations and conceded rights of the contracting parties."

"Diplomatic representatives should reside at Pekin, and consuls be received at all the principal ports. The property and personal safety of aliens and strangers guarantied, and the same privileges conceded to foreigners residing in, or visiting China, as are granted to them in Europe and America."

It is idle to suppose, that because the policy of the United States has hitherto been to avoid, by all possible means, any coalition, or even connexion with the political acts of other nations, we can always escape from the responsibilities which our growing wealth and power must inevitably fasten upon us. The duty of protecting our vast and rapidly growing commerce will make it not only a measure of wisdom, but of positive necessity, to provide by timely preparation for events which must, in the ordinary course of things, transpire in the east. In the developments of the future, the destinies of our nation must assume conspicuous attitudes; we

cannot expect to be free from the ambitious longings for increased power, which are the natural concomitants of national success. The annexation of one country or province, whether by conquest or purchase, will only tend to increase the desire to add another and another, and we, as a nation, would have no right to claim exemption from this universal vice, and in this view we should be prepared to meet the inevitable consequences of our own ambitious tendencies.

But, after all, these events in the history and fate of nations are doubtless directed by an overruling Providence, and probably we could not, if we would, change their course, or avert our ultimate destiny. It only belongs to us to endeavor to act justly and honorably in all our foreign relations, and I cannot but believe that we should be just to ourselves and to the world, to enourage whatever practical measures might be suggested to change for the better the political and civil condition of China and Japan, and the countries more to the south; and especially with respect to Formosa. The United States alone should assume the initiative. This magnificent island, though nominally a province of China, is practically independent. The imperial authorities maintaining a feeble and precarious footing only in isolated parts of the island; a large portion being in possession of independent tribes, and yet such is its productiveness in minerals, drugs, and the more valuable products of those genial regions, that at this time a revenue, estimated at a million of dollars, is collected, though little or none of it goes into the imperial treasury.

The inhabitants of the island may be divided into two classes: the first composed of those at present submitting to the authority of China, whether of native or Chinese blood; and the other, and probably the more numerous portion, of natives, yet in their unconquered and primitive state. The whole population has been estimated at two, and by some, as high as three millions; and looking to the peculiar abstemiousness of the people of the east, who rarely indulge in any other than vegetable food, it may reasonably be supposed that an island of the extent of Formosa, and of such fertility, could subsist even a larger number.

It may, I think, be safely assumed that an American settlement at Kelung would be looked upon with favor by the Chinese, for reason of the advantages of protection that would be secured to them by the presence and co-operation of the more warlike settlers, in the defence of the port and its neighborhood from the depredations of the numerous rebels and pirates who infest the whole island and its coasts.

Grants of land and important privileges, including the advantages of working the coal mines, could, doubtless, be obtained by purchase at nominal cost, and without looking to any other protection from the government at Washington than that which would be rendered by the occasional presence of one or more of the vessels of the China and Japan squadron, a flourishing community of Americans might soon be established, which would contribute greatly to the convenience and advantages of our commerce in those seas.

Kelung would become a port of general resort for vessels of all nations. The settlers might not only direct the working of the mines, already fully described in this volume, but the products of the land could be largely increased by the introduction of those improvements in agriculture and the mechanic arts which have been hitherto unknown to the Chinese, who are deficient neither in sagacity, ingenuity, or industry, or incapable of profiting by foreign instruction. Indeed, they may be looked upon as remarkable for their industrious habits; and consequently there would be no want of laborers, at very moderate compensation. In fact, we find the Chinese established at most of the European settlements in the east, not far remote from their native country, where they form themselves into communities and practice their own

domestic and religious customs, giving due obedience to the laws of the country in which they reside. These people chiefly belong to the laboring and mechanical classes, though many of them engage in trade, and with considerable success. They are singularly provident in their habits of saving, and it is not unusual to find amongst them persons of considerable means, their aim being to accumulate sufficient to enable them to return to their homes.*

An American settlement, once firmly established in Formosa, would gradually increase its social and political power, its area of landed possessions, and consequently its wealth and usefulness. Neither of the European governments could reasonably object to its advancement. On the contrary, it would be their policy to foster and protect it, because those of their subjects trading in the east would equally benefit by the advantages which it would offer to the general commerce of those seas.

In a communication of mine to the Secretary of the Navy, dated Madeira, December 14, 1852, and published in Senate Ex. Doc. No. 34, of 33d Congress 2d session, I endeavored at that early period to impress upon the government the importance of adopting timely measures for securing an influence in that part of the world. I quote:

"When we look at the possessions in the east of our great maritime rival, England, and of the constant and rapid increase of their fortified ports, we should be admonished of the necessity of prompt measures on our part.

"By reference to the map of the world it will be seen that Great Britain is already in possession of the most important points in the East India and China seas; and especially with reference to the China seas.

"Singapore commanding the southwestern, while Hong Kong covers the northeastern entrance, with the island of Labuan on the western coast of Borneo, (an intermediate point,) she will have the power of shutting up at will, and controlling the enormous trade of those seas, amounting, it is said, in value to 300,000 tons of shipping, carrying cargoes certainly not under £15,000,000."†

"Fortunately the Japanese and many other islands of the Pacific are still left untouched by this gigantic power, and as some of them lay in a route of a commerce which is destined to become of great importance to the United States, no time should be lost in adopting active measures to secure a sufficient number of ports of refuge, and hence I shall look with much anxiety for the arrival of the Powhatan, and the other vessels to be sent to me."

The experience of my recent cruise did but serve to strengthen the opinion expressed in this letter, and to confirm the policy of my oft repeated suggestions, that commercial settlements in the China and Pacific seas will be found to be vitally necessary to the continued success of our commerce in those regions.

So long as such a settlement as I propose does not become a fortified place, and of sufficient strength to excite the jealousy of other powers, it should be looked upon as a port of resort for all nations.

It would therefore be unadvisable to have any other defences than enough to protect the port from the attacks of pirates and common marauders, of which there are very many in the

* The natives of China who are sent away as coolies are of the very worst of the population, mere vagabonds; and most of those emigrating to California are of this character; but those who are found in the countries bordering the China seas and Indian ocean are of a better class.

† See Governor Crawford's opinion in "The Expedition to Borneo," by her Majesty's ship "Dido," chapter 24, published by Harper & Brothers, New York, 1846.

Chinese seas. In truth, it would be the wiser policy if the European powers were to leave their least important colonies undefended, as in such condition they would not in time of war be otherwise molested than by occasional visits of the enemy for refreshments and supplies, which would in most cases be paid for. As fortified places, their possession would be seized upon when practicable as were the strongholds of Europe in former wars by contending forces. The troops of either one or the other of the belligerents forcibly occupying and holding them as garrisons, regardless of the interests or safety of the proper residents. But in later times the inhabitants of many of those cities, profiting by experience, have, wherever they have had the power, thrown down their defences, and thus rendered them untenable for military purposes. And so it would be the policy of England and France to demolish the defences of their minor colonies, withdraw the garrisons and leave the inhabitants dependent on their own resources; and free, if they should desire it, to secure by negotiation their neutrality in time of hostilities.

The constantly ameliorating changes which have transpired in latter times in the laws and customs of war, will no longer justify those measures of coercion and cruelty which were practised in former days. The world will never again countenance rapine and murder; the wanton destruction of edifices of religion and learning, of works of art, and defenceless private property; wars will hereafter be conducted in a manner more honorable and magnanimous; and that nation will deservedly receive the execrations of all good men, who shall henceforth allow of the perpetration of those acts of barbarity which have been of common occurrence *even* in recent times.

The geographical position of Formosa renders it eminently suited as an entrepôt for American trade, from which communications might be established with China, Japan, Lew Chew, Cochin China, Cambodia, Siam, the Philippines, and all the islands situated in the adjacent seas; and it recommends itself more strongly from the fact of its capability of furnishing abundant supplies of coal, which, in the present and increasing use of steam for purposes of commerce, will prove of vast importance to the eastern trade.

Up to the present time the greater part of the vast quantities of coal consumed by the numerous war and commercial steamers which navigate the waters of the east is brought from England, at enormous cost of freight, the mines of Labuan supplying only an insignificant portion of that which is required.

Another recommendation may be found in the advantages of its naval and military position, situated as it is directly in front of many of the principal commercial ports of China. It covers, and might be made with a sufficient naval force to command, not only those ports, but the northeastern entrance of the China seas, precisely as Cuba, in the hands of a powerful maritime nation, might command the American coast south of Cape Florida and the entrance to the Gulf of Mexico; and from the extent and fertility of soil of Formosa, it might be made capable of furnishing, in addition to its home consumption, large quantities of agricultural and other products for exportation.

The establishment of a commercial entrepôt, unshackled by the restrictions of duties upon foreign or domestic commerce beyond some trifling municipal impost, would draw to its ports vessels of all nations, and it would not be long before it would rival the great commercial marts of Hong Kong and Singapore.

Now, it is evident that whatever may benefit the commerce of the United States will also contribute to the advantage of other commercial nations, and the extension of American territory cannot but result advantageously to other powers, as offering new markets for the disposal

of their products, whether manufactured or otherwise; and viewing these settlements, not as fortified positions, ever to act on the aggressive, but merely as trading establishments, they could in no possible way excite the suspicion or jealousy of other nations, but, as before remarked, would rather contribute to their convenience and profit.

In conclusion, I may make one more quotation, and from another published paper of mine:

"*Objections to an American colony considered.*—We proceed now to consider briefly another point. What are the objections, let us inquire, which may be interposed to the establishment of an American settlement or colony such as we have described? Can they be sustained by any national argument? I think not. In truth, colonies are almost as necessary to a commercial nation as are the ships which transport from one country to another the commodities in the interchange of which commerce subsists.

"The objections hitherto advanced by our wisest men against the admission of detached and distant colonies into our federative organization cannot apply to small and distinct settlements established merely for purposes of trade or some religious or moral object. If once a few Americans determine to congregate and sit down together, whether in the western wilds or upon some remote island in the Pacific, there must be some insurmountable obstacle, indeed, which will ever prevent the accomplishment of their designs; and carrying with them, as such adventurers would, the elements to constitute a useful and happy government, it would not be long before their infant colony would grow into a flourishing settlement; and though, according to the theory of our institutions, it would not at first, if separated from our recognized territory, meet with much countenance from the government at Washington, yet the very circumstance of the settlers being thrown upon their own unassisted resources would prompt them to extraordinary exertions, and when fairly established in their new home they would themselves determine upon a congenial form of government, and elect their own rulers.

A general idea prevails that the possession of settlements abroad, however insignificant, involves the necessity of their defence against the combined forces of an enemy. This is only true to a certain extent, and with strongholds vitally essential to the prosperity and safety of the institutions of the nation to which they belong; but in regard to minor places, such as can have no influence upon the results of a war between two great nations, they should be considered neutral, so long as they shall keep aloof from any part in the struggle. It is not to be supposed, in these enlightened times, that the barbarities practised in former wars are to be any longer tolerated. The extraordinary improvements in the means of destruction in battle, both by sea and land, will render partisan warfare contemptible, and hence there would be little of honor or advantage in making forays upon small isolated colonies, to whatever nation belonging. They should be left undisturbed, and for the very good reason, that if thus regarded, they might be resorted to by the vessels of either of the belligerents in cases of extremity.

In the late war of the United States with Mexico, the Americans held for a long time many of the principal cities and towns, and all the seaports of the enemy, but so far from molesting the inhabitants of those places, they were actually protected from the exactions of their own rulers; private property was considered sacred, everything required for our use not belonging to the Mexican government was scrupulously paid for, and no private building was occupied without a just compensation to the owner; such were the facts within the sphere of my observation, and I believe the same liberal policy was pursued co-extensively with all the operations of the Americans pending the war.

It may, therefore, be assumed that a few small settlements, scattered through the Pacific

ocean, and subject to their own local laws, will sooner or later be established as measures of necessary expediency and convenience to our growing commerce.

The moment a vessel at the present day leaves the American shores upon a foreign voyage, go where she will, her officers and men, in entering port, become subject to laws often oppressive and generally at variance with the spirit of our institutions.

Whatever of prejudice there may be in the minds of many of our rulers to these proposed settlements, their coming into existence cannot be prevented, nor can the onward spirit of our people be stayed by any laws that could be made, consistent with the conservative elements of our Constitution. The people *will* emigrate and settle in remote places, and the notice and sympathies of the country will be drawn toward them; and in this way we shall have foreign settlements, even if they are not established by positive enactment.

They may not be considered strictly as colonies, but all such settlements would very soon, if composed of our countrymen, make their own constitutions and local laws. They would be offshoots from us rather than, strictly speaking, colonies; and it would be hard to say how they could be prevented by any government.

M. C. P.

REMARKS OF COMMODORE PERRY

UPON

THE PROBABLE FUTURE COMMERCIAL RELATIONS

WITH

JAPAN AND LEW CHEW.

REMARKS OF COMMODORE PERRY

UPON THE PROBABLE

FUTURE COMMERCIAL RELATIONS WITH JAPAN AND LEW CHEW.

THE extent and value of American trade with these countries will mainly depend upon the will and decided action of the United States government, and the enterprise of our own merchants, who are rarely wanting in this element of success; doubtless, a profitable interchange of commodities could be brought about by a judicious prosecution of the friendly relations already established by the treaties of "Ka-na-ga-wa" and "Napha," and by the formation, in due time, of *commercial* treaties, which will embrace, in their details, all the stipulations of reciprocal trade.

Some few of the trading community have either wilfully, or through ignorance, misconstrued the meaning of the letter and spirit of the treaties above referred to, and have adventured upon speculations which, though in some instances remunerative in their results, were not authorized by promises held out either by the treaties or by incidental information officially or privately communicated.

The treaty with Japan professes to be nothing more than a compact, establishing between the United States and that empire certain obligations of friendly intercourse with, and mutual protection to, the citizens and subjects of the contracting powers, and granting to American citizens rights and privileges never before extended to strangers.

This treaty, in its concessions on the part of the Japanese, far exceeds the most sanguine expectations, even of those who, from the first, advocated the policy of the Japan expedition. It purports to be a preliminary, and surely a most important step, in advance of a commercial arrangement to be agreed upon when the Japanese government may be better prepared by a more perfect knowledge of the usual requirements of international law and comity to enter upon additional pledges. Certainly the advantages of this treaty have been considered of sufficient importance by four of the great powers of Europe to be sought for by them.

It was expressly stated, pending the negotiations, that as Japan had not, at the time, any foreign commerce, the people were ignorant of the requirements necessary to its re-establishment and prosecution; that in consequence of the long discontinuance of foreign intercourse, the country furnished nothing more than was needed for its home consumption; and time would be required to produce the commodities suitable for exportation, in payment for articles purchased from strangers. That the laws of Japan in regard to foreigners had been for a long period inflexibly stringent, and though it was admitted that they were not suited to the present

enlightened condition of the world, they could only be ameliorated by slow degrees; that there was an evident desire with many of the people to cast off the shackles which had so long bound them to a mistaken policy; but however a portion of the most intelligent might wish for a change, there would still be arrayed, for a time at least, in opposition to the measure, a majority, and especially amongst the hereditary princes, who had their proprietary estates in the interior, and whose power over their vassals—a power subject only to the more despotic rule of the court, would be seriously lessened by the introduction of the more liberal principles of Christian nations; and yet there can be little doubt that, by the exercise of just, honorable, and conciliatory measures towards these singular people, they could, and in no great space of time, be brought into friendly commercial relations with the United States and the powers of Europe.

The arguments of the Japanese princes who negotiated the treaty were certainly reasonable enough, and their sincerity was sufficiently proved by the fact that a few of the most obnoxious of the laws of the empire were repealed or set aside before the departure of the American squadron; such, for instance, as the abrogation of that which inflicted the punishment of death upon all who, whether by accident or design, found themselves separated from their country; another which prohibited the slightest barter with strangers, and the more singular decree which required that all Japanese vessels should be constructed upon one precise model and rig, with open sterns, thus purposely rendering them unsafe for ocean navigation. Other changes, tending to the same liberal object have since taken place, and it may be safely predicted that many years will not elapse before this magnificent country will be numbered amongst the most important of the eastern nations, with which a profitable trade will be established by the interchange of many of our manufactured articles for the products of a country already possessed of great resources.

Amongst many articles which they very much need is that of woolen cloth; debarred by their religion from rearing animals for slaughter, they confine their domestic quadrupeds to the horse, the bullock, the dog, and cat, and consequently have no material of which to manufacture warm clothing, skins being an abomination to them; they are obliged to quilt together folds of their flimsy cotton, or the more costly texture of silken cloth, and hence the manufactured woolen and cotton cloth of the United States and Europe would be gladly received in exchange for their home products of gold, silver, copper, camphor, coal, lumber, spars, dried fish, tobacco, and various descriptions of grain, in addition to their own manufactured articles, such as silks, crapes, grass-cloth, lacquered ware, porcelain, &c.

For the last two centuries the Japanese have been left to provide for themselves, being in no way dependent upon foreign supplies; but as they are unquestionably a luxurious and pleasure-loving people, they would be inclined to seize with avidity upon the means of adding to their comforts and convenience, and would soon find the way, in their abundance, to pay for whatever they purchased of foreign production; and thus the enjoyment of one foreign luxury would beget the desire for others, and from being at first luxurious they would, as in respect to the early introduction into Europe of spices, teas, and other eastern products, soon become necessaries, and in this way a successful commerce would be created.

But in order to bring about and render permanent this desirable object, the government of the United States should watch with constant solicitude the attempts which have already been made, and will doubtless continue to be made, by persons calling themselves American citizens, to force upon the Japanese a traffic which they cannot, under present circumstances, entertain; and to claim privileges not provided for in the treaty, but which may be secured by fair and

honorable means, if not prevented by the unauthorized and covert acts of these men, who, in their desire for gain, assume, whether rightly or not, all the immunities of citizenship, but entirely overlook the honor and character of the country whose protection they are always ready to claim.

It has been hinted, with what truth I shall not undertake to say, that at least one experiment has already been made to introduce into Japan the abominable traffic in opium; fortunately, this diabolical attempt was defeated by the sagacity of the Japanese authorities.

Of the Lew Chews I have little to say in this paper, other than to remark that, as places of resort for temporary equipment and supplies, these islands hold out every convenience to vessels passing in their route; fertile beyond measure, as some of them are, and peopled by an inoffensive, industrious race, they could, by the practice of kind and honorable measures towards them, be brought into the most friendly intercourse; but, as before remarked, the governments of the United States and Europe should protect these and other defenceless communities, in remote parts of the world, from the acts of injustice and outrage not unfrequently committed by the crews of ships navigating distant seas, who, in the confidence of escape from detection, inflict upon the simple natives wanton and unprovoked wrongs, threatening them, if they resist, with the interposition of the power of their respective governments, whose good faith they deliberately violate. And if perchance the natives assume the defensive in the protection of their lives, their property, and domestic rights, and blood is shed, then the home governments are beset with complaints emanating from the aggressors themselves, misrepresenting and exaggerating the acts of the natives, who, having no means of explanation or defence, are consequently looked upon as guilty—for how can it be otherwise proved? And the governments thus importuned can do no less than to cause investigations to be made; and this can only be accomplished by the despatch of vessels-of-war, at considerable cost, to the distant regions where these *outrages* of the natives are *alleged* to have been committed; and the results will turn altogether upon the prudence, discretion, and sense of justice of the officers entrusted with this duty. Meanwhile, the really guilty parties go unwhipped of justice.

Now, to avoid these acts of cruelty, at least to guard against their being perpetrated by persons sailing under the American flag without the knowledge of the authorities at home, consuls, or consular agents should be sent to every part of the world visited by our ships, there to be prepared, in their official character, as well to watch over the rights and interests of our *bona fide* citizens as to detect and bring to punishment a class of adventurers to be found everywhere—men who, from their cosmopolitan and vagabond life, have no claim upon the protection of any nation—yet are they the most clamorous in demanding their *assumed* rights.

The additional cost of salaries to the increased number of consuls would be as nothing, compared with the advantages that would accrue from their services; indeed, it might be a question whether the outlay would not be in a measure returned to the revenue of the country by the remunerative results arising from the greater facilities rendered to our foreign commerce.

M. C. P.

CORRESPONDENCE

IN

REFERENCE TO SIAM.

CORRESPONDENCE

IN

REFERENCE TO SIAM.

In connexion with this report, it may be well to notice certain measures which doubtless had a leading influence in bringing to a successful issue the treaty recently negotiated by Mr. Townsend Harris with the kingdom of Siam. Indeed, Mr. Harris writes to Commodore Perry, under date of June 4, 1856, as follows:

"I should have mentioned before that both the kings of Siam inquired after you and your welfare. They are both aware of your services to your country, and of your opening Japan, and I do not hesitate to say to you that *your* expedition to Japan was one of the great causes that led to the English and American treaties with Siam."

Commodore Perry to the Second King of Siam.

U. S. Flag Ship Mississippi,
Point de Galle, Island of Ceylon, March 14, 1853.

Most Exalted Prince: I have been most happy to meet at this port a vessel-of-war belonging to the kingdom of Siam, one of beautiful form and construction, and commanded by an officer of skill and merit.

In remembrance of the kindness you extended to the late Mr. Roberts and the officers of the United States ship "Peacock," in 1836, I beg your acceptance of a curious pistol, which has been entrusted to my charge, to be presented to some high functionary who has sufficient acquaintance with the arts to understand its mechanism and use.

The renown which your highness has acquired in America for your attainments in every branch of science induces me to place at your disposal this trifling gift of Mr. Colt.

I hope that you will send one of your ships of Siam to America, where I can promise her officers a friendly and honorable welcome.

And it will at all times give me the greatest pleasure to render to all vessels under the Siamese flag whatever aid and assistance it may be in my power to command.

With profound respect, I have the honor to be your most obedient servant,

M. C. PERRY,

Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

His Royal Highness PHAR PEN CLOW CHOW YOU HOU.

The Second King of Siam to Commodore Perry.

PALACE OF THE MAHA UPERAT OF THE KINGDOM OF SIAM,

Bangkok, September 25, 1853.

RESPECTED SIR: It gives me great pleasure to acknowledge the receipt of your favor of March 14, 1853, from Point de Galle, together with the beautiful pistol which you did me the honor to forward for my acceptance.

It is the best and most perfect thing of the kind I have ever seen, and does great credit to American genius and American skill. I desire to communicate, through you, my best thanks to the distinguished and ingenious inventor, Mr. Colt, for this beautiful gift.

I beg you will also accept for yourself my acknowledgements for the kind and flattering manner in which you have conveyed the gift to me.

I shall ever retain a pleasant remembrance of my intercourse with the late Mr. Roberts and the officers of the United States ships "Peacock" and "Enterprise," during their stay here in 1836.

I would desire to reciprocate to you personally and to your country all the friendly interest you have expressed for Siam

With great respect, I have the honor to remain your much obliged friend,

PHAR PEN CLOW CHOW YOU HOU,

Maha Uperat of the Kingdom of Siam, or Second King of Siam, &c., &c., &c.

His Excellency M. C. PERRY,

Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

Commodore Perry to the Second King of Siam.

U. S. FLAG SHIP SUSQUEHANNA,

Macao, December 15, 1853.

MOST EXALTED PRINCE: I have had the honor and great satisfaction of receiving your communication of the 25th of September last, and now beg to thank you for the kind and cordial manner in which you have received the trifling present which I did myself the pleasure of tendering to your acceptance, not from any value it possesses, but as a curious and useful invention.

It would give me the highest gratification to be able to visit Siam with my squadron some

time during the following summer, not only that I might have the honor of paying my personal and official respects to his Majesty the First King and to your highness, but to offer in a becoming manner the friendly wishes of my government for the prosperity of the Siamese kingdom, and to invite a friendly reciprocity of social and commercial intercourse.

I am the more anxious to visit Siam, and to make the acquaintance of your royal highness, as I have in my squadron many rare modern inventions, which I should be most happy to exhibit to one so highly gifted as your highness is with scientific knowledge.

With the most profound respect, I subscribe myself your most obedient servant,

M. C. PERRY,

Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

His Royal Highness PHAR PEN CLOW CHOW YOU HOU,

Maha Uperat of the Kingdom of Siam, &c., &c., &c.

The Second King of Siam to Commodore Perry.

NORTHERN ROYAL OR SECOND KING'S PALACE,

Bangkok, Siam, March, 1854.

RESPECTED SIR: I have the pleasure to acknowledge the receipt of your letter, dated Macao, December 15, 1853.

I have given due attention to its contents, which gave much pleasure. I have acquainted his Majesty, my much esteemed royal elder brother Somdet Phoa Paramende Maha Morykeet, the supreme King of Siam, with the substance of your communication. His Majesty, on being informed of it, was pleased and gratified that you, being a distinguished officer of the United States, having entire control of affairs in India, should think of those countries which long have been distinguished friends. His Majesty also thanks you for being so good as to send a communication, informing us of your desire to visit Siam; you say that, should you be able, you would be happy to visit Siam. Upon the present occasion you have come from the United States on account of the state of affairs in Japan and China; but China being now in a disturbed state, you must probably be engaged in looking after the interests of the merchants of the United States, who are in all parts of China, and must have a great deal to attend to. If you should find it consistent to visit Siam or not, let it be as you please. Should you decide to come, please write to His Excellency Chau Phaya Phraklang, minister for foreign affairs, a month or two previous to your coming, and inform him of the time of your arrival here, and how many vessels and men will accompany you, as his excellency is the proper person to receive foreign visitors. He will arrange to receive you in a proper manner.

I remain, respectfully yours,

PHAR PEN CLOW CHOW YOU HOU,

Second King of Siam, &c., &c., &c.

His Excellency M. C. PERRY,

Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

Commodore Perry to Messrs. ———.

U. S. Flag Ship Mississippi,
Macao, October 20, 1853.

Dear Sirs: Our friend, the Rev. Dr. ———, of Canton, informs me of his having written to you with reference to a contemplated visit of mine to Siam, after I shall have accomplished my Japan mission.

He has doubtless intimated to you my desire to obtain some accurate information as to the probability of a favorable reception by the King of Siam of any propositions I might make for modifying and enlarging the stipulations of the present treaty between the United States and that kingdom, and of inducing the king to send one of his finest ships to the United States in charge of some of the most intelligent of his officers, that they might examine into our institutions, religious, civil, military, and commercial, and take back with them an account of what they shall have seen, as furnishing evidence of the advantages that Siam would derive from a free and mutually liberal intercourse with us.

I am well aware of the impolicy of taking any steps in this business until I can learn of certainty whether the king and his advisers would receive my propositions with favor, and be disposed to enter into friendly negotiations.

Another failure following that of Mr. Ballestier would put our relations on a worse footing than they now are, and this is the object of my addressing myself to you to ask, as a particular favor, that you would, if it be at all practicable, ascertain the feelings and disposition of the king and his councillors with respect to any diplomatic visit I might make to Bangkok.

These enquiries should be made as if emanating directly from yourselves, as Americans and well wishers of a more friendly understanding between the two countries. You might say that you have been credibly informed that Commodore Perry has been charged with full powers to negotiate with Japan, Siam, Cochin China, and other eastern nations, but he is not disposed to make any advances towards Siam until he is well assured that such friendly demonstrations would be met in the same frank and liberal spirit; that the United States, as a nation, is very powerful, and any rejection of proffers made by an accredited ambassador of that country would, if treated coolly, give great offence; that a reciprocal treaty with a nation of such vast commercial resources must result to the advantage of the weaker power, and if Commodore Perry could have sufficient proof from any authentic source that a visit from him, with one or more of the splendid steam frigates he has under his command, would be favorably received, he would doubtless go to Siam, and pay his respects to the king.

When at Galle, in Ceylon, in March last, I saw a Siamese sloop-of-war at that port, and was visited by her captain and some Buddhist priests, who were on a pilgrimage to a temple near by, I sent the Second King of Siam, the one who speaks English so well, a trifling present; since then, a Siamese vessel at Whampoa has, at the request of her captain, been assisted by one of my ships. These little acts are proofs of our friendly disposition towards the Siamese, and I feel assured that if the king would send one of his ships, whether with cargo or not, to the United States, the result would be most gratifying to him.

The Sultan of Muscat sent some years ago a sloop-of-war to our country, and her officers were treated with great kindness and distinction; the same civilities were extended to an officer sent a short time after by the Sultan of Turkey to the United States.

If the King of Siam determines on despatching one of his ships, whether on a voyage for observation or commerce, or both, it will give me pleasure to offer my services in any possible way to facilitate so desirable an object.

You will, my dear sirs, readily understand the motives which actuate me in this delicate business, and whilst you are acting seemingly to effect some object desirable to your own wishes, you may be the means of obtaining such information as will make a visit of mine of great advantage to both nations.

If it were possible to bring about an invitation from the King that I should visit Siam, negotiations would follow as a matter of course.

I have sent a copy of this letter to each of you gentlemen, and by different mails, in the possibility of the miscarriage of one of them.

Very respectfully,

M. C. PERRY,

Commander-in-chief U. S. naval forces, East India, China, and Japan seas.

Commodore Perry to Mr. McLane.

SINGAPORE, *September* 19, 1854.

MY DEAR MR. MCLANE: On arrival at this place I was informed by our consul that a Siamese messenger from the king had been waiting some time here to see me.

I have this moment parted with him, and he informs me that the king was much pleased with the intelligence that I contemplated visiting Siam, and had erected a building for my reception, and made many other preparations to do me all honor; that on such occasion, or rather the occasion of my visit, he would depart from the usual court etiquette, and receive me in person, &c., &c.

An hour before my interview with the Siamese messenger I had held a long conversation with Colonel Butterworth, the governor of Singapore, who had received a letter from the king of Siam, an old correspondent of his, in which the king refers to me, and remarks that he was anxiously awaiting my arrival; another letter received by the governor from the same source he had forwarded to Sir John Bowring, which he will doubtless show you.

I give the above for what it is worth. All these preparations may possibly be intended merely as a blind to conceal a predetermined intention of conceding nothing in the way of improving the character of the existing treaty with the United States.

As Colonel Butterworth very justly remarked, the Siamese princes, like all eastern potentates, are full of diplomatic duplicity; nevertheless, I should have much liked to have had a bout with his Siamese Majesty.

Most respectfully and truly yours,

M. C. PERRY.

His excellency R. M. MCLANE,
United States Commissioner to China.

Commodore Perry to the Secretary of the Navy.

ON BOARD ENGLISH MAIL STEAMER HINDOOSTAN,
At sea, Indian Ocean, October 7, 1854.

SIR: I have the honor to enclose herewith a copy of a communication addressed by me, from Singapore, to the Hon. R. M. McLane, commissioner to China; in explanation of which I may inform the department that on arrival at Ceylon, on my outward passage to China, I met a ship of the king of Siam, having on board a number of distinguished Buddhist priests, on a pilgrimage to a temple near to Galle. To the captain of this ship and to the pilgrims I paid some attention, in view of availing of so favorable an opportunity of opening a correspondence with the younger brother of the king, the one who evinced so much friendship to those of our officers who had already visited his country.

Accordingly, in a letter addressed to this prince, I informed him of my desire to visit, at some future time, with the steamers of my command, his flourishing country; and to endeavor by every suitable act to enlarge and cement more strongly the friendly intercourse already subsisting between the United States and Siam.

It was my desire to revise the treaty entered into by the late Mr. Roberts, which had virtually become a dead letter and altogether inoperative; and that with England had also shared the same fate. And, although subsequent attempts had been made by Sir John Davis and Sir James Brooke, (the Rajah,) on the part of England, and Mr. Ballestier, as envoy from the United States, I was induced to think that another trial would have resulted more successfully; and consequently, under the authority of one of my blank letters of credence, took the preliminary steps in the business.

But knowing the character of all eastern potentates, I was not disposed to venture hastily upon a visit to Bankok, (even if it had been at the time practicable,) *there*, possibly, to be politely repulsed, as the three gentlemen last mentioned had been. Therefore, on arrival at Canton, and conferring with our secretary of legation, Dr. Parker, I addressed myself, with his assistance, confidentially, to two of the American missionaries resident in Siam, and in good favor with the king, requesting them to make inquiry as to the feelings of the king and his ministers with repect to the government and people of the United States, and to give me their candid opinions, whether, if I came to Siam, I should be successful in effecting the object of my visit.

In due time I received replies, not only from the second king, but from the reverend gentlemen addressed by me. The letter of the king was merely one of courtesy; those of the missionaries assured me of a friendly reception at court, but expressed some uncertainty as to the disposition of the government to enter into more liberal commercial intercourse with foreign powers. On the whole, however, they rather recommended the proposed visit.

Since the dates of these letters, I have received another from the second king, equally friendly, and referring me to his brother, the first king; and from other information obtained, I should have made up my mind to enter upon the experiment after my return from Japan, if circumstances had permitted.

It may be asked why I did not take advantage of the interval of my detention in China to make the desired visit. The answer is, that I had not at the time a sufficiency of coal on hand

to authorize so large an expenditure as would have been required in the passage of the steamers to and from Siam, and still leave an adequate supply for my second visit to Japan.

One of my objects had been to induce the king to send one of his ships (all of which combine both war and commercial purposes) to the United States, with some of his most intelligent officers—many of whom speak English*—there to examine into our institutions, resources, &c.; the surest way, in my opinion, of securing the respect and friendship for our government of a people not more than half civilized, as we understand civilization.

My plans with respect to Siam have, however, been frustrated by the indispensable delay in the negotiations with Japan, and the necessary return of the Mississippi and Susquehanna by way of the Pacific, the employment on special service of the Powhatan, and the imperative necessity of keeping a ship constantly at Canton and Shanghai.

Copies of all the correspondence referred to have been furnished to Mr. McLane, and will also be forwarded to the department on my return to the United States.

With respect to the possibility of opening an intercourse with Cochin China, notwithstanding the previous failures of England, France, and the United States, I am of opinion, founded upon reliable information obtained in China proper, and at Singapore, that a favorable issue might be accomplished, provided that small steamers of light draught were employed to ascend the rivers upon which the principal cities are situated, and in sufficient force to resist and prevent insult, to command respect, and, as a consequence, *to secure the friendship* of these singular people; and though the trade of Cochin China and the neighboring countries is growing in importance, it is a question whether the advantages of a treaty purchased at so much expense would be otherwise desirable than as reflecting high honor upon the enterprise and energy of a nation yet comparatively in its infancy.

With great respect, I have the honor to be your most obedient servant,

M. C. PERRY.

Hon. JAMES C. DOBBIN,
Secretary of the Navy, Washington.

* Both the kings speak and write English.

LETTER

OF

CAPTAIN H. A. ADAMS TO COMMODORE PERRY,

COMMUNICATING

THE PARTICULARS OF THE RATIFICATION

OF

THE TREATY OF KA-NA-GA-WA.

LETTER

COMMUNICATING THE

PARTICULARS OF THE RATIFICATION OF THE TREATY OF KANAGAWA.

Captain H. A. Adams to Commodore Perry.

PHILADELPHIA, *July* 9, 1855.

SIR: In the belief that an account of my proceedings since I left your immediate command in April, 1854, may be acceptable, I will offer you a statement in detail which will include an account of the exchange of ratifications of the treaty with the Emperor of Japan. Agreeably to your orders I sailed from Yedo bay on the 4th of April, 1854, in the Saratoga, Commander Walker, carrying with me the treaty you had just concluded. We reached Honolulu on the 1st of May, where I took the first vessel that offered for San Francisco, whence I started by the mail route via Panama for New York and Washington, and reached the seat of government on the 12th of July. The news of the treaty was received with much pleasure, and obtained the immediate and unanimous approval of the Senate. The ratified copy of the treaty was intrusted to me to carry out to China, and subsequently to Japan. I left New York on the 30th of September, and arrived, by the English overland route, at Hong Kong on the 1st of January, 1855. Commodore Abbot, in accordance with instructions from the Navy Department, gave orders to Captain McCluney to convey me in the Powhatan to Simoda, where we arrived on the 26th of January. At Hong Kong I had engaged a very intelligent gentleman, Mr. Wilhelm Lobscheid, to act as interpreter. On my arrival I addressed the following letter to the chief of the supreme council, which I sent by an officer of the governor of Simoda, requesting him to forward it immediately to Yedo.

U. S. SHIP POWHATAN,
Simoda, January 26, 1855.

YOUR EXCELLENCY: I have the honor to acquaint you, for the information of his Majesty the Emperor of Japan, that I have arrived here from the United States of North America, and bring with me a copy of the treaty made by Commodore Perry with the Empire of Japan, which has been approved by the Senate of the United States, and signed by the President. I am furnished with full powers to exchange ratifications agreeably to the 12th article of the treaty, and am ready at any time to meet such high officer as shall be properly authorized for the same purpose by the Japanese government.

I have the honor to be, very respectfully, your obedient servant,

H. A. ADAMS,
Commander U. S. Navy.

His Excellency ABE ISE NOKAMI, *&c., &c., &c., Yedo.*

I gave the following memorandum to the Japanese interpreter, Mr. Lobscheid, explaining for his information each paragraph separately.

MEMORANDUM.

It is provided by the 12th article of the treaty that ratified copies shall be exchanged within eighteen months after the day on which it was signed at Ka-na-ga-wa by Commodore Perry and the Japanese commissioners. I have brought a copy for this purpose, approved by the Senate of the United States and signed by the President. I wish to deliver this to some person of the highest rank who shall be appointed by the Emperor to receive it, and to deliver to me in return a copy in the Japanese language, approved and signed in the same manner by the Emperor.

As I have a special power for this purpose, which I will deliver with the treaty to the high officer appointed to exchange ratifications, I shall expect that high officer to have the same authority in writing from the Emperor, which he will deliver to me at the same time. This is in accordance with the usage of nations.

It is desirable that the exchange shall be made as soon as possible, as I wish to return with the Japanese copy immediately to the United States. I am ready to proceed for this purpose to Yedo, if it is agreeable to the government of Japan; or to make the exchange in proper form on board the United States ship Powhatan, as soon as the Japanese commissioner is ready.

The Japanese copy of the treaty is to have the seal and signature of the Emperor attached to it, in like manner as the seal and signature of the President of the United States are affixed to the copy which I bring.

It will be necessary to have the original treaty at hand when the ratifications are exchanged, in order to compare it with the copies, and see they all agree.

When the exchange is made, the commissioners will sign two certificates of the fact, to be transmitted to the President of the United States.

The Japanese officer who boarded the ship informed us that the town of Simoda had been totally destroyed by the effects of an earthquake on the 23d of December. The Russian frigate Diana, which was lying here at the time, received so much injury that she subsequntly foundered. I will subjoin to this communication a full account of this calamity.

On the 29th January I paid a visit of ceremony to the governor of Simoda. I found him to be Isawa Mimasaki Nokami, who had been one of the commissioners for making the treaty. He received me in a temple situated on an eminence, which seemed to have escaped serious damage from the earthquake. He stated, in the course of conversation, that the Japanese government would not be prepared to exchange ratifications at this time, as by the treaty this was not to be done until eighteen months had elapsed from the time it was made. I told him this was a mistake, and referred him to the 12th article of the treaty itself, which says, "within eighteen months, or sooner if practicable." Before leaving him I expressed a hope that he would do all in his power to forward the business, which he promised he would. He said it would require six days to send a letter to Yedo and get an answer back.

On the 4th of February I received a message from the governor, saying that letters had come from Yedo, and inviting me to a conference on shore. I went accordingly. After the usual compliments, and an expression of regret at the delay I was subjected to, which he said was partly owing to the destruction of the place by the earthquake, and partly to their press of business with the Russians, who were here negotiating a treaty, he began to state other difficulties which stood in the way of immediate exchange of ratifications. In the first place, he asked if I had

brought a Dutch translation of the treaty, and being told I had not, he said it would then be impossible to proceed, as they did not understand English. To this I replied that we were in similar circumstances, as none of us understood Japanese; that I had brought a copy of the treaty in English, signed and sealed by the President of the United States, and all I required in return was a copy in Japanese, signed and sealed by the Emperor. I added that they had already translations of the treaty both in Dutch and Chinese, which had been carefully compared, both by their own interpreters and ours, when the treaty was made at Kanagawa, and moreover, that their interpreter, Moryama Yenoske, who assisted at making and translating the treaty, was now at Simoda, and understood English sufficiently to compare the ratified copy with the original, and to see that they were word for word the same. I requested him to send to Yedo for a Dutch translation. He said he had done so already. Our conversation was carried on in this manner.

Captain A. How long will it be before it arrives, and you are ready to finish this business?

Governor. I cannot give a decided answer to this.

Captain A. I wish to have a definite answer. I consider the ship in danger here, from the insecurity of the harbor and the frequent earthquakes. Captain McCluney is also very uneasy, and it is important I should know as soon as possible whether the Japanese government is willing to act in accordance with the 12th article of the treaty or not. If I am to be kept waiting long, I must request Captain McCluney to take the ship high up in Yedo bay, where she will be safe, and where the communication with Yedo can be so much shorter.

Governor. They are willing to do everything according to the treaty. But one thing must be mentioned. It is impossible the Emperor's name should be to it. He never signs anything; it is contrary to the custom of Japan.

Captain A. It must be signed by the Emperor, "the august sovereign," or the person who holds the supreme power in Japan, by whatever name he is called.

Governor then says repeatedly that only the commissioners who would be appointed to exchange ratifications and the chief of the supreme council could sign it.

Captain A. I cannot consent to this, nor make any exchange under such circumstances. The copy I bring is signed by the President of the United States, and I will not accept in exchange for it anything less than the signature of the Emperor himself.

Governor here goes into a long explanation to show that the sovereign power is really in the hands of the supreme council, and that the Emperor has nothing to do with affairs of this kind.

Captain A. That may be so; but as the Emperor's name only is used in the treaty, I can recognize no other authority.

Governor. Have you seen the supplementary articles made to the treaty by Commodore Perry at Simoda?

Captain A. I have heard of them, but never seen them.

Governor. It is agreed by them that the commissioners only shall sign the ratifications.

Captain A. I would like to see these articles, but they could not govern me in this case. I wish to know distinctly whether the Japanese government is willing to comply with the stipulations of the 12th article of the treaty or not; and if not, that the chief of the supreme council will please state the reasons in writing, in order that I may lay them before my own government. Among western nations such a denial would be considered a great affront.

Governor. All will be done according to the treaty. Commissioners will be sent here to meet

you, and exchange ratifications. I have sent for a Dutch translation of the treaty that we may see exactly how it reads.

Captain A. Unless I can hear, in the course of five or six days, that the commissioners are coming, a regard for the safety of the ship will make it necessary to move her up Yedo bay to some safe anchorage.

Governor. Everything will be done quickly. Will you be good enough to give me an English copy of the treaty.

Captain A. Not at present. After the ratifications are exchanged, I will have a copy made for you with great pleasure.

Here the interview terminated with the usual compliments on both sides. On the 9th of February, Hirajama Kanziro, an officer of rank and man of learning, arrived from Yedo. He came on board the Powhatan to see me, and announced that the commissioners were on their way to Simoda, and might be expected in three or four days. He said the Japanese were totally unused to treaty making, and ignorant of the proper forms. I explained everything to him, assuring him that by following my directions they would not go wrong, as everything would be done in accordance with the practice of western nations. Kanziro had three scribes with him, who put down all I said in writing. I gave him a memorandum, in which I stated among other things that no preparation was necessary for the exchange of ratifications except a comparison with the originals, which would be made by the interpreters in the presence of the Japanese commissioners and myself, and that I hoped they would conclude the business as soon as possible. An accident, similar to the one that caused the loss of the Diana, might befall this ship if we remained here. We had felt several heavy earthquake shocks since we had been in port; and during a gale two days since we were obliged to get up steam to prevent the ship from going ashore. She was dragging on the rocks, with three anchors down. There was no holding ground; and that if he had not assured me the commissioners were coming, the ship would this day be on her way towards Yedo, to find a secure anchorage, and wait for the action of the Japanese government. On the 12th of February, Kura-kawa Kahei, lieutenant governor of Simoda, came on board, when, after the usual compliments, the following conversation took place:

Lieutenant Governor. One of the commissioners arrived last night.

Captain A. When may the others be expected?

Lieutenant Governor. I have come to speak on that subject. The original Japanese version of the treaty reads that ratifications of the treaty shall not be exchanged until eighteen months have elapsed. It will be compared with the Dutch translation and the English original. It is perhaps the fault of the interpreters. The commissioner who has arrived would be glad to see Captain Adams on shore to-morrow, to compare the originals and translations.

Captain A. In case the comparisons are satisfactory, is the commissioner authorized and prepared to make the exchange of ratifications immediately?

Lieutenant Governor. It will be done very soon, but I cannot say in how many days. The commissioner has the ratified copy with him; but, in consequence of the difference between the original and the translation, it will be necessary to refer again to Yedo.

Captain A. I have prepared a letter to the prime minister, which, however, I will not send until after my interview with the commissioner to-morrow. I do not like this procrastination, and cannot remain here much longer. Captain McCluney has given a large part of his provisions to the Russians; and we may be in want ourselves if we are delayed for any time.

Lieutenant Governor. We do not understand English, and wish you to give us a Dutch translation of the treaty.

Captain A. I cannot do that. You have already a Dutch translation, which was made and carefully compared with the treaty at Kanagawa.

Lieutenant Governor. We do not understand the meaning of the word "within."

The meaning of this word was here explained in Dutch and Chinese by Mr. Lobscheid. The difficulty about the signature of the Emperor was resumed by Kurakawa Kahei. He wished to know whether the ratification should not be signed by the high government authorities; they were the proper persons, &c., &c. I told him very shortly, that, as I had often said before, according to the 12th article of the treaty, the ratifications were to be signed by the President of the United States and the august sovereign of Japan, and that I would not accept anything less than the name of the august sovereign of Japan, whoever he might be, inasmuch as the President of the United States had signed the ratification himself.

Lieutenant Governor. The Emperor does not rule in Japan. The government is conducted by a supreme council, and the chief of the council is the head of the government. He performs all duties.

Captain A. I have heard this before. Why, then, was the Emperor's name inserted in the original treaty? Why not the prime minister? Now the Emperor must sign the treaty. It is useless to discuss the matter any further at present.

Lieutenant Governor. Here is a bundle of religious books, left in Simoda by "Bittinger." This is contrary to Japanese law, and is not right. The governor has had them all collected, and begs you will receive them, and carry them away to America.

Captain A. I will take them. To-morrow I will wait on the commissioner.

The next day, February 13th, I went on shore to the house of the governor, accompanied by Lieutenant Pegram, Purser Eldridge, Mr. Lobscheid, and Mr. Craig, Captain McCluney's clerk, who was to take notes of the conversation. I found the commissioners had all arrived, and were in readiness to receive me. Their names were: *Ido-Tsu-Sima Nokami, Isawa Mimasaki, Nokami, Tsoesocki Soeroega Nokami, Matsmotu Dzulo,* and *Koka kin Idsero,* with Tatsenoske for chief interpreter. After an exchange of salutations, compliments, &c.,

Captain A. Have the commissioners brought the original treaty with them from Yedo?

Commissioners. We have brought them for comparison; the same that were written at Ka-na-ga-wa last year.

These copies were now produced, and the ratified copy brought by me carefully compared with the Dutch translation. After the reading was done:

Captain A. You have heard it now, is it all right?

Commissioners. All is right; but our understanding was that the exchange should not take place for eighteen months. The fault of the delay was on our part, not yours; another excuse for us is, that we have been very busy with the Russians.

Captain A. Since the American copy is found to be all right, if you have the Japanese ratification, we will now compare that with the Dutch translation.

Commissioners. We have here the original, which was made last year. We wish to compare that.

The Japanese original was then produced, and carefully compared with the Dutch translation. They were found to differ, the Japanese averring that in their language it read "after eighteen months."

Captain A. Have you the Chinese copy? We will examine that.

The Chinese copy was examined and found to agree in substance with the English and Dutch.

Captain A. You perceive that the Japanese copy is the only one that differs from the others. That was made by your own interpreters. Ours did not understand Japanese, and as the original was made in English, any difference from it in the translation must be wrong.

Commissioners. Yes, that is undeniable, the error is ours.

Captain A. Now, I would like to see the Japanese ratification, that I may know how it is signed.

Commissioners. It is not here. On finding that it differed from the English, it was sent back to Yedo.

The objections to the Emperor signing the ratification were now renewed in the strongest and most formal manner. The former assertions made on the subject were repeated over and over. The discussion lasted three or four hours. I did not recede, but insisted that it should be signed by the Emperor "Kubo," august sovereign, or person of the highest station in the empire, by whatever name or title he was known; one whose authority could never be called in question; and I further said, that as they declared the power of making and ratifying treaties, and doing similar acts, was vested in the supreme council, it would be necessary and proper for them to sign it also, and pointed out to them, that the American ratification bore the signature of the Secretary of State in addition to that of the President. By this time I had learned that the ratification they had brought down with them, was without the signature of the Emperor. I now had the following note translated into Dutch and handed to them.

"It appears that the ratification of the treaty brought by you from Yedo was not signed by the Emperor, or august sovereign, as it should be according to the 12th article of the treaty. Therefore it will be impossible for me to receive it in exchange for the one brought by me from the United States signed and sealed by the President. I will prepare a letter to Abe Ise Nokami, and send it to the governor by an officer; and I beg the favor of him to forward it immediately to Yedo. In a case so unexpected as this, it is my duty to inform the President of the United States as soon as possible, that he may take such measures as he shall think necessary for the honor and dignity of the country." The commissioners begged leave to retire with this note for consultation. They returned after about fifteen minutes absence.

Commissioners. We have agreed that the Emperor's name shall be to the treaty. The prime minister will sign it by his authority.

Captain A. It wont do. The President of the United States put his name to the treaty, and the Emperor must do the same.

Commissioners. We have no great seal like yours.

Captain A. That is unnecessary. If you have any mark or sign which is put by the government on public papers to show that they are authentic, such a mark will be sufficient.

Commissioners. We have such a sign.

The Japanese after some private conversation among themselves now said that, in order to avoid misunderstanding and preserve friendship, everything should be done as I desired, and engaged to have the signatures of the Emperor and supreme council affixed to the treaty in the place and manner prescribed by me. A form was made out by them, and submitted to me for examination.

Captain A. This is all right. I will keep this to compare it with the treaty when it arrives, to prevent mistakes or misunderstandings. How soon will you be ready?

Commissioners. In eight days.

Captain A. I cannot wait so long. It must be sooner.

The Japanese here stated that in three days from this their new year commenced, which was a season of rejoicing, visiting, and festivity; and both by law and custom no work was done for several days at this period. They persisted so earnestly in this, that I consented at last to wait seven days. On the 20th of February, the lieutenant governor came off to the ship, attended as usual. After an exchange of compliments:

Captain A. I hope you have come to say that everything is prepared on shore.

Lieutenant Governor. We wish to speak on that subject. Immediately after the last interview the commissioners wrote to Yedo to have the ratification signed in the form agreed on. The ratified copy has come from Yedo. We have brought it for your examination, and also a letter from the chief commissioner explaining the proper title of the Emperor when used in great matters.

(Mr. Lobscheid had always used the word Kubo, in his translations, as an equivalent for Emperor.)

The letter.

The commissioners have, as much as was in their power, and as distinctly as possible, written to Yedo about everything that was agreed on at the meeting recently held in the temple of Tsio Lakzi, translated by Lobscheid, and the commissioner Idsero, in order that all affairs, each word, and each line, might be fulfilled according to promise. Further, about the conclusion of the treaty, we have to-day received the following document from the supreme council at Yedo:

"The reason of this is—that though his excellency, Adams, wishes to have the word 'Kubo' written, the government, after consultation, finds this word improper, because the word 'kubo' is with us only used by the common people; and that, in so important a document as the stipulations of the treaty, and such like, always *Tai-Koen* is written, which is in accordance with Japanese usage; and especially should this title, 'Grand Lord,' or 'August Sovereign,' be written in a public document which is to be sent to a foreign country and faithfully kept till in eternal life. In such a document, the word 'kubo,' as a common or vulgar word, may never be written. Also in the letters which are sent from Corea to Japan, and from Japan to Corea, the word '*Tai-Koen*,' has been used for many hundred years. Therefore, according to the old usage, the word '*Tai-Koen*' is used in the confirmation of the treaty, not only because it is becoming to do so, but because it would be impolite to insert a word used only by the common people in a document on a level with his Majesty the President of the United States' signature, written with his own hand. The above mentioned will be well known to his excellency, Adams, if he remembers the Japanese usage of last year. But should he not remember this, or the high officers of the United States doubt it, then the plenipotentiaries Ido-Tsu-Sima, Isawa Mimasaki, Tsoesocki Soeroega, Matzmoto Dzulo, and Hokakin Idsero, will sign a declaration to that effect to remove all doubt. The word command or order, signifies what proceeds from the grand lord to his subjects. He assembles his subjects and verbally communicates to them. Thus it speaks for itself that in such a case he has also the power to enforce the obedience of his subjects. Hitherto, in important documents, by or through authority, the words, power and order are used, which express the above meaning. The confirmation of the treaty is also signed by the six supreme councillors, as desired by his excellency, Adams, and with this reason, because all political affairs, be they large or small, must be done by these persons, who, in all affairs of the government, must meet at the same time, and in all councils and

affairs of state must sit in the same chamber. Therefore, in all home affairs, as well as those that have reference to foreign countries, the names of all persons are written. So it has hitherto been the case in those documents sent to Russia or Holland. Thus, according to our old usage, this will also be strictly observed. If only one name was written in the confirmation of the treaty, which, as an important document, will be kept till eternal life, it would be contrary to Japanese custom, and besides, impolite to the United States. All this is written after the council of the government, and sent with the confirmation of the treaty. In order to prevent any mistake in the interpretation, this has been written in Dutch.

IDO-TSU-SIMA NOKAMI.

After reading this letter, which was translated by Mr. Lobscheid, I asked to see the ratified treaty which the lieutenant governor had brought off with him. It bore the signature and seal of Tai-Koen, in full, with a column of Japanese characters adjoining it, expressing, as was explained to me, his power and dignity. It bore also the seals and signatures of the six supreme councillors, in a lower place.

Captain A. This letter and the signatures to the treaty are all quite satisfactory. Will the commissioners be ready to conclude the business to-morrow morning?

Lieutenant Governor. Yes, they will. We wish further to say that the commissioners have received from Yedo a ratified copy of the supplementary articles to the treaty of Kanagawa, which were added by Commodore Perry last year at Simoda, and we wish to know if you will receive it and carry it to the United States. When these supplementary articles are also confirmed by the American government, the ratification can be sent out by some ship coming to Japan.

Captain A. Yes, I agree to do this.

Lieutenant Governor. On this important occasion the Japanese wish to give a proof of their good will and friendship towards the Americans. They therefore request that the ratifications may be exchanged on shore, where they are preparing an entertainment, and where they have arranged some trifling presents for the captain and officers of the ship.

Captain A. By whom are these presents offered? Do they come from the Emperor or the government?

Lieutenant Governor. No. They are offered by the commissioners.

Captain A. I must be perfectly assured on that point. By the laws of our country, officers are forbidden to accept presents from the governments of other countries.

Lieutenant Governor. We are aware of that; we were told so by Commodore Perry. But these are not from the Emperor nor the supreme council, nor the government in any way. They are only a few trifles from the commissioners for the captain and officers of the ship, in return for the books and other valuable things given to them, of which they beg your acceptance as old friends.

The next day, February 21st, a Japanese officer came off to the ship, and announced that the commissioners were ready at the temple to receive me. I went on shore immediately, attended by as many officers of the Powhatan as could be spared from duty. The treaty was carried by sailors, with the United States flag flying over it. On my arrival at the temple, after the compliments of reception, we were shown, according to the custom of Japan, the presents intended for the captain and officers of the Powhatan. They consisted of some pretty specimens of lacquered ware. Three or four pieces were for myself. The treaties on both sides were then

produced and carefully examined; and after receiving the formal assurance of the commissioners that the seal and signature of the Tai-Koen and supreme council were genuine and authentic, and finding everything else right, the exchange was made in due form. This was immediately communicated to Captain McCluney, on board the Powhatan, who fired a salute of seventeen guns, with the Japanese flag at the fore. We then sat down to the feast they had prepared for us, where we drank, in many cups of sakee, to the eternal friendship of the two countries. The commissioners accepted an invitation from me to visit the Powhatan, and I went on board to receive them. They came off in about an hour after me, attended by a large suite of officers, interpreters, and servants. They were received with a salute of thirteen guns, and were entertained in the cabin and wardroom. About sunset, they left the ship in high spirits, and apparently much delighted with their visit. A parting salute of thirteen guns was given them. The next morning we left Simoda in the Powhatan for Shanghai.

Notwithstanding the delay in perfecting the treaty, I found the Japanese during my visit much more disposed to be friendly and sociable than formerly. Our officers roamed where they pleased over the country and the villages, and were welcomed everywhere. There was no attempt to watch or follow them. A bazaar was opened in a temple at the foot of the hills and filled with articles of Japanese manufacture, brought from Yedo and other places. We were not only invited but absolutely importuned to buy. At the interviews I had with the governor and commissioners on shore everything was conducted as at the making of the treaty at Ka-na-ga-wa. The hall was fitted up in the same manner, the entertainments the same, and the inferior officers and interpreters who were present always remained upon their knees, as on that occasion. During all the time of our stay, except when conferences were held on shore, I was visited daily by the lieutenant governor or some officer of high rank. An anxious wish was expressed by these people that trading vessels from America would soon begin to visit them, and the governor of Simoda intimated to me that it would be very agreeable to him personally if a consul from the United States should be appointed to reside at Simoda. They were eager to obtain books on medical or scientific subjects, and many valuable works were presented to them by Dr. Maxwell and others. Indeed, they were glad to receive books on any subject except religion. They told me they had learned how to manage the locomotive engine sent to the Emperor by the United States government, but the magnetic telegraph was too hard for them.

The Russian Admiral Pontiatin concluded a treaty with them while I was there. He informed me that the terms of it were precisely the same as of that made with the United States, except that the Russians get the port of Nangasaki instead of Napa-Keang.

During our stay at Simoda a French ship arrived and anchored in the outer harbor, having on board two Japanese seamen, who had been taken off the wreck of a junk about three years previously by an American whale ship. The Japanese authorities ordered the vessel off, would permit none of their people to go on board of her, and positively refused to receive the ship-wrecked men. They had, they said, no treaty with France, and French vessels had no right to come there under any pretext. At the intercession, however, of Captain McCluney and myself, they agreed they would receive these men from the Powhatan, if Captain McCluney would first take them on board the ship, and then deliver them as coming from an American man-of-war. This was done. They were kept all night on board the Powhatan, and landed at Simoda next morning. They were immediately compelled to shave their heads and resume

their national costume, and were placed under strict surveillance, where they remained when we came away.

I could learn no more of the political condition of Japan than what is contained in the positive assertions of the commissioners respecting the power of the supreme council.

The earthquake which I have referred to in the previous pages occurred on the 23d of December, 1854. Its effects were most calamitous. Every house and building on the low grounds was destroyed; a few temples and edifices standing on elevations alone escaped. The destruction was not caused by the agitation of the earth, but by the overflowing of the sea which followed the shocks. The Japanese say the water in the bay and near the shore was first observed to be violently agitated. It soon began retreating fast, leaving the bottom of the harbor nearly bare, where there was usually five or six fathoms of water. After this it returned in a high wave, overflowing the beach and town up to the tops of the houses, the inhabitants flying to the hills for safety. Numbers were overtaken by the wave and drowned, the accounts varying from 100 to 400. The water receded and returned in this way five times, tearing down houses and temples, and covering the adjacent shores with the wreck of buildings and vessels torn from their anchors. The Russian frigate Diana, carrying the flag of Admiral Pontiatin, was lying in Simoda at the time. The enclosed translation of Mr. Lobscheid from her log-book gives the full particulars of her loss. She foundered near the port of Hido, or Heado, about sixty miles from Simoda. Before leaving Simoda all her guns were landed, and other precautions taken to insure her safety. The officers and crew were all in Japan still when I came away, with no prospect of leaving it soon.

The outlines of Simoda harbor are not altered by the earthquake, but the holding-ground seems to have been entirely washed away, leaving no bottom but naked rocks. The Russian officers say the mud boiled up when the water fell in a thousand springs.

The inhabitants of Simoda appeared to be very little dispirited by their great misfortune; they were busily engaged in clearing away and rebuilding. Stone, timber, thatch, tiles, lime, &c., were coming in from various quarters, and before I came away there were about 200 houses nearly or entirely completed.

It was the 22d of February when the Powhatan left the harbor. After a boisterous passage, we arrived at the mouth of the Yang-tze-kang on the 3d of March, but were prevented by the thick fogs from getting up to Shanghae until the 8th. I left Shanghai in the Vandalia, Commander Pope, on the 14th of March, and arrived at Hong Kong on the 21st. Here I was detained, waiting for the regular mail day, until the 15th of April, when I left Hong Kong by the English overland route, and arrived in Washington on the 25th of June, where I delivered the Japanese ratification to the honorable Secretary of State.

I am, very respectfully, your obedient servant,

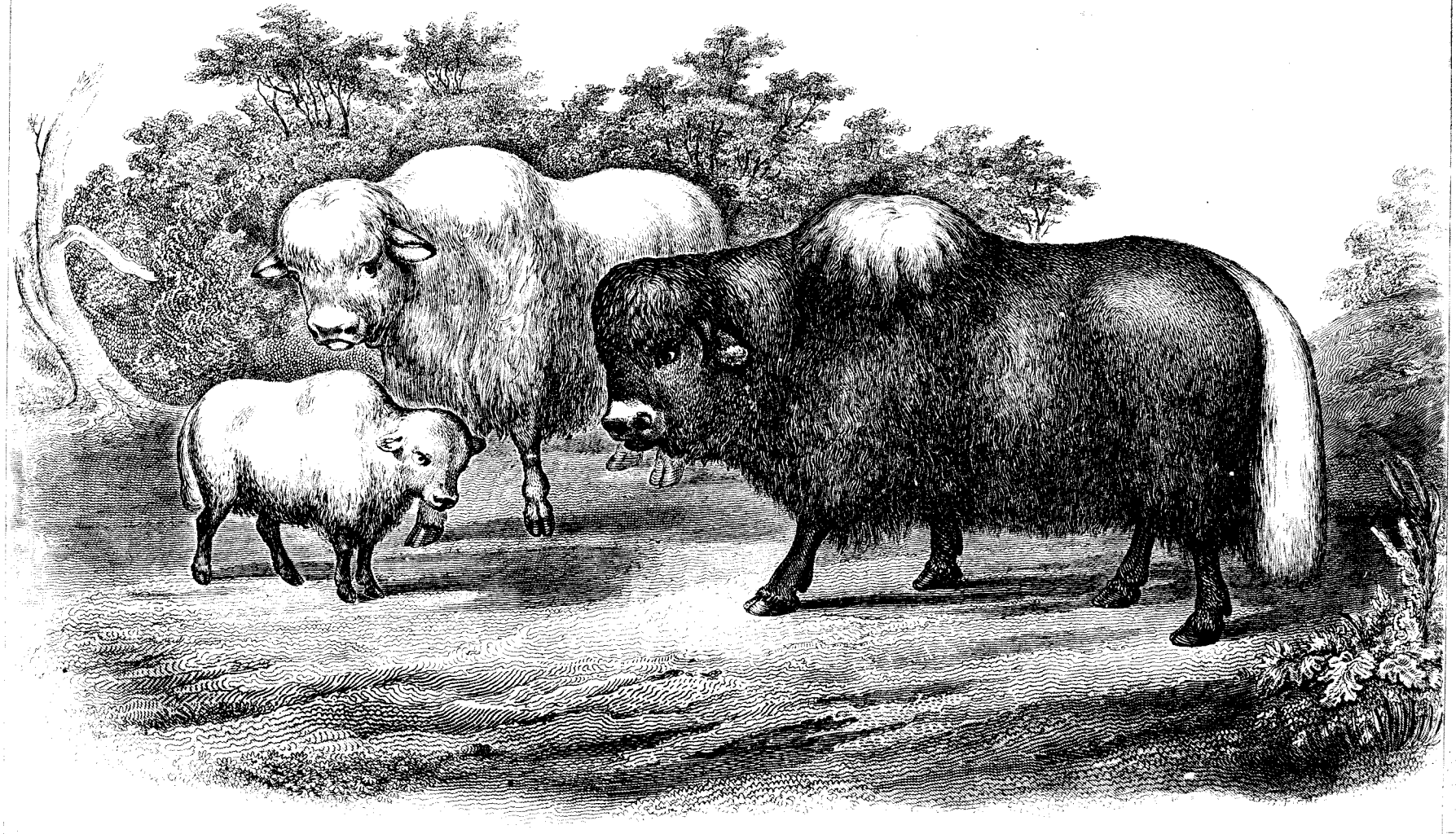
H. A. ADAMS, *United States Navy.*

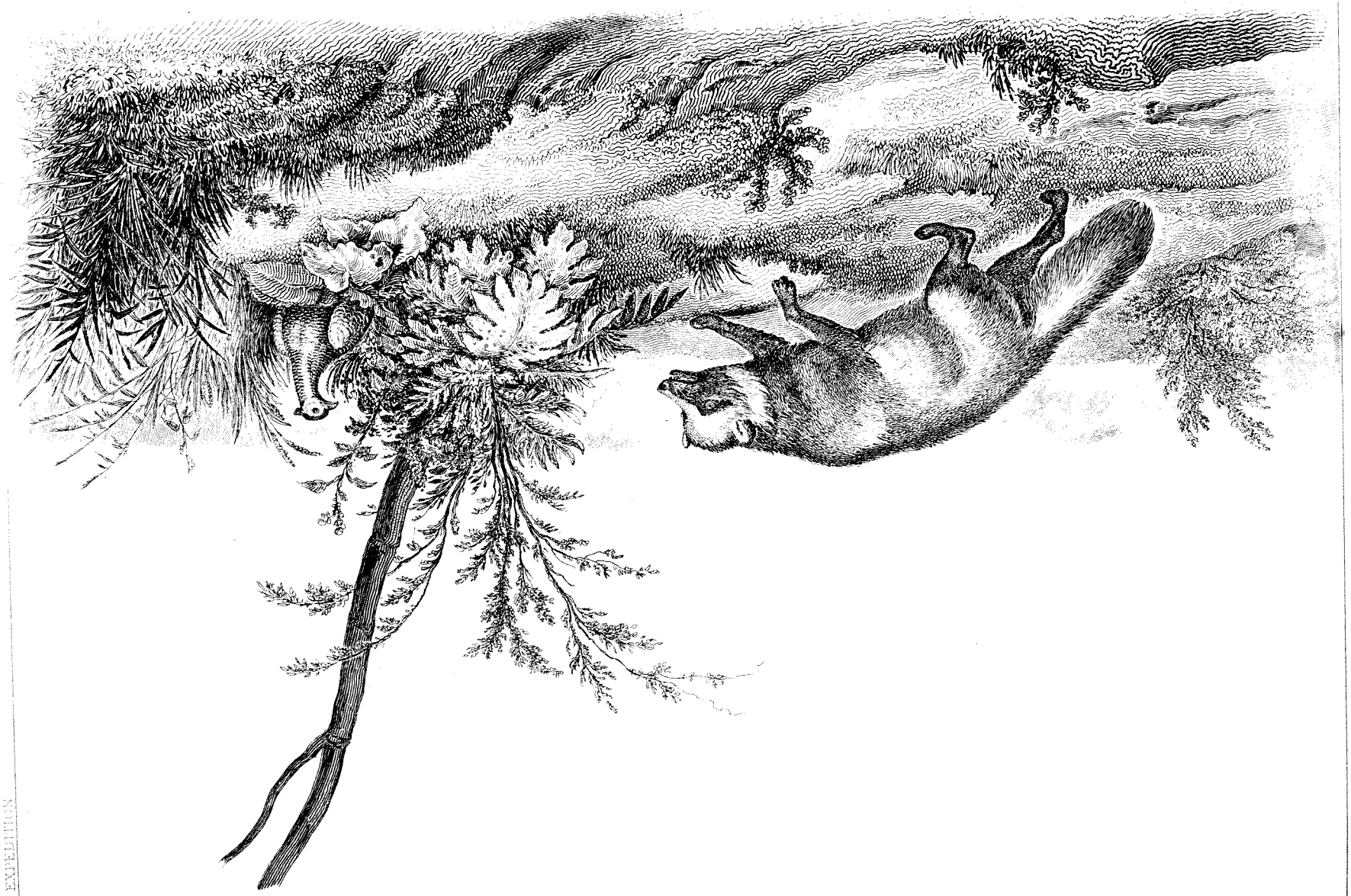
Commodore M. C. PERRY, *United States Navy.*

PAPERS

ON

NATURAL HISTORY.





INTRODUCTORY NOTE

TO

PAPERS ON NATURAL HISTORY.

WITH reference to the following papers upon the respective branches of Natural History of which they particularly treat, it should be borne in mind that, in the equipment of the Japan Expedition, scientific researches were to be considered of secondary importance, and consequently no special appropriations were made or any steps taken at the outset to employ civilians, as in other expeditions, for purposes purely scientific.

I fully believed, and so expressed myself to the government, that the officers of the several vessels of the squadron would be sufficiently competent, if their acquirements were properly developed, to accomplish all in the way of science that could reasonably be expected of an expedition intended exclusively for naval and diplomatic service; and though but few of those officers took an active part in pursuits not immediately pertaining to their legitimate routine of duties, there were some who rendered important assistance in obtaining the collections now described.

Mr. William Heine contributed chiefly to the procurement of the birds. The collections of fishes and shells were made under my own supervision, and the botanical specimens were gathered and preserved by the chief interpreter, Mr. S. Wells Williams, and by Doctors Green, Fahs, and Morrow.

But it is a source of extreme regret to me that these plants, which possess considerable interest as coming mostly from Japan and Lew Chew, have not been described and published in this report, as I had intended they should have been. By some mistake they fell into the hands of a distinguished botanist of this country, who, for reasons never satisfactorily explained to me, failed to describe them, as he had promised to do, and by the consequent delay prevented my seeking other means of having the desired description and drawings prepared for the press.

The acts of Congress calling for my report in detail make no provision for the indispensable cost of *preparing* for publication the original manuscript of so voluminous a work, and hence I have labored under many disadvantages in the procurement of suitable aid in the preparation and arrangement of the papers on Natural History.

The birds have been described by that well known naturalist, Mr. John Cassin, of Philadelphia; and for the classification and description of the fishes and shells, I am entirely indebted to the gratuitous services of my personal friends, Messrs J. Carson Brevoort and J. C. Jay, of New York, each distinguished for their attainments in the departments of science in which they have respectively labored in friendly regard to me.

In order to avoid unnecessary expense to the government, none of the varieties of birds, fishes, or shells, in the collections of the expedition, have been engraved for publication that have ever, so far as we know, been heretofore *accurately* figured and described in preceding works.

M. C. PERRY.

BIRDS.

BY JOHN CASSIN,

MEMBER OF THE ACADEMY OF NATURAL SCIENCES, PHILADELPHIA, OF THE AMERICAN PHILOSOPHICAL SOCIETY,

OF THE NEW YORK LYCEUM OF NATURAL HISTORY, &C., &C.

NOTE.

The Zoological collections of the United States Expedition to Japan possess the high interest of being the first ever made in Niphon and Jesso, the two principal islands of the Japanese Empire. Other collections from this exclusive and mysterious country have occasionally reached Europe, but they were made almost entirely in Kiusiu, one of the most southern islands of the Empire, in which is the city of Nangasaki, the only port open to the very limited foreign trade allowed by the government previous to the treaty negotiated by the present Expedition. This is especially applicable to the collections which served as the basis of Messrs. Temminck and Schlegel's very handsome and valuable work, the "Fauna Japonica," the most reliable authority extant on Japanese Zoology.

The present collections were made principally at Hakodadi, one of the seaports of Jesso, the most northern of the three larger islands of the Empire, and distant from Nangasaki about ten degrees of latitude and nearly the same of longitude. It might, therefore, be expected that some variations in the fauna should have been noticed, from the difference of locality. So far as relates to the collection of birds, we are prepared to say that such is the case, several species having been ascertained to inhabit Jesso, not previously known as belonging to the ornithology of Japan.

Notwithstanding that the collections in natural history are of so high interest and so creditable in extent, it is to be remembered that the Expedition to Japan was not projected nor organized for exploring or scientific purposes, but for the performance only of a special duty. Hence arrangements for zoological investigation were not made by the government, which proved to be a circumstance much to be regretted, as the protracted character of the negotiations afforded ample time for research in this branch of knowledge. Had there been provision of the description alluded to, the results under the enlightened and judicious direction of Commodore Perry, would undoubtedly have been in the highest degree important to zoological science.

Fortunately, several members of the Expedition, as well as their distinguished Commander, fully appreciated the value of an opportunity so rarely presented, and exerted themselves most honorably and successfully. We may allude especially to Mr. William Heine, artist to the Expedition, by whom the zoological collections were made almost exclusively. Availing himself of the protection and encouragement of Commodore Perry, no opportunity was lost by Mr. Heine; and his collections made at various points in the course of the Expedition attest his indefatigable perseverance and most laudable desire to add to the stock of zoological knowledge, and thus contribute, by no means inconsiderably, not only to the honor of the Expedition but of his country. His notes inserted in the present article on the birds of the collection, and especially those relating to the two species of Japanese Pheasants, are highly valuable. The latter contain the only information hitherto published relating to the two most beautiful known birds of their family, and the pride of Japanese ornithology.

Mr. Heine expresses himself as indebted for assistance in the zoological collections to numerous gentlemen attached to the Expedition, and especially to the Rev. George Jones, chaplain, Lieutenant S. Nicholson, Midshipman Boardman, Messrs. W. T. Peters and Hamilton Patterson, assistant draughtsmen, Mr. Forth, engineer, Mr. Smith, marine, and Mr. Hampton, purser's steward; also, to Dr. Varhave, of Benicia, California.

A.—BIRDS COLLECTED IN JAPAN.

1. ORDER RAPTORES.—Rapacious Birds.

MILVUS MELANOTIS, Temminck.

Milvus melanotis, Temm. & Schleg. Fauna. Japonica, Aves, p. 14, (1850.)
Falco cheela, Latham Ind. Orn., 1 p. 14, (1790)?
Milvus govinda, Sykes Proc. Zool. Soc., London, 1832, p. 81?
The Japanese Kite.
Temm. and Schleg. Faun. Jap. Birds, pl. 5.
Hardw. and Gray, Ill. Indian Zoology, pl. 18?
Gould, Birds of Asia, part 4, pl. 1?

A single specimen in the collection of the Expedition is from Hakodadi, and is in young plumage.

This species is nearly related to the kite of India and other countries of Asia, usually known as *Milvus govinda*, Sykes, and which is probably the same as *Falco cheela*, Latham. The comparison that it has been in our power to make with the specimen now before us, and with others from India in the collection of the Academy of Natural Sciences, of Philadelphia, has not convinced us of the absolute identity of the species, and for the present, therefore, we regard them as distinct.

Mr. Heine's note on this bird is as follows:

"Shot at Hakodadi during a fishing excursion, towards the upper end of the bay, where he was hovering for some time around the party, and flew in long, easy stretches, with very graceful motion. He came, repeatedly, very near the men who were hauling the seine. The stomach contained the remains of what appeared to have been a frog."

ACCIPITER GULARIS, (Temminck.)

Astur gularis, Temm. & Schleg. Faun. Jap. Aves, p. 5, (1850.)
Temm. & Schleg. Faun. Japon. Aves, pl. 2.

Specimens from Hakodadi. This species appears to be peculiar to the Japanese islands, and is, so far as we can see, quite distinct from the Indian species, *Accipiter virgatus*, Temm., with which it has been considered identical.

The young bird is darker above than represented in the figure of the adult male in the plate in Fauna Japonica, above cited, and has the transverse bars on the under parts much less regular and lighter colored than in the figure of the female in the same plate.

We have no information relating to this species.

2. ORDER INSESSORES.—The Perching Birds.

HETERORNIS PYRRHOGENYS, Temminck.

Lamprotornis pyrrhogenys, Temm. et Schleg. Faun. Jap,, p. 86, (1850.)

Temm. and Schleg. Faun. Jap. Aves, pl. 46.

Numerous specimens are in the collection of the Expedition, this species having been found in abundance in the neighborhood of Hakodadi, in the month of May, (1854.)

It would be almost impossible to describe all the varieties in the distribution of the colors of this handsome bird in the specimens before us, though evidently indicating difference of age and sex, and always presenting sufficient similarity to be recognized without difficulty as the same species. The adult males are very nearly as given in the plate in Fauna Japonica, above cited. Head above white, back and shoulder fine metallic violet, wings and tail dark metallic green, ears and sides of the neck bright chestnut, breast and sides cinereous, abdomen white; throat, rump, and under tail coverts dull ferrugineous. In all the more adult specimens, the throat is very nearly the same color as the rump, and more tinged with ferrugineous than in Temminck and Schlegel's plate. This ferrugineous is rather a remarkable color in this bird, and has an appearance almost like a white linen or muslin tinged with an oxide of iron, or iron moulded.

In younger males, all the above colors are much less distinct, and the bright chestnut of the cheeks scarcely perceptible. In females, this character is entirely wanting, and the entire upper plumage is dull brownish cinereous. "Eye light yellow."

We find the following note on this bird, by Mr. Heine, in his manuscript now before us:

"These beautiful and interesting birds abound near Hakodadi. In the gardens and woods surrounding the dwellings of farmers and fishermen, they are as abundant as sparrows in this country. They fly sometimes in pairs, but generally in larger numbers, with a short, jerking motion. When alighted, they appear to be always on the move, hopping and flying about from one place to another, and sometimes in a very eccentric and harlequin-like manner, which, indeed, is the character of their manners generally. Any uncommon noise attracts their attention very quickly, and when I killed one of them, the report of the gun brought many others to the spot.

"The beautiful variegated plumage of these birds, which, in a bright sunshine, showed to great advantage, and their many and curious attitudes, made them a most pleasing sight, and I have frequently, when sitting under the shade of a tree, watched them with the greatest interest and pleasure."

STURNUS CINERACEUS, Temminck.

Sturnus cineraceus, Temm. pl. col. II, liv. 94.

Temm. and Schleg. Taun. Jap. Aves, pl. 45; Temm. pl. col. 556.

A single specimen from Hakodadi, where it was obtained in May, 1854. Though an easily recognized species, and in the present specimen presenting all the characters well marked, the colors are lighter than as represented in the plate of Fauna Japonica, above cited, and very much like that in Planches Coloriees. "Eyes light yellow."

EMBERIZA CIOPSIS, Bonaparte.

Emberiza ciopsis, Bonap. Consp. Av., p. 466, (1850.)

Emberiza cioides, Temm. and Schleg., Faun. Jap., p. 98, (1850, not of Brandt.)

Temm. and Schleg., Faun. Jap., pl. 59.

This species, remarkable for its close resemblance to the European *Emberiza cia*, or meadow bunting, was observed in abundance at Simoda.

EMBERIZA PERSONATA, Temminck.

EMBERIZA PERSONATA, Temm., pl. col. III, livraison 98.

Temm. pl. col. 580. Temm. and Schleg., Faun. Japan, pl. 59 B.

Like the preceding, observed in abundance at Simoda. This species is similar in some respects to *Emberiza citrinella*, or the yellow hammer, of Europe, but is smaller and quite distinct.

MOTACILLA BOARULA. Linnæus.

MOTACILLA BOARULA, Linnæus, Mant., 1771, p. 527.

MOTACILLA MELANOPE, Pallas.

The GRAY WAGTAIL.

Gould B. of Eur. II, pl. 147.

Not distinguishable from the bird of Europe. Specimens are from Hakodadi, and are in spring plumage.

Mr. Heine mentions this bird as follows:

"Of this bird I saw two specimens only in the neighborhood of Hakodadi, which seemed to be male and female. They would not allow me to approach them closely, but I succeeded in procuring one, when the other escaped. They were on the ground near a small stream of water."

MOTACILLA LUGENS, Temminck and Schlegel.

MOTACILLA LUGENS, Temm. and Schleg., Faun. Japan Aves, p. 60, (1850.)

Temm. and Schleg., Faun. Japan Aves, pl. 25.

From Hakodadi; a species very like *M. alba* of Europe.

CALAMOHERPE ORIENTALIS, (Temminck and Schlegel.)

SALICARIA TURDINA ORIENTALIS, Temm. and Schleg., Faun. Jap. Aves, p. 50, (1850.)

Temm. and Schleg., Faun. Jap. Aves, pl. 21 B.

Scarcely different specifically from the European *Calamoherpe turdoides*. The Japanese bird is, however, slightly smaller. A single specimen in the collection of the Expedition is from Hakodadi.

ZOSTEROPS JAPONICA, Temminck and Schlegel.

ZOSTEROPS JAPONICUS, Temm. and Schleg., Faun. Jap. Aves, p. 57, (1850.)

Temm. and Schleg., Faun. Jap. Aves, pl. 22.

One of the handsomest little birds of the difficult genus *Zosterops*, and rather strongly characterized. The throat and inferior coverts of the tail are bright yellow, and the sides are very nearly the same light fawn color which is to be seen in the Australian species. The white ring around the eye is quite conspicuous. Specimens in the collection were obtained at Hakodadi.

Mr. Heine's note on this bird is as follows:

"The only specimen of this bird I shot in a garden at a small village on the western extremity of the bay of Hakodadi."

CUCULUS CANORUS, Linnæus.

CUCULUS CANORUS, Linn. Syst. Nat. I, p. 168, (1766.)
CUCULUS BOREALIS, Pallas.
The EUROPEAN CUCKOO.
Buff. Pl. Enl. 811, Gould B. of Eur. III, pl. 240.
From Hakodadi; differing in no respect from the cuckoo of Europe.

PICUS MAJOR, Linnæus.

PICUS MAJOR, Linn. Syst, Nat. I p. 176, (1766.)
Gould, Birds of Europe III, pl. 229.

We find in the collection a specimen of a female of this species, in good plumage and preservation. On minute examination and comparison with European specimens, we can find no material difference; in fact, they are absolutely identical, except the slightly smaller extent of the white spaces on the forehead and cheeks in that from Japan now before us. It is possible that these characters may be constant, thus presenting another instance of slight variations from European and Asiatic forms, not unfrequently to be noticed in Japanese birds. At present, however, we regard the species as identical with that of Europe.

This species is not given as a bird of Japan in the Fauna Japonica of Temminck and Schlegel, nor, so far as we are aware, by any other author, and must be regarded as an addition to Japanese ornithology. The specimen was obtained at Hakodadi in May, 1854.

Mr. Heine mentions this bird as follows:

"This specimen is the only woodpecker that I ever saw in Japan, nor did I ever hear their notes nor their hammering on trees in the woods, which can readily be done in countries where they are frequently met with. The present specimen was shot near a village at the mouth of Kamida creek, near Hakodadi."

3. ORDER RASORES.—THE GALLINACEOUS BIRDS.

TURTUR MEENA, (Sykes)

COLUMBA MEENA, Sykes Proc. Zool. Soc. London 1831, p. 149.
COLUMBA GELASTIS, Temm. Pl. Col. IV, liv. 24.
Temm. Pl. Col. 550. Temm. and Schleg. Faun. Jap. Aves pl. 60, B.

Specimens in excellent plumage are in the collection of the Expedition, and were obtained at Hakodadi in May, 1854. They are apparently of more adult age than is represented in the plate of Temminck and Schlegel's Fauna Japonica, to which we refer above. In fact, had we not access in the collection of the Philadelphia Academy to authentic specimens from the Leyden museum, labelled under the direction of the distinguished naturalist whom we have just named, we should scarcely consider our present bird as the same species. The front and throat are light-ashy, almost white; the back ashy-brown, with a few feathers only, narrowly edged with dull rufous; rump dark-bluish-ashy; entire under parts light-vinaceous, darker or browner on the breast. The mark on the side of the neck presents five diagonal stripes of black and very pale-ashy—the feathers of the former color tipped and edged with the latter, and not arranged as in the figure in Fanna Japonica. We have, however, no doubt whatever of the identity of the present specimens with the species represented.

PHASIANUS VERSICOLOR (VIEILLOT)

On careful comparison with specimens of *Turtur meena* from India, we find no material difference. It is possible that the Japanese bird may be slightly larger; and in the specimens now before us the black space on the sides of the neck is more extended, and the feathers more widely edged with ashy than in those from India; "eye orange."

Mr. Heine mentions this bird as follows:

"The cooing of this dove could be heard everywhere in the woods around Hakodadi. They were, however, difficult to approach, and would take alarm very easily. They were generally in pairs, and kept always in the tops of the highest trees."

PHASIANUS VERSICOLOR, Vieillot.

PHASIANUS VERSICOLOR, Vieill. Gal. des Ois. II, p. 23, (1825.)
PHASIANUS DIARDII, Temm. pl. col. V, liv. 82.

PLATE 1.—*Male and Female.*

The pheasants appear to have been originally birds of Asia exclusively, though one species, the common pheasant, and perhaps another, the ring-necked pheasant, have been naturalized in Europe for many centuries. The introduction of the common pheasant of Europe (*Phasianus colchicus*, Linnæus) is ascribed by history, or rather by legend, to Jason, and is supposed to have taken place about 1250 years before the Christian era. It is said to have been brought from the banks of the river Phasis, in Colchis, a country in Asia Minor, and hence acquired its Latin name *Phasianus*, from which all others by which it is known in Europe are derived.

This bird is now completely naturalized throughout nearly the whole of Europe, and is a very remarkable instance, if its introduction is truly stated, of transplanting or naturalizing a species. Though frequently attempted, success is attained exceedingly rarely, and the probability is that zoological provinces now remain very nearly as at the era of the earliest reliable history. Were it not for such instances as that of the European pheasant, though they are rare, and instances also of the complete naturalization of plants, as the *Leontodon* and *Capsella* in North America, the successful transplanting of any natural production from its native region to another might be safely doubted. Instances in the animal world are, however, of seldom occurrence, and the bearing of this description of information on the great questions of migration and colonization in the human family is important in the highest degree.

Several different groups or genera of birds have been called pheasants, of which we can enumerate perhaps ten known species, including the Argus pheasant, (*Argus giganteus*,) a large and magnificent species of northern Asia, inferior in size and color only to the peacock, and the golden pheasants (*Thaumalea*) of China. They appear to be very similar to each other in their habits, habitually living in thick and tangled woods, and resorting only for food to unsheltered localities.

All the known species, including the two that we have mentioned, are Asiatic, and the localities in that continent of all are now well known. Of these we have the gratification of presenting to the reader figures of the two species yet known to inhabit the Japanese empire, and to lay before him the first information ever obtained in relation to these beautiful and interesting birds.

The bird now before us has been known to naturalists since the time of Vieillot, as above cited, who described it from specimens brought to France by M. Diard, a celebrated collector. It is erroneously stated by Vieillot to be from the island of Java. It has, however, always been

regarded as a valuable and rare addition to zoological collections, and the members of the American Expedition to Japan are the first of any cultivated nation who have seen this bird in its native haunts. Knowing the high interest of all the information possible to be given in relation to this bird, Mr. Heine has had the kindness to furnish for our present article the following highly valuable and beautiful sketch:

"After the treaty of Yokuhama had been concluded, the United States squadron proceeded to Simoda. A friendly intercourse with the natives was established, and I constantly availed myself of Commodore Perry's kind permission to make additions to our collections in natural history.

"One morning, at dawn of day, I shouldered my gun and landed in search of specimens of birds, and that day had the good fortune to see, for the first time, the pheasant now before us.

"The province Idza, at the southern extremity of which the port of Simoda is situated, forms a long neck of land extending from the island of Niphon in a southerly direction, and is throughout mountainous, some of the mountains being from 4,000 to 5,000 feet high. The valleys are highly cultivated, presenting in the spring a most luxurious landscape. The tops of the mountains and hills are in some places composed of barren rocks, and in others covered with grass and shrubs, producing an abundance of small berries. Between those higher regions and the fields below the slopes are covered with woods, having for the greater part such thick undergrowth that it is scarcely possible to penetrate them.

"Following the beautiful valley, at the outlet of which the town of Simoda stands, for about four miles, I came to a place where the Simoda creek divides into two branches. Selecting the eastern branch, I soon left fields and houses behind me, and ascending through a little gulley, I emerged from the woods into the barren region. It was yet early in the morning; clouds enveloped the peaks and tops of the hills; the fields and woods were silent, and the distant sound of the surf from the seashore far below rather increased than lessened the impression of deep solitude made upon me by the strange scenery around.

"The walk and ascent had fatigued me somewhat; I had laid down my gun and game-bag, and was just stooping to drink from a little spring that trickled from a rock, when, not ten yards from me, a large pheasant arose, with loud rustling noise, and before I had recovered my gun, he had disappeared over the brow of a hill. I felt somewhat ashamed for allowing myself thus to be taken so completely aback; but noticing the direction in which he had gone, I proceeded more carefully in pursuit. A small stretch of table-land, which I soon reached, was covered with short grass and some little clusters of shrubs, with scattered fragments of rocks; and as I heard a note which I took to be the crowing of a cock pheasant, at a short distance, I availed myself of the excellent cover, and crawling cautiously on my hands and knees, I succeeded in approaching him within about fifteen yards. Having the advantage of the wind and a foggy atmosphere, and being moreover concealed by the rocks and some shrubs, I could indulge in quietly observing him and his family. On a small sandy patch was an adult cock and three hens busily engaged in taking their breakfast, which consisted of the berries already mentioned growing hereabouts in abundance. From time to time the lord of this little family stopped in his repast and crowed his shrill war-cry, which was answered by a rival on another hill at some distance. At other moments again, when the sun broke forth for a short time, all stretched themselves in the golden rays, and rolling in the sand shook the morning dew from their fine plumage. It was a beautiful sight, and I looked upon it with exceeding pleasure; so much, indeed, that I could not find the heart to destroy this little scene of domestic happiness

PHASIANUS SŒMMERINGII_(TEMMINCK)

Lith. of Wm E. Hitchcock, Phila^a

by a leaden shower from my fowling piece. Suddenly the birds showed signs of uneasiness, and I soon discovered the cause in a Japanese root-digger coming from the opposite direction. I therefore took up my gun, and standing on my feet, raised the birds also, and as they flew towards the next hill, I had the good fortune to bring down the cock with one barrel of my gun, and one of the hens with the other.

"The Japanese, who came up after I had loaded my gun and secured my game, looked with some astonishment at the stranger, for I was certainly the first foreigner who had been in pursuit of game on the hunting grounds of Niphon. He evidently asked me several questions, which I was not, of course, able to understand, but from his signs, and the frequent repetition of the word *statzoo*, (two,) I inferred that he inquired whether I had fired twice in such quick succession with one gun. I nodded and explained to him as well as I could the nature of my double-barrelled gun, and the use of percussion caps, which seemed to astonish and delight him very much. A pipe of tobacco which I offered was gladly accepted; and in answer to a question that he appeared to understand, he gave me the name of the pheasant as *Ki-zhi*.

"Later in the day more people came to the hills, some for the purpose of digging roots, others to look after their cattle, which appeared to be turned out to graze on the hills. The birds had taken to the bushes, where I could not follow them, and so obtained no more specimens on that occasion.

"A few days after, Lieutenants Bent and Nicholson and myself made another shooting excursion to the hills, but although we saw many pheasants but a single specimen was shot, and the birds appeared to be very shy. We observed several Japanese with matchlocks about the hills, firing away at a great rate. As we did not see either of them with game, and as the game laws of Japan are very severe, so much so, indeed, that their observance has been made a special article of the treaty with the United States, I concluded that the firing was only for the purpose of driving away the pheasants to places where they would be more secure from the strangers."

PHASIANUS SOEMMERINGII, Temminck.

PHASIANUS SOEMMERINGII, Temm. pl. col. V, liv. 82, (about 1828.)

PLATE 2.—*Male and Female.*

This is undoubtedly the most beautiful of all the true pheasants, and will compare in richness and brilliancy of color with almost any other species of bird. In the adult male, the neck and back are of a deep golden-red, with a metallic lustre of great beauty; but, as will appear from our plate, the female is exceedingly plain and unpretending.

Like the preceding, the present is only known as a bird of Japan, and but few years have elapsed since it was first introduced to the attention of naturalists by the celebrated Professor Temminck, well known as the most distinguished of European ornithologists. It appears to inhabit the same districts of country as the preceding species, and to subsist on much the same description of food; but we regret to say that the gentlemen of the expedition had no opportunity for observing this species to such extent as to enable us to make any important contribution to its history.

Nothing having previously been published in relation to this beautiful pheasant, we have exerted ourselves to obtain all available information, and have great pleasure in again acknowledging our obligations to Mr. Heine, the accomplished artist of the expedition, for the following note:

"On one of my excursions, alluded to in the preceding notes, I came very suddenly upon another species of pheasant, of very beautiful colors and with a very long tail. Being in the midst of briars and in an inconvenient position, I missed him, or, at least, did not injure him further than to shoot off his two long tail-feathers.

"Returning on board in the evening, I found that our kind and revered chaplain, the Rev. George Jones, had purchased a pheasant of the same kind from a Japanese root-digger in the hills. It was not wounded or otherwise injured, and seemed to have been either caught in a trap or found dead. To my inquiries of the Japanese Dutch interpreter whether those birds were ever hunted, I could obtain but evasive answers; but if, however, such is the case, the right is undoubtedly reserved to the princes and nobility.

"It appears that both these kinds of pheasants inhabit similar localities, and are abundant over the southern and the middle parts of the island of Niphon, for even during my rambles in the vicinity of Yokuhama, in the bay of Yeddo, I could hear their calls in the little thickets and woods scattered over the country."

For the following note on the bird now before us and the preceding species, we are indebted to the kindness of Joseph Wilson, jr., M. D., of the United States Navy, who was attached as surgeon to the squadron of the expedition:

"Our acquaintance with the pheasants of Japan began soon after our arrival at Simoda, or about the middle of April, 1854. A Japanese brought to the landing-place a young bird, which, with the dark tips on his downy covering and his frequently repeated *peet-peet*, might have been mistaken for a young turkey, but for his diminutive size. This interesting little fellow had been obtained by hatching an egg of a wild pheasant, obtained in the hills, under a domestic fowl.

"A few days after this, a male pheasant in full plumage was brought to the same place, dead but uninjured, and evidently but very recently killed. The golden brilliancy of this bird's plumage is probably not exceeded by any object in nature, and is quite equal in lustre to the most brilliant markings of the humming birds or the most highly burnished metal. This splendid coloring covers the whole body of the bird, merely shaded with a little copper-red about the tips and margins of the feathers, so as to show the lance head form of the feathers. This specimen was taken on board the flag-ship Independence and preserved.

"The specimen of the other species that I saw was shot by Mr. Heine, who made a very beautiful painting of it. The two birds are found in the same localities and seem to be similar in habits.

"The Japanese system of agriculture, although very minute and appropriating all available land to some useful purpose, yet affords abundant shelter for the native fauna. Scarcely any land is tilled, except such as can be watered, so that the tops of hills and large portions of mountainous and precipitous places are appropriated to the growth of timber, or left covered with the primitive forest. These wooded districts afford shelter for wild hogs, foxes and raccoons, (the skins of which were seen,) as well as for the pheasants, and they all descend in turn to plunder the crops or steal the chickens in the valleys. During the first part of our stay at Simoda, the cultivated fields afforded no food for the pheasants. The natives told us they were plenty in the hills, but no one was willing to undertake to show them, and several rambles through the bushes, where these birds were supposed to feed, ended in disappointment. Once only, I had a glimpse of a brood of young ones, near a hut in the mountains, but they immediately disappeared by running very rapidly. Perhaps one reason of our want of success is to be

found in the fact that the wheat was ripe and partially harvested before we left, (June 24th,) so that, during the time of our efforts, they were enabled to fill their crops occasionally from the wheat-fields and lie very close in the hills during the day, without being under the necessity of wandering in search of food.

"The note of one or the other of these species of pheasants was heard frequently. On the top of a precipitous hill, about a mile south of Simoda, covered by small pines and a very thick growth of shrubbery, a pheasant (so we were assured by the Japanese) passed the weary hours while his mate was on her nest, and very sensibly solaced himself and her with such music as he was capable of making. It was, however, anything but melodious, and may be represented as a sort of compound of the filing of a saw and the screech of a peacock. There are two notes only, uttered in quick succession, and represented by the Japanese name of the bird—*Ki-ji;* but the second note is much longer, louder, and more discordant, in fact has more of the saw-filing character—*Kee-jaeae.* These two notes are uttered, and if the bird is not disturbed they are repeated in about five minutes. A good many attempts, perhaps twenty, to become better acquainted with this individual, all failed. It seemed impossible to make him fly, though his covert was by no means extensive.

"This is about all I saw or heard of these birds during a stay of more than two months at Simoda, (from April 17th to June 24, 1854,) and I much regret that it is not in my power to give a more satisfactory account of them."

COTURNIX JAPONICA, Temm. et Schlegel.

COTURNIX VULGARIS JAPONICA, Temm. et Schleg. Faun. Jap. Aves, p. 103, (1850.)

The JAPANESE QUAIL.

Temm. and Schleg. Faun. Jap. Aves, pl. 61.

Our specimens show the characters quite distinctly which are pointed out by the learned authors of Fauna Japonica as distinguishing the Japanese bird from the common quail of central and southern Europe. These characters are, however, rather slight, though apparently constant. Collected at Hakodadi, May, 1854. "Eye orange."

4. ORDER GRALLATORES.—THE WADING BIRDS.

GALLINAGO SOLITARIA, (Hodgson.)

SCOLOPAX SOLITARIA, Hodgson Proc. Zool. Soc., London, 1836, p. 8.

Temm. and Schleg. Faun. Jap. Aves, pl. 68.

A large species, inhabiting Japan and northern India. Our specimens are of both sexes, very nearly resembling each other, the female being rather paler in the dark tints of the plumage. The male is represented in the plate cited above. "Hakodadi, May, 1854."

Mr. Heine says: "This snipe was not uncommon in the vicinity of Hakodadi, where it kept in the meadows and marshy woods."

GALLINAGO STENURA, (Temminck.)

SCOLOPAX STENURA, Temminck.

SCOLOPAX HORSFIELDII, Gray Ill. Ind. Zool. II, (name on plate. 1834.)

SCOLOPAX BICLAVATA, Hodgson Proc. Zool. Soc., London, 1837, p. 491.

"SCOLOPAX GALLINAGO, Linn.," Temm. and Schleg. Faun. Jap., p. 112.

Gray and Hardw. Ill. Ind. Zool., II, pl. 54.

Japanese specimens cannot be distinguished from others from India now before us, and are undoubtedly the species above named. This bird is smaller than *Scolopax gallinago* of Europe, and has the bill shorter, a character very readily perceived on comparison, and so strong as alone sufficient to establish a specific distinction.

Both sexes are in the collection of the expedition, and are from Hakodadi.

Mr. Heine observes: "These specimens were obtained by Lieut. Nicholson while engaged in surveying. He found this snipe very numerous near the rocky shores northwest of the entrance to the bay of Hakodadi. I had no opportunity of observing this species."

NUMENIUS TAHITIENSIS, (Gmelin.)

SCOLOPAX TAHITIENSIS, Gm. Syst. Nat. I, p. 656, (1788.)
"SCOLOPAX PHÆOPUS, Linn. an?" Forster Desc. An., p. 242.
The TAHITIAN CURLEW.

PLATE 3.—*Adult male.*

Two specimens of this curlew are perhaps the most interesting birds in the present collection. Both are labelled as having been obtained at Hakodadi in May, 1854, and are in good preservation.

On the faith of a description by Latham, in his "General Synopsis of Birds" III, p. 122, under the head of "The Otaheite Curlew," Gmelin gives the above name. Latham described from specimens in the collection of Sir Joseph Banks, and undoubtedly from Otaheite. This species, however, appears to have been lost sight of, though holding a nominal place in the books, and doubtfully cited.

The present specimens agree so nearly with all the descriptions, and especially with that of Forster, as above cited, that we have no hesitation in applying to it this specific designation. It is no more remarkable that this species should be found in the Japanese islands than the well known extensive ranges of locality inhabited by other of the smaller species of this genus. *Numenius hudsonicus*, for instance, very probably inhabits the entire seacoasts of both sides of North and South America.

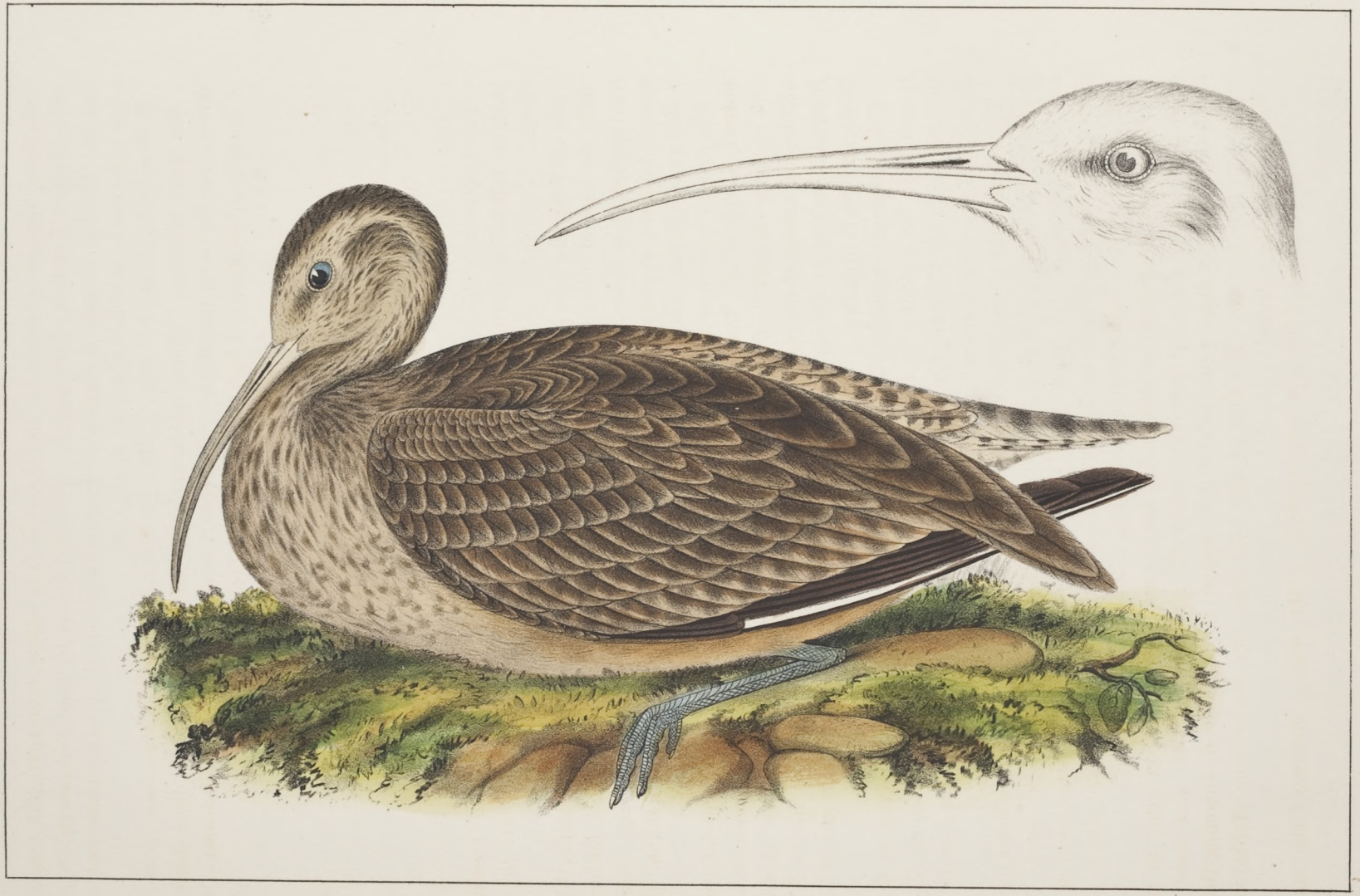
This bird much resembles *Numenius phœopus* of the old world, as intimated by Forster. Both specimens in the present collection are, however, smaller than any specimen of *N. phœopus* in the museum of the Philadelphia Academy. The bill is about half an inch shorter, and not so strong, and the wing is an inch shorter; the tarsi, also, are shorter.

The colors of the plumage are very similar in both species. In the specimens now before us, the back and the exposed ends of the tertiaries are clearer brownish black than in *N. phœopus*, and much less edged with cinereous. The shafts of the primaries are strong and flattened, and clear white, very conspicuous on the outer surface of the first four, more so than in *N. phœopus*.

Mr. Heine's note relating to this species is as follows:

"Abounds in the vicinity of Hakodadi. Large numbers may be seen either on the beach or around the little ponds in the flats immediately adjoining the bay. They were usually searching for food, and having made a successful dash at a small marine animal, announce that feat by a long drawn plaintive cry. The flesh of this bird was very tender, and afforded an agreeable addition to our mess stores."

"Several specimens of this bird were obtained by Mr. Smith, private of the marine corps, and myself."



NUMENIUS TAHITICUS (GMELIN)

Lith. of Wm E. Hitchcock, Philad.a

Our figure is much reduced, but the outline of the head and bill is of the size of life.

For an instance of the extensive migration of the wading birds, the reader is referred to the species immediately following, (*Totanus brevipes.*)

TOTANUS BREVIPES, Vieillot.

TOTANUS BREVIPES, Vieill. Nouv. Dict. 6, p. 419, (1816.)
TOTANUS FULIGINOSUS, Gould Voy. Beagle, Birds, p. 130, (1841.)
SCOLOPAX UNDULATA, Foster Desc. An., p. 173, (1844.)
TOTANUS PULVERULENTUS, Müller Verh., p. 153, (1844.)
TOTANUS OCEANICUS, Lesson Comp. Buff., p. 244, (1847.)
TOTANUS POLYNESIÆ, Peale Voy. Vincennes and Peacock, Birds, p. 237, (1848.)
TRINGA GLAREOLA, Pallas Zoog. Ross. As. 2, p. 194, (1831.)
Temm. and Schleg. Fann. Jap. Aves, pl. 65.

This appears to be a very extensively diffused species, extending its range over almost the entire temperate and tropical regions of the Pacific ocean. We find no distinction between specimens in the present collection from Japan and others from the Sandwich islands and Australia. The latter are in the museum of the Philadelphia academy, and are from the fine Australian collection of Mr. Gould, now belonging to the institution just mentioned. Those are the types of *Totanus griseopygius*, as cited above, and figured by that distinguished author in his Birds of Australia, which, for all that we can see, are specifically identical with other specimens now before us from the Feejee islands, the Sandwich islands, and other localities, and also the present from Japan. The Australian bird may be slightly smaller than those from more northern localities, a character not entirely to be relied on, as shown in prepared specimens.

This bird is found also in the northwestern, and perhaps the western, countries of North America. Specimens were sent from Washington Territory by Dr. J. G. Cooper, while attached to a party surveying a route for a railroad to the Pacific ocean, under command of the Hon. I. I. Stevens.

Specimens in the collection of the expedition are labelled "Hakodadi, May, 1854," and "At sea, between Simoda and the Sandwich islands."

We find the following relating to this species in his manuscript notes, kindly placed at our disposal by Mr. Heine:

"This bird was frequently seen on the sandy beach of the bay of Hakodadi. One specimen (marked No. 6) was caught at sea, when the nearest land was 1,500 miles distant. It was very much exhausted, and was knocked down by Lieutenant Nicholson with a speaking-trumpet."

CORETHRURA ERYTHROTHORAX, Temminck et Schlegel.

GALLINULA ERYTHROTHORAX, Temm. et Schleg. Faun. Jap. Aves, p. 121, (1850.)
The JAPANESE RAIL.
Temm. and Schleg. Faun. Jap. Aves, pl. 78.

This species is very similar to, if not identical with, *C. rubiginosa*, Temm. pl. col. 357, which is the same as *C. rufescens*, Vieill. Nouv. Dict. 18, p. 656. It resembles it so very nearly, that all the specimens in the fine collection of the Duke of Rivoli, now in the museum of the Philadelphia Academy, bear the latter designation. The only apparent difference is the slightly larger size of the Japanese bird, a character which appears to be constant, and is carefully pointed out in Fauna Japonica.

The present bird belongs to the genus *Corethrura*, of Reichenbach, a singularly natural and

homogeneous group, characterized by the bright rufous color of the head, and of the greater part of the inferior surface of the body. It is scarcely distinguishable, except by size, from *C. cayennensis*, (Pl. Enl. 368,) a South American bird. *C. fasciata*, Raffles, which is *C. euryzona*, Temminck, is another similar and strictly congeneric species.

Specimens in the collection are from Hakodadi. The most adult are exactly as represented in the plate in Fauna Japonica, cited above. Another specimen, probably a female, has scarcely a trace of the handsome rufous-lilac of the breast and head, those parts being of the same olive-brown of the upper parts.

"Eyes deep orange.—Hakodadi, May, 1854."

Mr. Heine observes:

"Two specimens only of this bird were obtained, in a marshy place on the northwestern part of the bay of Hakodadi, and were the only ones of the kind seen. They hide themselves in the close cover of the reeds, from which, in this instance, they were raised by some dogs belonging to a Japanese soldier. On account of their short wings, they flew slowly and but for a short distance."

HIATICULA, ?

A small species not given by Messrs. Temminck and Schlegel in Fauna Japonica. One specimen only is in the collection, which is in young plumage, and quite impossible to determine. It is about the size of *H. cantiana*, and much resembles it, but has the bill rather longer.

"Hakodadi, May, 1854; eye black."

PHALAROPUS HYPERBOREUS, Linnæus.

TRINGA HYPERBOREUS, Linn. Syst. Nat. I, p. 249, (1766.)

PHALAROPUS RUFICOLLIS, Pallas Zoog. Rosso-Asia. II, p. 203, (1811.)

PHALAROPUS CINERASCENS, Pallas.

TRINGA FUSCA, Gm. Syst. Nat. II, p. 675, (1788.)

The NORTHERN PHALAROPE.

Audubon B. of Am., pl. 254; Oct. ed. V, pl. 340. Gould B. of Eur. IV, pl. 336.

This handsome and interesting little bird is apparently a wanderer over the temperate regions of the entire northern hemisphere, frequenting usually the shores of the ocean, but sometimes ascending rivers and other streams of fresh water. Having the general appearance and many of the habits of the sandpipers, (*Tringæ*,) it differs from them in fearlessly alighting in the water and swimming with much ease and swiftness, thus showing an affinity to the swimming birds, indicated antecedently by its lobed feet. This is the case also with other of its congeners, though to our eye the present bird is the most graceful swimmer, and in the water is quite at home.

Specimens in the collection of the expedition obtained at Hakodadi are strictly identical with others now before us from the Atlantic coast of the United States and Greenland.

This bird is not given in Fauna Japonica by Messrs. Temminck and Schlegel, and is another addition to the ornithology of Japan made by the present expedition.

The following note by Mr. Heine relates to this species:

"The first specimen of this graceful bird was obtained by Lieutenant Nicholson during the survey of the bay of Hakodadi. Afterwards I met with several of them in the marshy plains that surround the bay northward and westward. Tripping over the leaves of aquatic plants, or

swimming in the little pools of water, they appeared most graceful little creatures; and the different attitudes they took in bending to the right or to the left to pick up insects, or to look whether danger approached, were perfectly charming.

"This bird did not appear, however, to be very numerous in Japan, not more than three or four specimens having been obtained."

V. ORDER NATATORES.—The Swimming Birds.

DAFILA ACUTA, Linnæus.

Anas acuta, Linn. Syst. Nat. I, p. 202, (1766.)

The pintailed duck.

Wilson Am. Orn. VIII, pl. 68, fig. 3. Gould B. of Eur. V, pl. 365.

A species inhabiting the temperate regions of all the countries of the northern hemisphere. Specimens in the present collection are from Hakodadi, and are identical with the common American and European bird.

MARECA FALCATA, Pallas.

Anas falcata, Pallas' Travels IV, p. 223, (French edition, 1793.)

Anas falcaria, Gm. Syst. Nat. I, p. 521, (1788.)

The falcated duck.

Pennant Arctic Zool. II, pl. 23. Pallas Zoog. Rosso-Asiat., pl. 70.

This beautiful duck appears to be one of the most abundant of the water birds of Japan, and was noticed at various points during the voyage of the expedition. It is remarkable for having a singular prolongation of the tertial quills, which curve outwardly and present a very graceful and almost peculiar character.

Although arranged in various genera by late ornithologists, there is no one of them with whom we can coincide, and have, after careful examination, assigned this bird to the genus *Mareca*, or Widgeons. To this genus it appears to belong, at least, more properly than to any other with which we are acquainted, though it is possibly the type of a distinct group combining somewhat the characters of *Mareca* and *Aix*, or of *Querquedula*. It is, however, too large for the last group, in which smallness of size appears to be a generic character.

Specimens are from Hakodadi.

MARECA PENELOPE, Linnæus.

Anas penelope, Linn. Syst. Nat., I, p. 202, (1766.)

The European Widgeon.

Gould B. of Eur. V, pl. 359.

The widgeon of Europe is apparently disseminated throughout the Old World from the Atlantic to the Pacific. A single specimen is in the collection of the expedition, and is labeled as having been obtained at Hakodadi in May, 1854. It is a male, in spring plumage.

Relating to this and the preceding species of ducks, we find the following in Mr. Heine's notes:

"The ducks in the collection appear to have been stragglers from the large flocks that abound in the fall and winter in the vicinity of Hakodadi, remaining in the bay as late as the month of May. All that I saw were exceedingly shy, and the present specimens were obtained only by surprising them during foggy mornings, when feeding amongst the reeds."

LARUS ICHTHYAETUS, Pallas.

LARUS ICHTHYAETUS, Pallas, Travels, II, p. 533, (French ed., Paris, 1789.)

The GREAT BLACK-HEADED GULL.

Pallas Zoog. Rosso-Asiat., pl. 77: Rüppel Atlas, pl. 17.

Two specimens in the collection of the expedition are from the Bay of Yedo. Both are young birds, but agree precisely with specimens, bearing the name above given, in the collection of the Philadelphia Academy, and of the correctness of which we have no doubt. The descriptions and figures above cited apply, however, to this species in adult plumage.

This bird presents a remarkable anomaly in the color of its head, belonging, as it does, to the same group of large gulls as *Larus fuscus*, but having the entire head black, as in the genus *Xema*. In the young birds now before us, the head is white, with nearly every feather striped longitudinally with light brown. The middle feathers of the tail are brown, mottled with white at their bases, and the outer feathers mottled in the same manner throughout their length; bill large, rather wide (or high) towards its top, with a conspicuous transverse bar of black.

This specimen is not given in Fauna Japonica, and is another contribution of the present expedition to our knowledge of the ornithology of Japan.

"Bay of Yedo, March, 1854; eyes gray."

Mr. Heine remarks of this species:

"This bird was abundant in Yedo bay, where large numbers were constantly flying around, with other species, and busily engaged in picking up food from the refuse thrown overboard from the ships of the squadron, especially after meal-times."

LARUS MELANURUS, Temminck.

LARUS MELANURUS, Temm. pl. col. V, liv. 77, (about 1827.)

LARUS CRASSIROSTRIS, Vieill. Nouv. Dict., XXI, p. 508?

Temm. pl. col., 459; Temm. and Schleg. Faun. Japon. Aves, pl. 88.

A specimen in adult plumage, from Hakodadi. It is precisely as represented in the excellent plate of Fauna Japonica, to which we refer above.

This handsome bird is strongly characterized by the color of its tail, which is white at its base and tip, with the intermediate space black, presenting, when folded, the appearance of being entirely of the latter color, topped with white. Its head and neck are of a remarkably pure snowy white, back and wing coverts dark cinerious. It may be the same as *Larus crassirostris*, Vicillot, but the description cited above is rather short to be satisfactory or conclusive in this difficult group.

"Hakodadi, May, 1854; eye black."

Mr. Heine observes: "This gull abounded in the Bay of Hakodadi, and was frequently killed by our men when on fishing excursions. As fresh provisions were scarce articles, it proved to be an acceptable addition to their messes, and was pronounced quite palatable."

LARUS BRUNNEICEPHALUS?

LARUS BRUNNEICEPHALUS, Jerdon, Madras Jour., 1840, p. 225?

LARUS LEUCOPTHALMUS, Temm. pl. col. V, liv. 65?

Temm. pl. col. 366?

We find a single specimen in the collection of the expedition, which is evidently that of an immature bird, having the head nearly white. It is, however, a species of the sub-genus *Xema*,

and undoubtedly in adult plumage would have the head dark colored. The specimen is not in good condition.

This bird is much like the European *Larus ridibundus* in the general colors of its plumage, and has very nearly the same distribution of white and black on the primaries. We allude, of course, to that species when immature, or with the head white. It is, however, very considerably larger, in which character it appears to approach both the species named at the head of this article. The bill in the present specimen is injured, but appears to have been more slender than in *L. ridibundus*.

Head, tail, and entire under parts of the body white, mantle light ashy, first primary white, with its outer edge black and tipped with black, and its inner edge ashy black; second and third primaries white, tipped with black, and with their inner edges (only) black; fourth primary tipped with black, and its outer web white and its inner web dark cinereous; all the other primaries dark cinereous, tipped with black; bill and feet red. Total length (of skin) about 18 inches; wing 13, tail 5½ inches.

After careful examination, we have concluded that this bird is probably the young of *Larus brunneicephalus*, of which we have mature specimens now before us from the collection of the Philadelphia Academy. It is not given in Fauna Japonica nor elsewhere, to our knowledge, as a bird of Japan; and we much regret that the loss of a portion of the upper mandible has prevented our presenting a figure of it to the reader.

"Bay of Yedo, April, 1854; eye yellow."

Mr. Heine mentions this species as having been abundant in the Bay of Yedo.

CERATORHYNCHA MONOCERATA, (Pallas.)

ALCA MONOCERATA, Pallas Zoog. Ross. Asiat. II, p. 362, (1811.)

PHALERIS CERORHYNCHA, Bonaparte Zool. Journ. III, p. 53, (1827.)

CERORHYNCHA OCCIDENTALIS, Bonap. Ann. New York Lyceum II, p. 428, (1827.)

CERATORHYNCHA OCCIDENTALIS, Bonap. Comp. List p. 66.

CHIMERINA CORNUTA, Eschsc. Zool. Atlas part 3, p. 2, (1829.)

The HORN-BILLED GUILLEMOT.

Eschscholtz Zool. Atlas pl. 12; Aud. B. of Am. pl. 402, fig. 5, Oct. ed. VII, pl. 471.

Specimens of both sexes of this curious bird are in the present collection. The female is entirely without the elevated horn-like appendage at the base of the upper mandible which so strongly characterizes the species, and from which it derives its name. The male and female are, however, very similar in color and all other characters, the white stripes from the corner of the mouth and behind the eye being rather less conspicuous in the female, and the color of the upper parts not so dark as in the male.

The description by Pallas, cited above, evidently applies to this bird, and that distinguished Russian zoologist appears to have been the first to introduce it to the notice of naturalists. It inhabits the northern shores of Asia and America.

"Hakodadi, May, 1854. Eye pale-yellow, iris black, very small."

BRACHYRHAMPHUS TEMMINCKII, Brandt.

BRACHYRHAMPHUS TEMMINCKII, Brandt. Bulletin Acad. St. Petersb., (1837.)

URIA WUMIZUSUME, Temm. pl. col. 5, liv. 98, (about 1828.)

Temm. pl. col. 576; Temm. and Schleg. Faun. Jap. Aves pl. 79.

Specimens in the collection are from Simoda, and are labelled as representing both sexes.

The female is very nearly the same in all respects as the figure of the young bird given in Fauna Japonica, as above cited, and is without the crest and white space on the head, which characterize the male bird.

Though the name applied by Temminck to this bird has priority, it is so singularly barbarous and difficult to pronounce, that we have adopted that of Prof. Brandt. It is very correctly and handsomely represented in both the plates referred to above.

Relating to this interesting species we find the following in Mr. Heine's notes, now before us:

"The officers engaged in the survey of the harbor of Simoda had frequently observed numbers of small birds swimming at some distance from the shore, but at the approach of the boats the birds invariably dived and disappeared. On one occasion, when returning from Rock island, the boat in which I was came suddenly upon a number of those little fellows, swimming and braving a rough sea in fine style, calling all the time with a chirruping voice. Two specimens were secured, when all the others quickly disappeared. This bird is common in the harbor of Simoda."

PHALERIS MYSTACEA, (Pallas.)

URIA MYSTACEA, Pallas Zoog. Rosso Asiatica II, p. 372, (1811.)

"ALCA CAMTSCHATICA, Nov. Act. Petrop. XII, tab. 8." Pallas as above.

MORMON SUPERCILIOSUM, Licht. Verz. p. 89?

PHALERIS CRISTATELLA," Temm. pl. col. V; Audubon Orn. Biog. V, p. 102.

Temm. pl. col. 200; Aud. B. of Am. pl. 402. Oct. Ed. VII, pl. 467.

Specimens of this curious little bird are in the collection of the expedition, from the bay of Yedo and from Simoda. They present, however, no characters other than as represented in the plates of Temminck and Audubon above cited.

The bird appears to inhabit the northern coasts of both continents and their islands; the specimens figured by Mr. Audubon were, however, of uncertain origin. It has not previously been known as a bird of Japan, and perhaps only inhabits the northern islands of that empire.

The name *cristatella*, though occasionally applied to this species, is properly the designation of a larger bird, not yet ascertained to be entitled to a place in the Fauna of the United States. It is probable that the name for the present bird, having priority of all others, is *camtschatica*, as above cited, a point which at present we are unable to determine, not having access to the early volumes of the Transactions of the Academy of St. Petersburg.

"Bay of Yedo, April, 1854," and "Simoda, April, 1854; eye grey."

GRACULUS CARBO, (Linnæus.)

PELECANUS CARBO, Linn. Syst. Nat. I, p. 216, (1766.)

CARBO CORMORANUS, Meyer.

The CORMORANT.

Gould B. of Eur. V, pl. 407. Aud. B. of Am., pl. 266; Oct. ed. VI, pl. 415.

The common cormorant of Europe appears to be another of the birds of the old world which are disseminated throughout that division of the globe. Specimens in the present collection appear to be precisely identical with others now before us from central and western Europe.

Obtained at the Bay of Yedo, April, 1854. "Eye bright green."

Mr. Heine mentions this bird as follows:

"Very large numbers of these birds were observed in the Bay of Yedo and its vicinity, either

swimming in large flocks or flying one behind another in long lines. Whilst in the water they could be approached but with the greatest difficulty. Later, during the survey of Simoda harbor, our boats visited a small group of rocks about six miles from the shore, and designated on the charts as Rock island. This served as a roosting place for these birds, as well as for numerous gulls. I was not, however, so fortunate as to find the nests of the cormorants, as only a small part of the rocks were accessible, and they had selected as their resort the inaccessible bluffs towards the seaside."

B.—BIRDS COLLECTED IN CHINA, THE LOO CHOO ISLANDS, THE ISLANDS OF SINGAPORE AND CEYLON, AND ON THE COAST OF CALIFORNIA.

The collection from the localities above mentioned, like that referred to in the preceding pages, was made almost exclusively by Mr. Heine, whose notes, which will be found inserted, add much of interest and information. It is also a feature by no means unimportant in reference to the present collection, that the species were actually collected at the localities designated, and not purchased nor obtained merely in trade collections, as is usual where bird skins are regularly offered for sale by dealers. This fact gives a degree of value and consideration to specimens of some well known species in the present collection.

I. ORDER RAPTORES.—The Rapacious Birds.

FALCO SPARVERIUS, (Linnæus.)

Falco sparverius, Linn. Syst. Nat. I, p. 128, (1766.)
Falco dominicensis, Gm. Syst. Nat. I, p. 285, (1788.)
The sparrow hawk.
Wilson Am. Orn. II, pl. 16, fig. 1. Aud. B. of Am., pl. 42; Oct. ed. I, pl. 22.
"Benicia, California, December, 1854."

HALIÆTUS LEUCOCEPHALUS, (Linnæus.)

Falco leucocephalus, Linn. Syst. Nat. I, p. 124, (1766.)
Falco ossifragus, Wilson Am. Orn. VII, p. 16, (1813.)
The bald eagle; the white headed eagle.
Wilson Am. Orn. IV, pl. 36; VII, pl. 55. Aud. B. of Am., pl. 31, 126; Oct. ed. I, pl. 14.
From Nappa valley, California.

ELANUS LEUCURUS, (Vieillot.)

Milvus leucurus, Vieill. Nouv. Dict. XX, p. 563, (1818.)
Falco dispar, Temm. Pl. Col. I, liv. 54, (about 1824.)
The white tailed hawk; the black shouldered hawk.
Bonap. Am. Orn. II, pl. 11, fig. 1. Aud. B. of Am., pl. 352; Oct. ed. I, pl. 16.
"Benicia, California, December, 1854." Very handsome and mature specimens are in the collection of the expedition; and considering the fact that on the Atlantic seaboard this species is restricted to the southern States, its occurrence so far north as Benicia, in December, is quite remarkable. Several birds have, however, this same range, being found much further north on the Pacific than on the Atlantic coast of the United States.

GARRULAX PERSPICILLATUS _ GMELIN.

Lith. of W.m E. Hitchcock, Phila.a

CIRCUS HUDSONIUS, (Linnæus.)

FALCO HUDSONIUS, Linn. Syst. Nat. I, p. 128, (1766.)
FALCO ULIGINOSUS, Gm. Syst. Nat. I, p. 278, (1788.)
The MARSH HAWK; the HARRIER.
Wilson Am. Orn. VI, pl. 51, fig. 2. Aud. B. of Am., pl. 356; Oct. ed. I, pl. 26.
From Benicia, California.

2. ORDER INSESSORES.—THE PERCHING BIRDS.

GARRULAX PERSPICILLATUS, (Gmelin.)

TURDUS PERSPICILLATUS, Gm. Syst. Nat. II, p. 830, (1788.)

PLATE 4.—*Adult Male.*

Several specimens of this bird are in the collection of the expedition, and seem to fairly represent the species in mature plumage. All have the abdomen and under-tail coverts rufous, which is a character mainly to be relied on in distinguishing this species from others nearly allied. Like many other birds of China, the present being but indifferently known, we have availed ourselves of the opportunity of having one of the finest male specimens figured in the plate accompanying.

The genus *Garrulax* is not to be assigned to a systematic position without difficulty. It has to us the appearance of a *Garruline* or *Corvine* group, and at present we so regard it, but it may belong more properly among the aberrant thrushes. The student will, however, find some diversity of opinion relative to the arrangement of this singular group of birds, presenting at least the advantage of a selection being made according to his judgment or fancy.

From Macao, China.

Our figure is about two-thirds of the size of life. Sexes very nearly alike.

MELOPHUS MELANICTERUS, (Gmelin.)

FRINGILLA MELANICTERA, Gm. Syst. Nat. II, p. 910, (1788.)
EMBERIZA ERYTHROPTERA, Jard. and Sel. Ill. Orn. III, (no page nor date.)
Jardine and Selby Ill. Orn. III, pl. 132.
From China.

Late ornithologists have greatly erred in regarding as one all the species of the genus *Melophus*. There are several well defined and distinct, though allied, species.

CHLOROSPIZA SINICA, (Linnæus.)

FRINGILLA SINICA, Linn. Syst. Nat. I, p. 321, (1766.)
Buff. Pl. Enl. 157, fig. 3, Temm. and Schleg. Faun. Jap. Aves, pl. 49.

Specimens of this handsome little finch are from Macao. Mr. Heine states that it is frequently to be seen in the gardens and shrubbery in the suburbs, and is quite familiar in its habits.

This bird is known also as a Japanese species, but no specimens are in the present collection from that country.

HETERORNIS SERICEA, (Gmelin.)

STURNUS SERICEUS, Gm. Syst. Nat. II, p. 805, (1788.)

PLATE 5.—*Adult Male.*

This handsome grakle is a species almost lost sight of by modern ornithologists, though known to the naturalists of a century since, and always holding its place in the books. We have figured an adult male selected from several fine specimens in the collection of the expedition, all of which are from the vicinity of Macao.

The figure in our plate is of the size of life, and represents the adult male. The female differs from the male in having the head much more tinged with cinereous, and the back tinged with brown.

Mr. Heine observes with reference to this species:

"These specimens come from the vicinity of Macao. Owing to the eagerness with which the Chinese kill everything that they can lay hold of, birds are scarce, and appear to have become very shy. This bird I obtained in the hills of Padre island, where it was flying about the rocks, apparently in search of insects. I could not discover a nest of this species, but when alarmed it took refuge amongst the cliffs of the rocks. If it had not been for its great timidity, it would probably have shown more of the manners of the similar kind of birds which I found in large numbers at Hakodadi (*H. pyrrhogenys*)."

LANIUS SCHACH, Linnæus.

LANIUS SCHACH, Linn. Syst. Nat. I, p. 136, (1766.)

LANIUS PYRRHONOTUS, Vieill. Gal. des Ois. I, p. 219, (1825.)

LANIUS CHINENSIS, Gray Zool. Mis., p. 1, (1841.)

LANIUS BENTET, Horsfield Trans. Linn. Soc., London, XIII, p. 144, (1822)?

Vicill. Gal. des Ois. I, pl. 135; Lesson Cent. Zool., pl. 72?

The present specimens from China, and others now before us from that country, are rather larger than specimens from the Malay Archipelago. In other respects they are exceedingly similar. Specimens are from the vicinity of Macao.

This species is mentioned by Mr. Heine as follows:

"Seen frequently on the hills of the islands around Macao and Hong Kong. I seldom met with them in the middle of the day, but generally at twilight they were busily engaged capturing insects. Large moths and other nocturnal insects seemed to be their favorite prey."

ARTAMUS FUSCUS, Vieillot.

ARTAMUS FUSCUS, Vieill. Nouv. Dict. XIII, p. 297, (1817.)

OCYPTERUS RUFIVENTER, Valenciennes, Mem. du Mus., Paris, VI, p. 27, (1820.)

Mem. du Mus., D'Hist. Nat., Paris, VI, pl. 6, fig. 1.

Specimens from Macao.

Mr. Heine observes:

"A bird of very solitary habits, occasionally met with about the little-visited rocky declivities in the vicinity of Macao."

HETERORNIS SERICEA _ GMELIN

Lith. by Wm E. Hitchcock, Philada

DICRURUS COERULESCENS, (Linnæus.)

LANIUS COERULESCENS, Linn. Syst. Nat. I, p. 134, (1766.)
EDWARDS BIRDS, 2, pl. 56.
From Pointe de Galle, Ceylon.

TEPHRODORNIS PONDICERIANA, (Gmelin.)

MUSCICAPA PONDICERIANA, Gon. Syst. Nat. II, p. 939, (1788.)
KEROULA INDICA, Hardw. and Gray, Ill. Ind. Zool., (name on plate.
LAMIUS MUSCICAPOIDES, Franklin Proc. Zool. Soc., London, 1831, p. 117.
KEROULA SHRIKE, Latham.
Hardw. and Gray, Ill. Ind. Zool., pl. 33, figs. 1–2.
From Singapore.

ERYTHROSTERNA RUBECULA, (Swainson.)

MUSCICAPA RUBECULA, Swains. Nat. Lib. Orn. X, p. 221, (1838.)
Nat. Lib. Orn. X, pl. 27.
A single specimen, apparently a female, from Ceylon.

This species is not given by Mr. Layard in his valuable "Notes on the Ornithology of Ceylon," in the Annals and Magazine of Natural History, (vols. 13, 14.) He does give, however, *Cyornis rubeculoides*, and possibly alludes to the present bird.

The present specimen is strictly identical with others in the museum of the Philadelphia Academy, labeled as from the island of Java. Mr. Swainson very probably describes and figures the female only. The male in the museum just mentioned is quite different in the color of the upper parts—head, back, and rump ashy black, (or slate color;) line over and behind the eye, white; tips of the greater wing coverts white, forming a wide oblique stripe across the wing. Quills and tail brownish black, the latter, with the external webs of the outer feathers white at the base of the tail. Under parts fine reddish fulvous, as in the female; ventral region and under tail coverts, white. Total length about 5 inches, wing 3, tail $2\frac{1}{2}$ inches.

The male, above described, we do not at present remember to have ever seen described; but it is not improbable that it may have received a distinct specific designation. This bird is generically, or at least sub-generically, distinct from *Cyornis*.

Mr. Heine's note on this species is:

"Inhabits trees around houses at Pointe de Galle, Ceylon."

HYPOTHYMIS CYANOMELANA, (Temminck.)

MUSCICAPA CYANOMELANA, Temm. pl. col. 3, (liv. 70.)
Temm. and Schleg. Faun. Jap. Aves, pl. 17, D; Temm. pl. col. 470.
From the vicinity of Macao; where, according to Mr. Heine, it is abundant, inhabiting the bushes in the outskirts of the town, and occasionally gardens.

LUSCIOLA CYANURA, Temm. and Schleg.

LUSCIOLA CYANURA, Temm. and Schleg. Faun. Jap., p. 54, (1850.)
Temm. and Schleg. Faun. Jap. Aves, pl. 21.
From Macao; and, according to Mr. Heine, found in similar localities as the preceding.

CALAMOHERPE CANTANS, (Temm. and Schleg.)

SALICARIA CANTANS, Temm. and Schleg. Faun. Jap. Aves, p. 51, (1850.)
Temm. and Schleg. Faun. Jap. Aves, pl. 19.
A single specimen, from the vicinity of Macao.

MALACOCIRCUS GRISEUS, (Gmelin.)

TURDUS GRISEUS, Gm. Syst. Nat. I, p. 824, (1788.)
MALACOCERCUS STRIATUS, Swainson Zool. Ill. III, p. 127, (1833.)
Swains. Zool. Ill. (2d series) III, pl. 127.

Appears to be a common bird of Ceylon. Specimens in the collection of the expedition present no characters other than are usual in this species.

We find, in Mr. Heine's manuscript notes, the following relating to this bird:

"The name of this bird was given to me at Pointe de Galle, Ceylon, as "the Cinnamon bird;" but why it has obtained such a designation I cannot determine. It seemed to prefer the dense woods, always sitting in the darkest and densest foliage. Its flight is very swift and noiseless; indeed, it glides through the air like the ghost of a bird, scarcely stirring the air. Its weight is very small compared with its apparent bulk, so that it seemed as if I held in my hand only a bunch of feathers. Sometimes it allowed me to approach quite near, but keeping, nevertheless, its light-colored, curious-looking eye fixed on me with anxious attention."

The habits of this bird here given by Mr. Heine seem to be different in some respects from Mr. Layard's account of this species in "Notes on the Ornithology of Ceylon," in Annals and Mag. Nat. Hist. XII, p. 271, but we have no doubt as to the identity of the species.

COPSYCHUS SAULARIS, (Linn.)

GRACULA SAULARIS, Linn. Syst. Nat. I, p. 165, (1766.)
GRYLLIVORA INTERMEDIA, Swains.
EDWARDS' BIRDS IV, pl. 181.

From Pointe de Galle, Ceylon. The specimens in the present collection are rather large for this species, and seem to approach *C. mindanensis*. The relations of the species of this genus to each other are, however, rather complex, and not easily determined.

PETROCINCLA MANILLENSIS, (Gmelin.)

TURDUS MANILLENSIS, Gm. Syst. Nat. I, p. 833, (1788.)
Buff. Pl. Enl. 636, 564.

Several specimens from Macao; where, according to Mr. Heine, it is of frequent occurrence. He observes: "This bird inhabits rocky hills and declivities in the neighborhood of Macao. I do not remember having seen two of this species together in one place, but always alone, perched on the top of a rock or stone, and very shy. When alarmed, it immediately disappears into its hiding-place in the fissures of the rocks, or other places affording concealment."

PETROCINCLA PANDOO, Sykes.

PETROCINCLA PANDOO, Sykes Proc. Zool. Soc. London, 1831, p. 87.

Adult and young birds in the present collection appear to be the species established by Col. Sykes, as above, and are easily distinguished from the preceding by their uniform slate-blue plumage, without the chestnut abdomen of *P. manillensis*. But from *P. cyanea*, we can find

IXOS HAEMORRHOUS — GMELIN

Lith. by Wm E. Hitchcock, Phila

no difference, except the shorter bill of the present bird—a rather slight character whereon to found a specific distinction.

From Singapore.

IXOS SINENSIS, (Gmelin.)

MUSCICAPA SINENSIS, Gm. Syst. Nat. I, p. 942, (1788.)

"TURDUS OCCIPITALIS, Temm." Eyd. et Gerv. Mag. Zool., 1836, p. 10.

Eyd. et Gerv. Voy. Favorite, Ois., pl. 14; Guerin. Mag. Zool., 1836, pl. 66.

Very fine specimens from Macao.

IXOS HÆMORRHOA, (Gmelin.)

MUSCICAPA HÆMORRHOUSA, Gm. Syst. Nat. I, p. 941, (1788.)

HÆMATORNIS CHRYSORROIDES, Lafres.

PLATE 6.—*Adult male.*

From Macao. This appears to be the species really entitled to the name above given, and never having been accurately figured, we have availed ourselves of the fine specimens in the present collection for that purpose.

In Mr. Heine's notes we find the following in reference to this bird:

"I found this species in various places around Macao. Like nearly all the other birds, it had retired to the rocky hills, where it hopped gaily from bough to bough, or flitted from rock to rock, sometimes solitary, but frequently in pairs. Its movements were short, and sometimes eccentric. When anything unusual attracted its attention, it raised its crest, and looked at the object with an expression of intense curiosity."

The figure in our plate is of the size of life, and represents the adult male.

PARUS CINEREUS, Vieillot.

PARUS CINEREUS, Vieill., Nouv. Dict. XX, p. 316, (1818.)

PARUS ATRICEPS, Horsf., Linn. Trans., London, XIII, p. 160, (1822.)

PARUS NEPALENSIS, Hodgs.

Temm., pl. col. 287, fig. 2.

A single specimen from the vicinity of Macao, which, for all that we can see, is strictly identical with others in the collection of the Philadelphia Academy from Java and other localities.

MOTACILLA LUGENS, Temminck and Schlegel.

MOTACILLA LUGENS, Temm. and Schleg., Faun. Jap. p. 60, (1850.)

MOTACILLA LEUCOPTERA, Vigors.

Temm. and Schleg., Faun. Jap. Aves., pl. 25.

Several specimens from Macao, entirely identical with those from Japan. It will, however, require nice discrimination to recognize the characters relied on by the projectors of species in the restricted genus *Motacilla*.

LORIUS DOMICELLA, (Linnæus.)

PSITTACUS DOMICELLA, Linn. Syst. Nat. I, p. 145, (1796.)

Edwards' Birds IV, pl. 171.

From Singapore.

This splendid parrot is stated by Mr. Heine to have been "frequently observed in the woods of the island of Singapore." Very fine specimens are in the collection of the expedition.

LORICULUS GALGULUS, (Linnæus.)

PSITTACUS GALGULUS, Linn. Syst. Nat. I, p. 150, (1766.)
Edwards' Birds VI, pl. 293, fig. 2. Bourj. St. Hilaire, Perr. pl. 88.
A single specimen in very fine plumage, labelled as having been obtained at Pointe de Galle, Ceylon.

LORICULUS INDICUS, (Gmelin.)

PSITTACUS INDICUS, Gm. Syst. Nat. I, p. 349, (1788.)
PSITTACUS ASIATICUS, Lath. Ind. Orn. I, p. 130, (1790.)
PSITTACUS MINOR, Gm. Syst. Nat. I, p. 351, (1788.) ?
Edwards' Birds I, pl. 6.
From Point de Galle, Ceylon.

YUNX TORQUILLA, Linnæus.

YUNX TORQUILLA, Linn. Syst. Nat. I, p. 172, (1766.)
Gould B. of Eur. III, pl. 233.
From Macao, and quite similar to specimens from Europe.

MEGALAIMA CANICEPS, (Franklin.)

BUCCO CANICEPS, Frankl. Proc. Zool. Soc., London, 1831, p. 121.
Le Vaill. Hist. Nat. Barbets, pl. 38.
Stated by Mr. Heine to be of frequent occurrence at Pointe de Galle, Ceylon.

ALCEDO BENGALENSIS, Gmelin.

ALCEDO BENGALENSIS, Gm. Syst. Nat. I, p. 450, (1788.)
Temm. and Schleg., Faun. Jap. Aves., pl. 38.
In all respects identical with specimens before us from localities on the coast of the continent of Asia and its islands, much south of Japan and the Loo Choo islands.
"Loo Choo, August, 1554."
Mr. Heine observes of this bird: "This kingfisher is to be seen very frequently in the island of Loo Choo. It frequents the little channels between the rice fields, or may be seen near pools of water, where it sits watching for its prey, and dashes rapidly into the water, returning with a chattering note or two to another convenient point of observation."
Specimens from Macao are also in the collection of the expedition.

HALCYON PILEATA, (Boddaert.)

ALCEDO PILEATA, Bodd. Tab. Pl. Enl., p. 41, (1783.
ALCEDO ATRICAPILLA, Gm. Syst. Nat. I, p. 453, (1788.)
Buffon, Pl. Enl. 673. Lesson, Cent. Zool. pl. 8.
A very mature and handsome specimen of this well known species is from a more northern locality than ever before determined. It was obtained at the mouth of the river on which the city of Nankin is situated.
Mr. Heine observes: "This bird was caught alive on board the United States steamship Mississippi when at anchor in the mouth of the Yang-tzi-kiang river."

HALCYON COROMANDA, (Latham.)

ALCEDO COROMANDA, Lath. Ind. Orn. I, p. 252, (1790.)
HALCYON LILACINA, Swains. Cab. Cy. Birds II, p. 335, (1837.)
Temm. & Schleg. Faun. Jap. Aves, pl. 39.

Another beautiful kingfisher, a fine specimen of which, in the present collection, is from Singapore.

Mr. Heine's note on this species is: "From the river Padang, in the island of Singapore. I had only broken his wing, and had to chase him for some time. When I finally captured him he raised a fierce cry, and defended himself quite gallantly."

MEROPS PHILIPPINUS, Linnæus.

MEROPS PHILLIPINUS, Linn. Syst. Nat. I, p. 183, (1766.)
MEROPS JAVANICUS, Horsfield, Trans. Linn. Soc. London XIII, p. 171, (1822.)
MEROPS DAUDINI, Cuvier Reg. An. I, p. 442, (1829.)
Le Vaill. Hist. Nat. Guepiers, pl. 14.
Specimens from Pointe de Galle, Ceylon.

Mr. Heine's note is as follows: "This bird abounds in wet and swampy grounds in the vicinity of Pointe de Galle, Ceylon. Sometimes, when sitting and partially concealed, it would not start until very nearly approached. It flies with a long, swift stretch of wing, and usually alights again at a short distance. It is easy enough to shoot, but more difficult to get afterwards without a dog, as, falling in the long grass of the swamps, it is easily lost, on account of its green color; and when it falls in a rice field it is impossible to approach without sinking ankle deep in the mud. Some little boys who followed me the whole day jumped eagerly into the mud to fetch the specimens of this bird, which are now in the collection of the Expedition."

CINNYRIS ZEYLONICA, (Linnæus.)

CERTHIA ZEYLONICA, Linn. Syst. Nat. I, p. 188, (1766.)
Vieill. Ois. dor. pl. 16, 17.
From Pointe de Galle, Ceylon.

3. ORDER RASORES.—THE GALLINACEOUS BIRDS.

TRERON VERNANS, (Linn.)

COLUMBA VERNANS, Linn. Mantiss, p. 525, (1771.)
COLUMBA PURPUREA, Gm. Syst. Nat. II, p. 784, (1788.)
COLUMBA VIRIDIS, Scopoli Flor. et Faun. Insub., p. 94, (1736.)
Buff. Pl. Enl. 138. Temminck and Knip's Pigeons, pl. 10.
Specimens of this fine bird are from Singapore.

In Mr. Heine's notes we find the following in relation to the present species:

"This beautiful dove was to be found in considerable numbers in the island of Singapore and the surrounding islands. They were to be seen usually in the morning and evening in the upper branches of trees in the woods, and could be shot quite easily. Their skins were exceedingly tender and difficult to prepare."

TURTUR CHINENSIS, (Scopoli.)

COLUMBA CHINENSIS, Scop. Flor. et Faun. Insub., p. 94, (1786.)
COLUMBA TIGRINA, Temm. Pig. et Gall. I, p. 481, (1813.)
Temm. and Knip's Pigeons, pl. 43.
From China. Mr. Heine observes:
"This dove passed the steamship Mississippi in great numbers whilst at anchor in the mouth of the Yang-tzi-kiang river, and several were shot. I never saw this species at any point at which I had an opportunity of collecting."

COTURNIX COROMANDELICA, (Gmelin.)

TETRAO COROMANDELICUS, Gm. Syst. Nat. I, p. 764, (1788.)
COTURNIX TEXTILIS, Temm. Pig. et Gall. III, p. 742, (1815.)
Temm. Pl. col. 35.
From China.

FRANCOLINUS PERLATUS, (Gmelin.)

TETRAO PERLATUS, Gm. Syst. Nat. I, p. 758, (1788.)
PERDIX MACULATA, Gray, Zool. Misc., p. 2, (1842.)
Vieill. Gal. des Ois. II, pl. 213.
Very fine specimens are in the collection from China.

4. ORDER GRALLATORES.—THE WADING BIRDS.

GRUS CANADENSIS, (Linnæus.)

ARDEA CANADENSIS, Linn. Syst. Nat. I, p. 234, (1766.)
The SANDHILL CRANE.
Aud. B. of Am. pl. 261. Oct. ed. V, pl. 314.
"Benicia, California, December, 1854."

ARDEA HERODIAS, Linnæus.

ARDEA HERODIAS, Linn. Syst. Nat. I, p. 237, (1766.)
The GREAT HERON; the BLUE CRANE.
Wilson, Am. Orn. VII, pl. 65, fig. 5; And. B. of Am., pl. 211, Oct. ed. VI, pl. 369.
"Benicia, California, December, 1854."

ARDEA EGRETTA, Gmelin.

ARDEA EGRETTA, Gm. Syst. Nat. II, p. 629, (1788.)
THE WHITE CRANE; the GREAT EGRET.
Wilson, Am. Orn. VII, pl. 61, fig. 4; Aud. B. of Am., pl. 386, Oct. ed. VI, pl. 370.
From Benicia, California.

ARDEA CINEREA, Linnæus.

ARDEA CINEREA, Linn. Syst. Nat. I, p. 236, (1766.)
ARDEA MAJOR, Gm. Syst. Nat. I, p. 627, (1788.)
Buff. Pl. Enl. 755, Gould B. of Eur. IV, pl. 274.

Precisely similar to specimens from Europe.

"Loo Choo, February, 1854, iris bright yellow."

Mr. Heine's only note on this species is "obtained near Too-may, Loo Choo, in rice fields."

ARDEA LEUCOPTERA, (Boddært.)

CANCROMA LEUCOPTERA, Bodd. Tab. Pl. Enl., p. 54, (1783.)

ARDEA SPECIOSA, Horsf. Zool. Res. Java, p. (not paged, 1824.)

Hoosf. Zool. Res., pl. 30. Hardw. and Gray, Ill. Ind. Zool., pl. 48.

From Pointe de Galle, Ceylon.

"Rice fields and swamps, iris yellow."

NYCTICORAX GARDENI, (Gmelin.)

ARDEA GARDENI, Gm. Syst. Nat. XI, p. 645, (1788.)

NYCTICORAX AMERICANUS, Bonap. Comp. List., p. 48, (1838.)

"ARDEA NYCTICORAX." Wilson.

The NIGHT HERON.

Wilson, Am. Orn. VII, pl. 61, fig. 2. Aud. B. of Am., pl. 236, oct. ed. VI, pl. 363.

From Benicia, California.

BOTAURUS LENTIGINOSUS, (Montague.)

ARDEA LENTIGINOSA, Montague, Orn. Dict. Supp. (not paged, 1813.)

ARDEA MINOR, Wilson Am. Orn. VIII, p. 35, (1814.)

The AMERICAN BITTERN.

Wilson, Am. Orn. VIII, pl. 65. Aud. B. of Am., pl. 337, oct. ed. VI, pl. 365.

From Benicia, California.

GALLINULA CHLOROPUS, (Linnæus.)

FULICA CHLOROPUS, Linn. Syst. Nat. I, p. 258, (1766.)

GALLINULA PARVIFRONS, Blyth.

The GALLINULE.

Gould, B. of Europe, V, pl. 342.

Specimens not distinguishable from the common European Gallinule, except that the frontal plate is apparently smaller than is usually seen. It is probable, however, that this is a variable character, and not to be relied on as indicating a distinct species.

"Loo Choo, August, 1854, eye yellow."

We find in Mr. Heine's notes the following allusion to the specimens before us:

"A number of living birds were presented to Commodore Perry by the regent of the Loo Choo islands, amongst which were the present specimens. They were very wild, and fluttered constantly, attempting to escape, and died in the course of a few days. I did not see this bird in its native haunts."

GALLINAGO STENURA, (Temminck.)

SCOLOPAX STENURA, Temm.

The INDIAN SNIPE.

This appears to be an extensively diffused species. In addition to those from Japan, there are, also, in the collection of the Expedition, specimens from China, in excellent plumage and condition.

The following is Mr. Heine's note:

"This snipe is found in considerable numbers in the rice fields around Macao and Canton. It is caught in nets by the Chinese, and brought to market alive.

CHARADRIUS PLUVIALIS, Linnæus.

CHARADRIUS PLUVIALIS, Linn. Sys. Nat. I, p. 254, (1766.)
CHARADRIUS APRICARIUS, Linn. Syst. Nat. I, p. 254, (1766.)
The GOLDEN PLOVER.
Gould, B. of Europe IV, pl. 294.
From China. According to Mr. Heine: "Like the preceding, this plover is frequently to be seen in the neighborhood of Macao and Canton, and is also brought to market alive."

SQUATAROLA HELVETICA, (Linn.)

TRINGA HELVETICA, Linn. Syst. Nat. I, p. 250, (1766.)
TRINGA SQUATAROLA, Gm. Syst. Nat I, p. 682, (1788.)
VANELLUS MELANOGASTER, Bechst.
The BLACK-BELLIED PLOVER.
Wilson, Am. Orn. VI, pl. 57, fig. 4.
Also from China, and, according to Mr. Heine, frequent in the vicinity of Macao.

HIATICULA ATRIFRONS, (Wagler.)

CHARADRIUS ATRIFRONS, Wagl. Isis, 1829, p. 650.
From Singapore.
"Along the river Padang, Singapore, iris brown."

TOTANUS GLOTTIS, (Linnæus.)

SCOLOPAX GLOTTIS, Linn, Syst. Nat. I, p. 245, (1766.)
Gould, B. of Eur. pl. 312.
Specimens from Macao, China, not different, so far as we can discover, from the European bird.

Mr. Heine states: "This bird is frequent on the beach in the vicinity of Macao. It is mostly to be seen solitary, very shy, and apparently always on the alert, and flying very swiftly."

TRINGA HYPOLEUCA, Linnæus.

TRINGA HYPOLEUCOS, Linn. Syst. Nat. I, p. 250, (1766.)
Gould, B. of Europe, pl. 318.
From Singapore.

RHYNCHÆA CHINENSIS, (Boddært.)

SCOLOPAX CHINENSIS, Bodd. Tab. Pl. Enl., p. 53, (1783.)
RHYNCHÆA VARIEGATA, Vieill, Gal. des Ois. II, p. 109, (1825.)
Vieill. Gal. II, pl. 240, Buff. Pl. Enl., 881.
From Macao, China.

RECURVIROSTRA OCCIDENTALIS, Vigors.

RECURVIROSTRA OCCIDENTALIS, Vig. Zool. Jour. IV, p. 356, (1829.)
The WHITE AVOCET.
Cassin, B. of California and Texas I, pl. 40.
From Benicia, California.

5. ORDER NATATORES.—The Swimming Birds.

ANAS BOSCHAS, Linnæus.

Anas boschas, Linn. Syst. Nat. I, p. 205, (1766.)
The Mallard.
Wilson Am. Orn. VIII, pl. 70, fig 7. Aud. B. of Am., pl. 221, oct. ed. VI, pl. 385.
From Benicia, California. Specimens in the collection present no points of difference from the bird of the Atlantic coast.

MARECA AMERICANA, (Gmelin.)

Anas Americana, Gm. Syst. Nat. I, p. 526, (1788.)
The American Widgeon.
Wilson, Am. Orn. VIII, pl. 69, fig 4. Aud. B. of Am., pl. 345, oct. ed, VI, pl. 389.
From Benicia, California.

QUERQUEDULA CAROLINENSIS, (Gmelin.)

Anas Carolinensis, Gm. Syst. Nat. I, p. 533, (1788.)
"Anas crecca," Wilson, Am. Orn. VIII, p. 101.
The Green Winged Teal.
Wilson, Am. Orn. VIII, pl. 70, fig 4. Aud. B. of Am., pl. 228, oct. ed. VI, pl. 392.
From Benicia, California.

FULIGULA MARILA, (Linnæus.)

Anas marila, Linn. Syst. Nat. I, p. 196, (1766.)
Anas frenata, Sparrmann Mus. Carls.
The Scaup Duck, the Black Headed Duck.
Wilson, Am. Orn. VIII, pl. 69, fig 3. Aud. B. of Am., pl. 229, oct. ed. VI, pl. 397.
From Benicia, California.

Very fine specimens of the four ducks preceding have afforded us an opportunity for careful comparison with specimens from the Atlantic coast. They appear to be precisely identical in all essential characters.

TADORNA VULPANSER, Fleming.

Tadorna vulpanser, Fleming, Brit. An. I, p. 122.
Anas tadorna, Linn. Syst. Nat. I, p. 195, (1766.)
The Sheldrake.
Gould, B. of Eur., pl. 357.
From Macao, China. The specimen now before us has the pectoral band more narrow and the bill more curved upwards than in European specimens, otherwise quite similar.

LARUS FUSCUS, Linnæus.

Larus fuscus, Linn. Syst. Nat. I, p. 225, (1766.)
Gould, B. of Eur. V, pl. 431.
From the Cape of Good Hope.

LARUS OCCIDENTALIS, Audubon.

Larus occidentalis, Aud. Orn. Biog. V, p. 320, (1839.)
Larus niveus, Pallas Zoog. Rosso Asiat. II, p. 320, (1811)?
Pallas Zoog. Ross. Asiat. pl. 86?

From Benicia, California. Specimens of this handsome species are now frequently to be met with in collections from the western coast of North America, where it appears to be a common species. This bird is closely allied to *Larus argentatus*, but is apparently different in some minor characters. It agrees quite well with all the characters indicated in Pallas' description above cited, except in the colors of the bill and feet, which are, however, evidently liable to vary, and to be very unreliable in preserved specimens.

STERNA MINUTA, Linnæus.

STERNA MINUTA, Linn. Syst. Nat. I, p. 228, (1766.)

Gould, B. of Eur. V, pl. 420, Wilson, Am. Orn. VII, pl. 60, fig. 2.

Several specimens in the collection of the expedition are apparently identical with others now before us from the coast of Europe. The bill may be perhaps rather larger, in which respect they approximate to *S. nereis*, Gould, a bird of Australia; but the black line from the nostril to the eye is well defined, and in all other characters they are clearly *S. minuta*.

"Loo Choo, August, 1854, eye black."

Mr. Heine observes:

"Seen very frequently about the coral reefs, surrounding Napha harbor, Loo Choo. Its flight is very swift, and sometimes it suddenly stops, flutters for a moment suspended in the air, and then dashes almost perpendicularly into the water. In this manner it catches fishes, which, if small, are devoured immediately, but, if larger, it flies away to some neighboring rock and eats them leisurely.

LETTER DESCRIBING THE MANNER

OF

HATCHING DUCKS IN CHINA.

LETTER FROM DR. JOS. WILSON TO DR. L. J. WILLIAMS, U. S. N.,

DESCRIBING

THE MANNER OF HATCHING DUCKS IN CHINA.

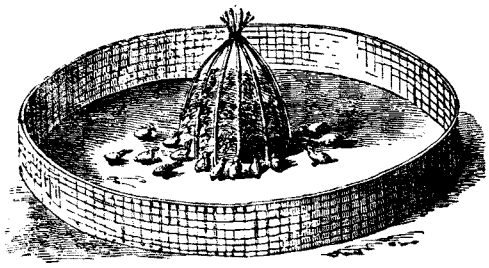
UNITED STATES NAVY YARD,
Philadelphia, February 23, 1856.

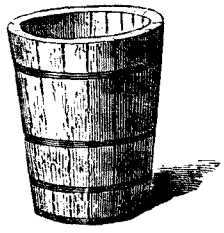
DEAR DOCTOR: I have received your paper of the 22d instant, and as I suppose I may serve your purpose better by going a little into detail, I will do so. There was no artificial heat in actual use while I was there; the temperature of the external atmosphere was at about 90° Fahrenheit; and there was a small chamber with a number of furnaces and charcoal ready to be lighted and put in requisition at very short notice.

The whole establishment was conducted in a rough building, like the common business places of the Chinese—front entirely open, partition wall to separate it from its neighbors, mud floor, &c.

The front room had large shelves on the two sides, about four feet deep from the wall, extending the whole length, the lower about a yard from the ground, and two others about eighteen inches apart. These shelves were appropriated to eggs which were within two or three days of their term; the shelves were first covered with two or three thicknesses of heavy spongy paper, almost as thick as blankets, which appeared to have been manufactured for the special purpose, in sheets four or five feet square. Next came a layer of eggs, two deep, all over the shelves, and two or three layers of the blanket paper mentioned. Parts of these shelves were occupied by eggs which had but recently been placed there; they felt very warm to the hand; seemed to depend exclusively upon their own warmth, which was certainly much above that of the atmosphere; the blanket paper protecting them from its chilling influence, as well as sudden changes. On some parts of the shelves the eggs were hatching, and the men were engaged where they were nearly all hatched in separating them; they tossed the little ones, as well as the eggs which showed signs of animation, very roughly and carelessly into baskets at considerable distance, greatly endangering the strangers' lives from concussion, fracture of limbs, &c., in our estimation; but in John's opinion it merely broke the shells, and thus enabled them the better to extricate themselves. The ducklings, after remaining a few hours to dry and extricate themselves from shells, were placed on the floor in little movable basket-work enclosures of bamboo, and supplied with a kind of grass, chopped up for food, which they ate with an appetite which showed that they fully appreciated it. This grass was

placed in little baskets with broad bottoms, so that they could not be overset, and the vertical splints continued upward and were tied together at the top, so as to afford slats, in the manner of a horse's manger ; they could stick in their heads, in the scramble for their first breakfast, but could not trample the food under their feet. I presume the young are transferred almost immediately to the boats, as I did not see any which appeared more than a week old.





At the back part of their room is a mud wall partition, with a door in the centre, and two other walls running back at right-angles to it, dividing the back end of the building into three small apartments : one for the furnaces of charcoal, &c., the middle one serves as entrance, and the third is the apartment appropriated to the most delicate part of the process. This has a board floor, raised about four feet from the ground, beneath which are placed the furnaces, if necessary. The apartment itself was very dark and smothering—not much gas or smoke, but high temperature. This apartment contained about ten barrels, lined with the flannel paper, *stratum super stratum*, about three or four inches thick. In these barrels the process begins, and continues till within two or three days of its termination, when they go to the shelves in the front room. The barrels are almost filled with eggs, a sheet of paper being interposed between each layer of about six inches, and the whole covered with three or four sheets of the flannel paper, and a thick light lid, composed in part of the same material.

The whole arrangement seems to be a most perfect protection from sudden changes of temperature, and I am under the impression that the eggs are handled a great deal, as they opened them without any hesitation, and even asked us if we would not like to invest capital in the business, for which they offered to pay two per cent. a month, or a share of the profits, which were certainly to be equivalent.

JOSEPH WILSON.

NOTES

ON SOME

FIGURES OF JAPANESE FISH

TAKEN FROM RECENT SPECIMENS

BY THE ARTISTS OF THE U. S. JAPAN EXPEDITION:

BY JAMES CARSON BREVOORT.

NOTES

ON

SOME FIGURES OF JAPANESE FISH,

BY JAMES CARSON BREVOORT.

The Expedition, owing to the possible difficulties it might have to encounter, was not accompanied by professed naturalists, which circumstance is much to be regretted. The Marine Fauna of the Pacific, which is in many respects peculiar, would have offered a wide field for investigation, and much valuable information might have been collected. The geographical distribution of fish in that ocean has not yet been studied, though the little that is known on the subject is highly interesting. Many abnormal genera, which connect widely dissimilar groups of other seas, are there met with, while some families there receive their full development.

A more intimate knowledge of the currents of the Pacific and Indian oceans will be necessary in order to account for the great range of certain fish. The Kuro-Siwo, of the Western Pacific, no doubt produces results similar to those observed in the case of the Gulf Stream in the Atlantic, by extending the range of southern, and limiting that of northern marine species. Sir John Richardson, in 1845, from zoological data of this nature only,* indicated the probability of such a current being found to exist, and his surmises have been fully verified.

The materials used for this paper consist of spirited figures of sixty kinds of fish, principally valuable from their having been taken from recently procured specimens. They were executed mostly by Messrs. Patterson and Peters, a few being the work of Messrs. Heine and Bayard Taylor, and are more or less correctly drawn; none of them, however, with any close attention to the specific characters.

From their authority, several true Salmonidæ have been added to the Japanese Fauna, with a few new species of other families. The range of several, described in the Fauna Japonica, has been extended, and some additional materials for the history of others has been gleaned from them. One of the most interesting results of their examination is the proof that viviparous fish, closely allied to the California ones, are found on the western shores of the Pacific. Some names of fish, and notes on them, were derived from a young Japanese who returned with the Expedition. He had been engaged in the coasting trade at home, and was familiar with most of the native species. The natives of Japan, generally, are large consumers of fish, and are well acquainted with all the productions of their own seas.

It will hardly be considered necessary, in this short paper, to give a list of works consulted. Such as could be referred to, are quoted in their proper place. Pallas, in his Zoographia Rosso-

* See his report to the British Association, at the 15th meeting, page 190.

Asiatica, describes many fish from the North Pacific, some of which occur on the coast of Japan. The loss of the plates, which were to have accompanied his work, makes it sometimes difficult to identify his species. The only special work on the subject is the Ichthyological portion of the Fauna Japonica. This of itself is a truly magnificent work, and but few countries can boast of one equally valuable. The authors of this portion of it—Messrs. Temminck and Schlegel—worked from the notes and collections of Mr. Bürger, who besides preserved specimens, had collected many drawings by natives of recent fish.

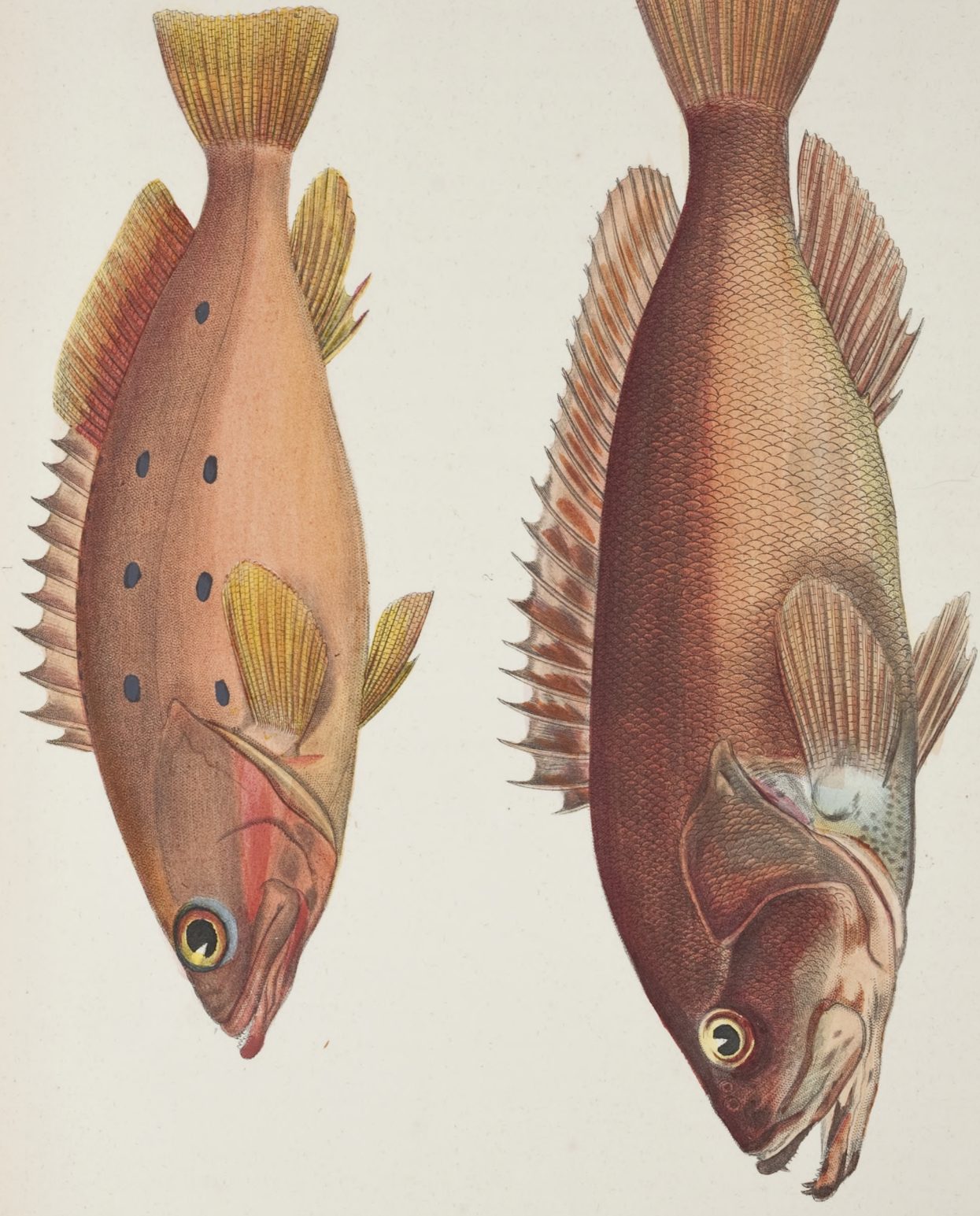
This work, commenced in 1842, was completed in 1850, and contains descriptions of 358 species, of which 294 are figured on 143 plates. The whole is in large folio. Schlegel seems to have been the chief author of it. Sir John Richardson, in his report on the Ichthyology of the seas of China and Japan, prepared for the 15th meeting of the British Association, in 1845, has added much information to what was already known. The "Histoire des Poissons" contains much new matter on the same subject; among other things, Mr. Valenciennes having identified most of the Pallasian species of salmon found on the eastern shores of Siberia. In this great work will be found all possible information relating to authorities on Japanese Ichthyology.

Some few fish found in the seas of Japan are described in the zoological reports of recent English expeditions, as those of the Blossom and the Samarang. The indefatigable Bleecker, who has contributed much to our knowledge of the Ichthyology of the Polynesian Islands, has also published three special papers on the subject of Japanese fish, and has reviewed the whole of this portion of the Japanese Fauna.

Much, however, remains to be done before the actual number of species found on the shores of this interesting archipelago can be determined with any approach to accuracy. From the skill of its inhabitants in the capture and preparation of fish, it is probable that the fisheries of Japan will yet prove to be of the greatest value to the commercial world.

Note.—A small collection of Japanese fish was made by a physician who accompanied the Expedition, but they could not be procured for examination.

The surveying expedition to the North Pacific has recently brought home very large collections in zoology, which are noticed in a recent number of the American Journal of Science and Art. Among these collections, made by the accomplished zoologist of the Expedition Mr. William Stimpson, there are 500 species of fish; of which many are from Japan and the neighboring waters.



Bayard Taylor del.

1

2

H. Patterson del.

1

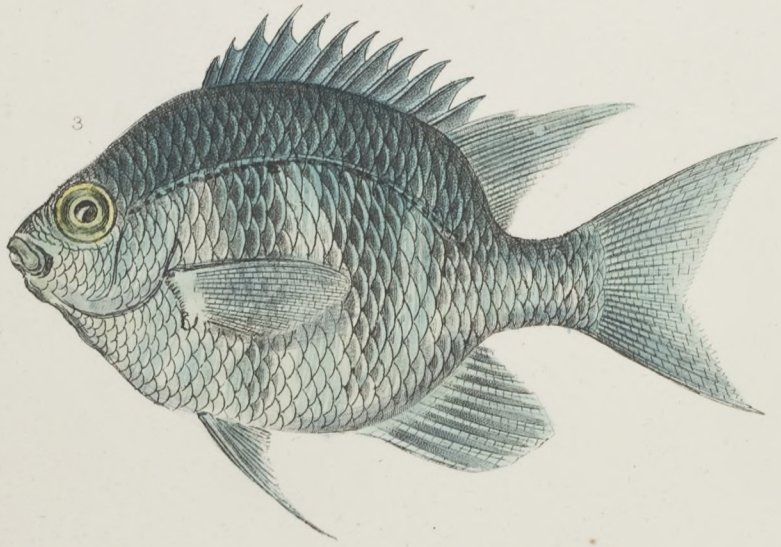
2

3

H.Patterson del.

Nº 1. PELOR JAPONICUM - Life Size. Nº 2. SEBASTES INERMIS - Life Size.

Nº 3. TRIGLA BÜRGERI.

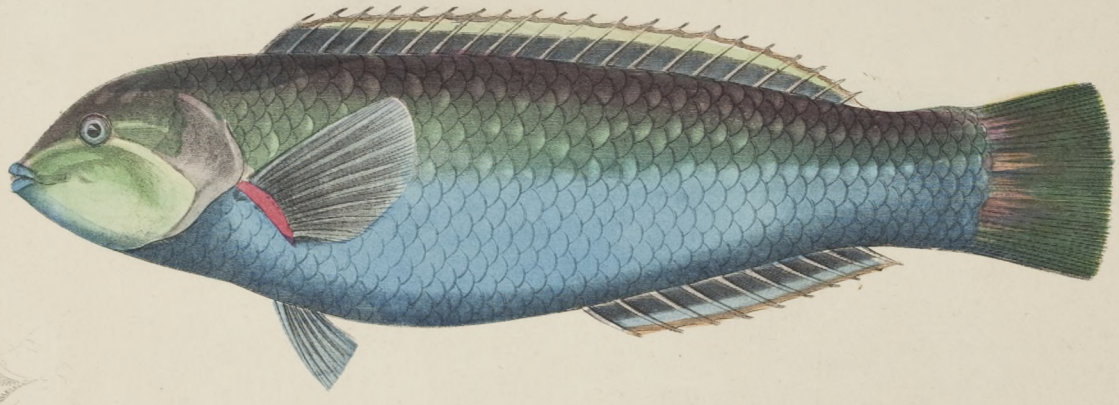


H.Patterson del.

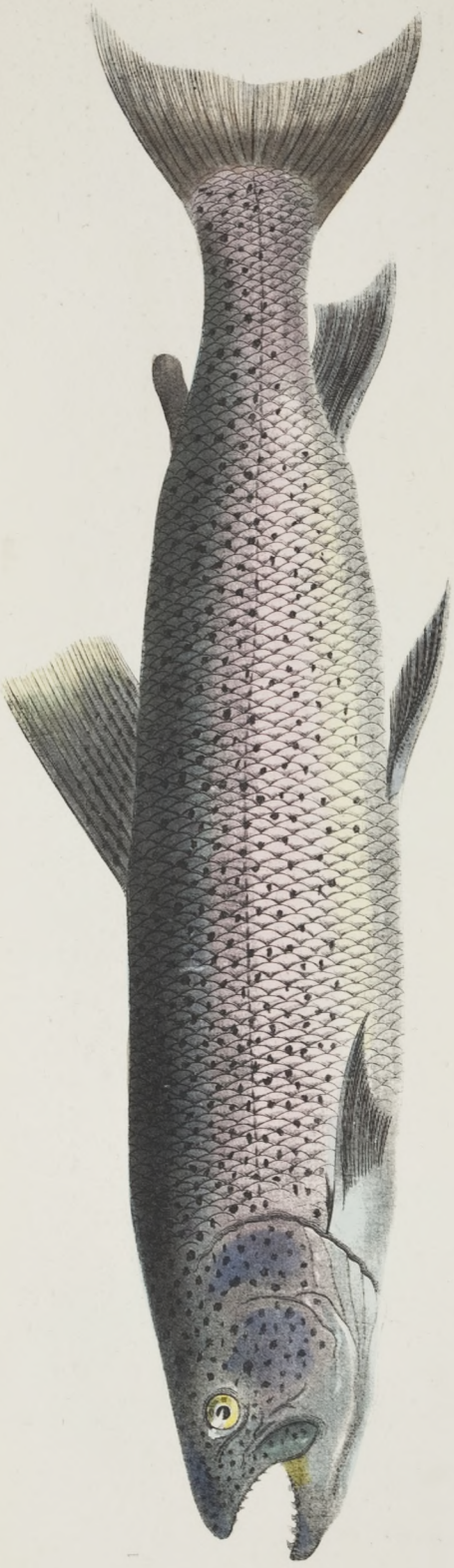
Nº 1 – ETROPLUS FUMOSUS — Life size.
2 – HENIOCHUS MACROLEPIDOTUS – „ „
3 – GLYPHISODON SMARAGDINUS.
4 – AMPHIPRION FRENATUS.
5 – APISTUS RUBRIPINNIS — Life size.
6 – MONOCENTRIS JAPONICUS – „ „

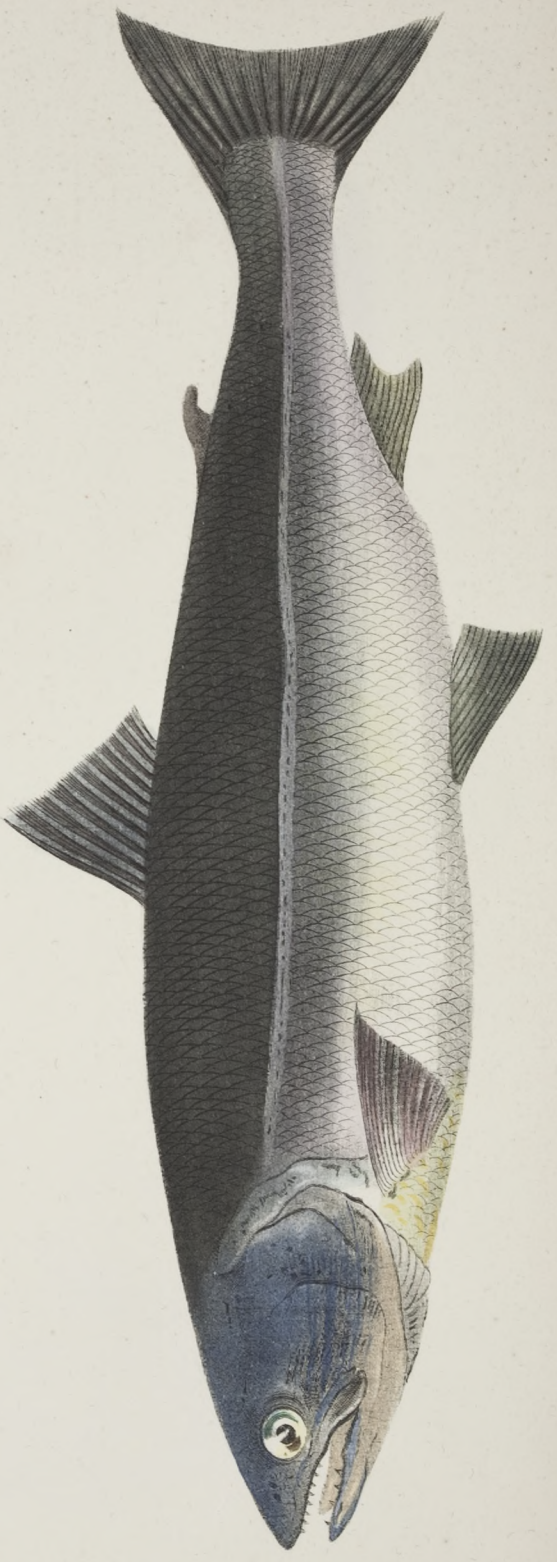
4 3 2 1

2 — GUNELLUS DOLICHOGASTER. 1 — CLINUS POLYACTOCEPHALUS.



1. SERRANUS URODELUS. 2. IULIS QUADRICOLOR. 3 & 4. IULIS LUTESCENS.





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1. MURAENA KIDAKO. [Nat size.]

2. ANGUILLA.

1. TRIAKIS SCYLLIUM [Reduced]
2. CESTRACION PHILLIPPI [Nat. size]

1. LABRAX JAPONICUS, Cuvier.

LABRAX JAPONICUS, Cuv. and Val. II, 85.
" " Bleecker, Nalezingen &c.
PERCALABRAX JAPONICUS, Faun. Jap. Pisces., Temm. & Schlegel, 2. pl. 2, fig. 1.

NOTES ON DRAWING.—From Simoda. 20½ inches.

More elongated than in the above quoted figure; the caudal more deeply forked. The colors paler, lateral line dark. First dorsal only with clouded spots; the second with a single series of longer spots between the rays.

This fish is much sought after as food by the Japanese. Langsdorff and Schlegel give its name as *Suzuki*, but Diengkitsch writes it *Suuzuki*. Dr. Cantor, in the Annals and Magazine of Nat. Hist., vol. 9, p. 277, notices this fish as found at Chusan and the river Peiho.

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2. SERRANUS TSIRIMENARA, Schlegel.

SERRANUS TSIRIMENARA, Faun. Jap. loc. cit. 7. pl. 4 a. fig. 3.

PLATE III, fig. 1. Life size?

NOTES.—From Port Lloyd, Bonin islands.—7¼ inches; D. 10 (?) A. (?) 8; C. 15; P. 15.

The colors are much brighter than in the figure of the Fauna Japonica, which was taken from a preserved specimen. The whole of the head and body bright orange red, becoming more yellowish below. The white spots, seven in number, of oblong form, four above and three below the lateral line, the six anterior ones being under the spinous dorsal. Head more dusky. A stripe of vermilion red from above tip of maxillaries to near the base of pectorals, shaded off on the edges. Under jaw edged with vermilion red; irides orange red. Margin of orbits blue. Spinous dorsal pale red, the membrane behind the points of the spines darker. Dark spots on back between bases of spines. Soft dorsal like the back, yellowish towards margin. The other fins bright yellow, ventrals and anals tipped with red.

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3. SERRANUS AKAARA, Schleg.

SERRANUS AKAARA, Faun, Jap. loc. cit. 9, pl. 3, fig. 1.

NOTES.—Hong Kong. (7¾ inches; reduced?)

The colors lighter than in the Faun. Jap., and nearly white below. Spots brownish yellow; cheeks pale yellow; dorsal dull yellow.

Aka, means scarlet; *ara*, a rock fish. Diengkitsch informs me that at Osaka it is called *Eso-owoo*, meaning shore fish; probably a generic name.

4. SERRANUS AWOARA, Schleg.

SERRANUS AWOARA, Faun. Jap., loc. cit. 9, pl. 3, fig. 2.

NOTES.—From Lew Chew. (Life size, 13½ inches; D. 11. 15.)

Pale dusky purple, darker on back, head, and spinous dorsal; soft dorsals paler; caudal, anal, and pectorals pale yellowish brown; ventrals bluish; small brownish red spots (more sparsely distributed than in the figure quoted) on whole of head and body; none on fins. The figure in the Faun. Jap. has a decided purple tinge on the sides, though in the text it is said to be yellowish brown.

Awo means purplish blue; *ara*, a rock fish.

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5. SERRANUS URODELUS, Forster.

SERRANUS URODELUS, Cuv. & Val. II. 306, and VI. 513.

PLATE VI, fig. 1. Reduced.

NOTES.—From Lew Chew.

Brilliant scarlet lake, or bright blood red over whole of body and fins; rather lighter on abdomen and cheeks. Pectorals tipped with orange yellow. Lateral line of a darker red, prolonged forwards and rising over the eye. On the caudal two clear white bars, converging and narrowing from the middle of the outer rays towards the middle of the posterior margin, without meeting. Irides paler red.

This well marked species was first noticed by J. R. Forster, at Otaheite. He named it *Perca urodela*, and his figure was found by M. Valenciennes among the drawings in the Banksian collection, with the above quoted name. In Bloch Schneider it is placed (page 333) under *Bodianus miniatus*, (*Perca miniata* of Forskäl, p. 40,) as a variety of that fish, which is a *Diacope*, according to M. Valenciennes, and is from the Red sea.

But one specimen was observed by the expedition.

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6. SERRANUS MARGINALIS, Bloch.

EPINEPHELUS MARGINALIS, Bloch, pl. 328, 1. East Indies.
HOLOCENTRUS ROSMARUS, Lacep. IV, 345, pl. 7, f. 2.
HOLOCENTRUS MARGINATUS, Lacep. IV, 342.
SERRANUS MARGINALIS, Cuv. & Val. II, 301.

PLATE III, fig. 2. Natural size.

NOTES.—From Simoda, (8⅝ inches.)

The drawing is colored bright reddish brown over the whole of body and fins; darker on back, and blackish brown on back of head. Spinous dorsal, with the membrane adjoining the

tips of the spines, dusky brown. All the fins reddish brown, like body; pectoral, ventrals, and anals, rather dusky. Breast in front of pectorals, dusky blue. Irides, yellow and red.

Strong canine teeth in both jaws; head large, profile arching uniformly, lower jaw longest. Body highest in front of dorsal. Spines eleven in number, first shortest, the others as well as soft dorsal, of nearly equal height. Caudal rounded.

In the Hist. des Poissons, as above quoted, M. Valenciennes says: "Bloch does not give the habitat of this fish, and gives it fancy colors. M. Lacépèdes' *Hol. rosmarus* was founded on a drawing by Commerson, made at the Isle de France, while his *Hol. marginatus* is from Bloch's *Ep. Marginalis*. M. Dussumier procured a specimen at Ceylon, and found it also at the Seychelles."

If the fish observed by these naturalists are all of one species, it has a wide range.

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7. THERAPON OXYRHYNCHUS, Schlegel, loc. cit. 16, pl. 6, f. 3.

NOTES.—From Simoda. D. 12. 10; A. 11. (9½ inches.)

The name *Isagi* is added to the drawing, by a native of Simoda. In the Faun. Jap. it is called *Sima isisaki*.

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8. HOLOCENTRUM SPINOSISSIMUM, Schlegel, loc. cit. 22, pl. 8, A.

NOTES.—From Lew Chew. D. 10, 14, A. 12, (7½ inches.)

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9. URANOSCOPUS ASPER, Schlegel, loc. cit. 26, pl. 9, f. 1.

NOTES.—From Simoda. D. 4. 13; A. 14. (10¾ inches.)

The formula for the fin rays should read D. 5. 13, &c. The name given to it in the Faun. Jap. is *Ten-mon-dai-o-goze*, which, it is interesting to remark, has the same signification as the scientific European name, derived no doubt from the fact of the eyes being on the back of the head, looking directly upwards. *Ten-mon-dai* means an astronomer, *goze*, resembling.

The name given to it by Diengkitsch is *Mu-shi-ma-okodi*, meaning horns behind the head.

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10. FRIGLA BÜRGERI, Schlegel, loc. cit. 35, pl. 14, f. 1, 2.

PLATE V, fig. 3. ⅔ size.

NOTES.—From Simoda. D. 8. 18; A. 18, &c. (Life size, 10 inches.)

The drawing is more dusky on the head than in the figure of the Faun. Jap. Upper parts of spinous dorsal dark; upper parts of caudal dark dusky.

11. PLATYCEPHALUS ISIDIATOR? Bloch.

PLAT. INSIDIATOR, Cuv. and Val. vol. IV, 227, cum al. cit.
" " Faun. Jap. Pisces, 39, pl. 15, f. 1.

NOTES.—Yedo Bay, (7½ inches,) with a Chinese name meaning *sandy scale.*

It seems doubtful whether the true *P. insidiator* is found in Japan. The eyes of the figure before us, as well as those of the so-called *P. insidiator* in the Faun. Jap., are much smaller than those of the true kind, besides other differences. The range, from the Red sea to Japan, seems too great for such a delicate fish. It will probably be found that Schlegel's species is a new one.

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12 and 13. SEBASTES MARMORATUS, Cuv. and Val.

S. MARMORATUS, Cuv. and Val., IV, 345.
" " Schlegel, Faun. Jap. 46, pl. 21, fig. 1.
" " Bleecker, Nalezingen &c.

PLATE IV, figs. 1 and 2.

NOTES.—Figure 1. From Simoda. Cosango, (9 inches,) reduced? D. 14. 12, A. 3. 9, P. 17. (10 free,) &c.

Figure 2. From Simoda. Kasagu, (9 inches,) reduced? D. 12. 12, A. 3. 5? P. 16. (6 free.)

The characters necessary to determine the position of these two Sebastes are not sufficiently distinct in the drawings, which are no doubt quite correct as to color. They may be different sexes of *S. marmoratus,* though the first one, in its number of fin rays, seems to agree with the *S. variabilis* of Pallas, which however has no spines over the eyes. The second one seems to correspond in its number of fin rays and colors with the *S. albofasciatus* of Lacépède, Cuv. Val. IV. 344, which is supposed by Schlegel to be only a variety of the *marmoratus.*

The colors of figure 1 are as follows: Of a general dull carmine, with broad cloud-like spaces of bluish dusky, and blotches of dusky brown on the sides and abdomen. Head of the same ground color, with smaller blotches of dusky. Lower part of opercles lighter, with dots and bars of brown. Irides red and brown. Dorsals dull brownish carmine, with numerous small spots of brown on the spinous portion; the spots on the soft portion being arranged in four series parallel to the back. Caudal brown at the base, ending with orange, the rays annulated with brown in four concentric series like spinous dorsal with tinges of orange. Pectorals light. Anal orange, brown at base; the rays annulated in three series with brown. Ventrals dull reddish.

The second figure differs considerably from the first in color, and somewhat in its form and fin rays, enough probably to constitute a different species, were it possible to compare actual specimens. The drawings no doubt represent large fish, though the notes do not give the size of life.

This last figure shows a fish of a general vermilion red color, blackish along the back of body and head. The head with irregular bars or blotches of dark dusky. Irides, red and yellow. Body marbled with indistinct blotches of dusky, the red ground color being varied with tinges of yellow. First dorsal blood red with a few spots of dusky on membrane. Second

dorsal and anal red, margined with orange. Caudal red at base, most of it being orange. Pectorals orange red, darker at base, most of the upper rays annulated with three series of brown spots. Ventrals, dull orange.

This figure resembles the one of the *marmoratus* given by Schlegel, in form.

The name on the first figure *Kasagu*, seems to signify ulcerated gills; the second one, *Cosango*, that it exceeds red coral, (in color.)

In the Fauna Japonica it is called *ara-kabu; ara* meaning, as before stated, rock fish.

Cuvier, who found a good figure of it in a Japanese work, and also in the Japanese Encyclopedia, says that M. Abel Remusat translated the text which describes it, as "*common, reaching a length of three feet, white savory flesh, sought for in the winter season;*" in all which it resembles other species of Sebastes. Its name in this Encyclopedia, (see Notices et Extraits des Manuscrits, &c., tom. XI, part 1, page 215,) as given by Remusat is *akan*, or *ako*, meaning red fish.

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14. SEBASTES INERMIS, Cuv.

SEBASTES INERMIS, Cuv. and Val. IV, 346.
" " Faun. Jap. 47, pl. 21, fig. 3, 4.

PLATE V, fig. 2. Life size.

NOTES.—From Hakodadi. ($5\frac{3}{4}$ inches.)

A young specimen, not so dark as the figure in the Faun. Jap., the blotches smaller and more distinct.

A figure was also taken of a specimen $9\frac{1}{4}$ inches long, from the same locality, and to which the same remark applies. The distinct separation of the two dorsals is a peculiar character of this species, though exaggerated in the figure, which also erroneously shows four spines in the anal.

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15. PTEROIS LUNULATA. Schlegel, loc. cit. 45, pl. 19; Bleecker Bijdrage &c., p. 3.

NOTES.—From Simoda, ($4\frac{3}{4}$ inches,) Hawogoshi.

Though in form this drawing recalls that of *P. lunulata*, the colors are different. The body is of a pale brownish blue with the bars etc., as in the above species, but more distinctly defined. The two appendages over the eye are longer and equal the diameter of the orbit. It is, perhaps, only a young specimen.

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16. APISTUS ALATUS, Cuv.

A. ALATUS, Cuv. and Val. IV, 392.
" " Faun. Jap. 49, pl. 22 a. f. 2.

NOTES.—From Simoda, ($5\frac{1}{2}$ inches.)

In the drawing the colors are dark bluish slate on back, fading to dirty yellow on the sides. Markings as in the figure of the Faun. Jap.

This specimen seems to be different from the true *A. alatus*, but a comparison of specimens can alone decide the question.

17. APISTUS RUBRIPINNIS, Schlegel.

A. RUBRIPINNIS, Faun. Jap. 49, pl. 22, fig. 2.

PLATE VI, fig. 5. Life size.

NOTES.—From Simoda. ($2\frac{1}{4}$ and $3\frac{1}{4}$ inches.)

Two drawings were taken of this species, the published one appearing to be either young or taken at the breeding season, from the brilliancy of its coloring. The markings are more distinct than in the Faun. Jap., and the abdomen of a brick red. The caudal has a broad band of white at its base; rest of fin red, with narrow bars of dark dusky. The eye is smaller than in Schlegel's figure.

The fin rays, which are noted on the figure, are D. 21, A. 8, P. 10, V. 5, C. 11, being nearly correct.

In the Faun. Jap. the fin rays are nearly the same, but require to be read A. 3. 4, V. 1. 4.

One of the drawings is marked *Iso-owoo*, as the native name. This means simply shore fish. Diengkitsch calls it *Karakame*. *Kara* is Corea.

18. PELOR JAPONICUM. Cuv.

P. JAPONICUM, Cuv. and Val. 4, 437, pl. 93.
" " Faun. Jap. 44, pl. 18, fig. 2.

PLATE V, fig. 1. Life size.

NOTES.—From Simoda. ($4\frac{1}{2}$ inches,) D. 18. 6, A. (2) 11, P. 10. 2, &c.

This is no doubt a young specimen of this fish. It is of a uniform dark dusky olive, with minute marblings of paler olive on sides and bases of fins. No large white blotches as in the figure of the Faun. Jap. Fin rays with two more spines in dorsal, a common thing in young fish.

The native name *Onio-goze*, means devil like.

19. MONOCENTRIS JAPONICUS, Houttuyn.

GASTEROSTEUS JAPONICUS, Houttuyn, Mem. Harlem. XX, pt. 2, 329.
SCIAENA JAPONICA, Thunberg, Mem. Ac. Stockholm XI, 102, pl. 3.
MONOCENTRIS CARINATA VEL CATAPHRACTA, Bl. Schn. 100, pl. 24.
LEPISACANTHUS JAPONICUS, Lacep. III, 321.
MONOCENTRIS ———, Tilesius. Mem. Ac. Münich III. 71, 1811–12, w. fig.
" JAPONICUS, Cuv. and Val. 4, 461, pl. 97.
" " Schlegel Faun. Jap. Pisces, 50, pl. 22, f. 1.
" CATAPHRACTA, Bleecker, Bijdrage, p. 5.

PLATE VI, fig. 6. Life size.

NOTES.—From Simoda. ($2\frac{1}{4}$ inches.)

Thunberg first brought home a specimen of this curious fish, whose proper place in the systems has not yet been determined by the scale of affinities. His specimen served for his own, and for

Houttuyn's descriptions. Schneider and Lacépède, as well as Gmelin, copied their descriptions from the above authors. Tilesius, who accompanied Krusenstern, describes it himself in the *Denkschiften der Münchner Acad. for* 1811–12, vol. III, p. 71, in a memoir entitled, *Abbildungen und Beschreibungen einiger Fische aus Japan*, &c.; and Messrs. Cuvier and Valenciennes describe it from his specimens also, without giving him credit for the above account of it. Tilesius seems to have given it the name of *Ericius*, according to a curious note in the Mem. de la Soc. Imp. des Nat. de Moscou; Tom XI, p. 243, where he criticises Bloch's description.

The figure herewith given is probably that of a young specimen, though it varies in the number of rows of scales, great height of body and colors, from the species as hitherto figured. Each scale on its centre is of a bright vermilion, and the fins are all of the same color. The joints of the scales form a net work of black lines. The margin of the mouth, border of suborbital and opercles are also black. The caudal forked, as in the Faun. Jap. In the Hist. des Poissons, it is said to be rounded.

Matskasa, the native name, means a pine cone or pine nut, which it indeed resembles in its external covering.

20. DIAGRAMMA CINCTUM, Schlegel.

D. CINCTUM, Schleg. Faun. Jap. 61, pl. 26. fig. 1.

NOTES.—From Simoda, (8 inches.)

From the imperfect drawing brought home by the Expedition, the following description has been made. Length, 8 inches. Height a little less than three times in total length. Head four times in the length. Eye five times in length of head. Profile sloping from the occiput in a straight line, at an angle of 45°. Lips very fleshy. First dorsal, with 12 spines, third longest, and not quite half the height of body. Caudal, slightly emarginate.

General color of body and fins leaden blue, darker on back of head and body, nearly white beneath. Stripes as in figure quoted. Irides silvery. Back sparsely dotted with oval spots of darker color, a few only below the lateral line. None over the head and shoulders. Dorsal and caudal spotted in same manner.

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21. AMPHIPRION FRENATUS, N. S.

PLATE VI, fig. 4. Life size.

NOTES.—From Lew Chew. (4¼ inches.) D. 12, (?) A. 17, &c.

This well marked species seems to be undescribed. It has been placed under the genus Amphiprion, though from the twelve dorsal spines noted in the drawing, and the smooth opercle, it may, perhaps, be a *Pomacentrus*.

If it have seventeen anal rays as noted, probably three of them are spinous, which would bring it nearer to *Glyphisodon*.

Its height is two and a half times in the total length, outline regularly arched above and below, spinous dorsal rising slowly to the soft dorsal, without break in the outline. Anal of subequal height. Caudal with rounded lobes and slightly emarginate. Color rich dark violet

or purple, over nead and back, extending low down on the sides, and as far as end of soft dorsal. Snout, breast, abdomen, and base of tail, a bright orange red, rather paler on the fins. The soft dorsal and caudal shading off into yellow on the margin. A distinct bright ultramarine blue stripe extends from the base of the first dorsal spine obliquely forwards under the eye, and over the preopercle, narrowing as it descends, and terminating near the throat.

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22. GLYPHISODON VIOLACEUS, N. S.

NOTES.—From Lew Chew. (4 inches.)

This seems to be a *Glyphisodon*, but the drawing is not distinct enough to determine its genus. Its height is $2\frac{1}{4}$ times in the length, regularly arched above and below, with subequal dorsal and rather deeply forked caudal. Fins and scales rather large. Rays cannot be counted. It is of a uniform dark dusky violet over the whole of the body and fins, darkest on the back; but without any bar or spot besides. Irides silvery.

The *G. melas* of Kuhl and Van Hasselt, (Cuv. and Val. V, 472,) comes near it as far as can be determined by the description. Their *Pomacentrus littoralis* seems also to agree with it in color, &c.

Bleecker has described many new species of *Pomacentri*, and other allied genera, from Sumatra, &c., but none of these appear to be identical with this species.

Diengkitsch calls it *Ya-ha-gi*.

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23. GLYPHISODON SMARAGDINUS, N. S.

PLATE VI, fig. 3. Life size.

NOTES.—From Lew Chew, ($3\frac{1}{4}$ inches.)

This species resembles the *G. coelestinus* of Solander, (Cuv. and Val. V, 464, pl. 135,) in shape, and were it not for its decided green hue I should not hesitate to class it with that species, which appears to be common in those seas.

Its height is only twice in its length; the dorsal spines appear to be twelve in number, and longer than in *G. coelestinus*, which has thirteen. The other fins as in that species.

Color of a general verdigris green, paler beneath, and very dark on back and spinous dorsal. Three or four bars of dark green across the sides, of which three are under the dorsal, and one on the tail. Irides green also.

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24. ETROPLUS FUMOSUS, N. S.

PLATE VI, fig. 1. Life size.

NOTES.—From Lew Chew. ($1\frac{3}{4}$ inches.)

This seems to be an *Etroplus* from its general form and great number of anal spines, which were not counted. Its height is twice in its length; outlines regularly arched. Dorsal and

anal with even outline and low. Ventrals pointed. Caudal slightly forked with pointed lobes.

Color over whole of body and fins, except the caudal, of a sooty blackness; a broad band of dull dusky violet under the breast, extending to the base of pectorals. Caudal pale yellow. Irides same color.

Diengkitsch recognized this fish and called it *Sumikak-owoo*. *Sumi*, soot or charcoal; *kakf*, to scrape; *owoo*, as before mentioned, means fish. *Sumikak* is the smoke black scraped from the bottom of an old kettle.

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25. LETHRINUS MINIATUS, Forster.

SPARUS MINIATUS, Bloch, Schneid. 281, (ex fig. J. R. Forster.)
LETHRINUS MINIATUS, Cuv. and Val. VI, 315.
" HÆMATOPTERUS, Schleg. Faun. Jap. 74, pl. 38.
" " ? Richardson, Zool. Sulphur. Icthyol. p. 144, pl. LXIV.

NOTES.—From Lew Chew. Size much reduced.

There seems to be no specific difference between Forster's fish, which is fully described in Bloch's Systema, (Ed. Schneider,) and the *hæmatopterus* of the Fauna Japonica. The drawing brought home by the United States Japan Expedition is identical with the one given by Schlegel.

The native name, *kutsi-butai*, means smooth forehead.

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26. DITREMA TEMMINCKII, Schlegel & Bleecker.

DITREMA ————, Schleg. Faun. Jap. 77, pl. 40, fig. 2.
" TEMMINCKII, Bleecker. Nalez. op. de Ichth. van Japan.

NOTES.—From Hakodadi. (9 inches.)

Hakodadi is in latitude 41° 49′ N., and is one of the most northerly ports of Japan.

The genus *Ditrema* was established by Schlegel upon the examination of two stuffed specimens and a native figure of a fish which offered the peculiarity of two anal orifices. Schlegel suspected that the second orifice was connected with the organs of generation. His description is here given in a condensed form. He gave the fish no specific name. After stating that it appears to belong to the *Menidae*, and comes near *Caesio*, he remarks upon the curious double anal openings, indicated also in the native drawing.

"Height two and a half times in the length; upper and lower outline arched, the upper one slightly inflected at the anterior insertion of the dorsal. Head rather small, conical, with slightly concave profile. Eyes of medium size, and vertical. Nostrils close to upper part of snout. Mouth small and narrow, somewhat protractile, with fleshy lips. A single row of small conical teeth in both jaws, set sparsely, and only on their anterior portion. Angle of the vomer projecting, but smooth, and like the palatines toothless. Angle of opercle obtuse, and like the pre-opercle smooth on the margin. Lateral line parallel to the back. Scales deciduous, smooth, of medium size, covering the opercles and forehead. Dorsal and anal with long bases and the soft rays numerous and closely crowded. Spinous dorsal much

lower than the branched portion, and increasing gradually in height from the first spine, which is half the length of the last. Anal fin with the short spines increasing in length from the first to the third, the soft rays longer than the spines, and divided into two portions, the first shorter than the last. Caudal broad at the base, and rather deeply emarginate. Pectorals and ventrals of medium size, and with no particular characters. Anal opening half way from first anal spine to the membrane attaching the ventrals to the body. Behind it a peculiar orifice, before mentioned. B. 6? D. 10, 22; A. 3, 27; P. 19; V. 1, 5; C. 19."

"When fresh, of a dirty pale bluish; lighter on sides, and white beneath. Lips pale flesh color. Pectoral of a bright light brown hue. Spinous dorsal of a brownish grey, with dirty yellow along the base, and with a rather broad blackish border. Soft dorsal and anal fins of a dirty greyish brown. Caudal blackish. Ventrals blackish green, yellowish at base of soft rays. Irides silvery white."

"This species does not exceed eight or nine inches in length. The Japanese name is Tanago. Caught in the spring in great numbers in the Bay of Nagasaki, and eaten daily at that time."

The figure by the artists of the United States Japan Expedition is identical with the one in the Fauna Japonica, though rather darker in coloring. It does not show the specific characters distinctly.

Bleecker, in a paper published in the 25th part of the Transactions of the Batavian Academy of Arts and Sciences, entitled Nalezingen op de Ichthyologie van Japan, characterizes the genus Ditrema as follows:

"Dentes maxillis minimi pluriseriati antice tantum aliquot conici majores; dentes vomerini vel palatini nulli; rostrum in tubum subhorizontalem protractile; ossa opercularia et suborbitalia edentula; pinna dorsalis unica; aperturae analis et genitalis distantes; pinna analis spinis 3, radiis numerosis subsimplicibus; membrana branchiostega radiis 6." He gives the species the name Temminckii.

He examined one specimen only, and places it between *Caesio* and *Gerres*.

Neither Schlegel nor Bleecker had suspected that this fish belonged to the interesting family of viviparous fish recently discovered on the opposite shores of the Pacific in California.

Upon showing the published figure of the Ditrema, and the figure of it by the American artist, to Diengkitsch, he immediately described its viviparous faculty, and added that it has a way of escaping from the fishermen's nets by keeping close to the sides of a rock or bank. He confirmed the name Tanango given to it in the Fauna Japonica, which is the name of a peculiar net, perhaps used for catching it. In the Notices et Extraits des Manuscrits, Tom. XI., part I., 1827, there is a notice of Japanese encyclopedias, by Mons. Abel Remusat, a highly interesting paper, in which a Japanese fount of letters is used for the first time. In the list of fish, page 216, No. 37, is one called in Chinese *Ju* or *Lian*, in Japanese *Tanako*, "a fish which swims in pairs;" and in a foot-note Mons. A. R. says: "It is asserted that this fish is viviparous, and the same in the case with the species called *Anagaiwo, Ei, Same, Heka or Fuka, and Sakataiwo.*" These five names seem to designate particular species of eels or lampreys, plaice, dog-fish, (*acanthias?*) cat-fish, (*silurus,*) and for the last, apparently, a bream, or perhaps another variety of Ditrema. This very interesting note, the authority for which is not given, induced me to compare the Ditrema with a specimen of the California viviparous fish procured by Dr. John L. Leconte in that country in 1851, and with the descriptions of the Embiotocoidae and Holconoti, by Agassiz, Gibbons and Girard, in the Am. Journal of Sc. and Arts, in the Proc. of the Acad. of Nat. Sc. of Philadelphia and of the Boston Soc. of Nat. Hist.,

when no doubt remained on my mind that species of the same family of fish were thus proved to occur on the Asiatic coast of the Pacific also. Without an examination of a specimen, it would be difficult to place the Ditrema in the above families. It will probably be found to constitute a new genus under one of them, and no doubt other species will be discovered.

27. HENIOCHUS MACROLEPIDOTUS, Cuv. and Val.

CHAETODON ACUMINATUS, Linn. Mus. Ad. Fred., pl. 33, fig. 3.
" MACROLEPIDOTUS, Bloch. pl. 200, fig. 1.
" " Seba. Thesaurus. III, pl. 25, fig. 8.
HENIOCHUS " Cuv. and Val. VII. p. 93 and 98.
" " Faun. Jap. 82, pl. 44, fig. 1.
" " Bleecker. Verh. Bat. gen. Tom. XXIII.

PLATE VI, fig. 2. Natural size.

NOTES.—From Lew Chew.

This fish has been figured by Vlaming, Renard, Ruysch, Valentyn, &c. There appear to be several varieties of it, which may prove to be different species on actual comparison of specimens. The figure herewith given varies from the one in the Fauna Japonica, having the whole snout black, which is stated in the Hist. des Poissons to be sometimes the case. The second black band does not touch the opercle, and the third unites with the second under the spinous dorsal. According to the figure, the dorsal fin has 10.24 rays. The fourth and fifth dorsal spines are much shorter than in the Faun. Jap. It seems to belong to the variety called *acuminatus*, by Linnæus. The name in the Faun. Jap. (*Kohatatate*) signifies small flag fish, or fish with a fin like a mast, that can be raised or lowered.

28. HOPLEGNATHUS FASCIATUS, Richardson and Schlegel.

HOPLEGNATHUS FASCIATUS, Rich. Report fifteenth meeting Brit. Assoc. p. 247.
" " Bleecker Bijdrage &c., p. 6.
POISSON PERROQUET NOIR, Krusenstern; Atlas. 52.2, (fid. Schleg.)
SCARODON FASCIATUS, Schlegel Faun. Jap. p. 89, pl. 46, fig. 1 and 2.

NOTES.—From Simoda. (21 inches.) *Kendi* on *Kandai*.

The drawing is so nearly like the figure in the Fauna Japonica that it seemed unnecessary to reproduce it.

Richardson founded this genus on a fish from Van Diemen's Land, and describes it as *Oplegnathus Conwayi* in the Proceedings of the Zool. Soc., 1840, p. 27, and in full detail as the *Hoplegnathus Conwayi* in the Transactions of the same society, vol. III, p. 145, pl. 7. In the Report of the fifteenth meeting of the British Association at Cambridge, in 1845, p. 247, he enumerates three species from China and Jupan, viz: the *H. fasciatus* and *punctatus*, of Schlegel,

and *H. maculosus*, a new species from Canton, on the authority of Reeve's and Hardwicke's drawings. In the Fauna Japonica Schlegel makes a new genus (*Scarodon*) to receive the two species from Japan, and gives to one of them the name it had previously received from Richardson, without being aware of his notices of it. He corrects it however in a note to the Index.

The exact place which this genus will occupy has not been determined by the above authors. Its interior anatomy, teeth, &c., will have to be consulted for that purpose. Bleecker, as above quoted, had two specimens, which being damaged, could not be examined in order to settle the question. He thinks this genus will stand at the head of a new family allied to the *Sciaenoids*, *Chaetodontoids* and *Scaroids*. He characterizes the family *Hoplegnathoidei* thus: "*Dentes maxillares ut in scaris. Ossa pharyngealia inferiora libera, non unita. Pinnae dorsalis, ventrales analisque spinosae.*"

Kandai means winter. In the Faun. Jap it is called *Hiza*.

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29. ZEUS JAPONICUS, Cuv. and Val.

ZEUS JAPONICUS, Cuv. and Val. 10, p. 24.
" " Schlegel, Faun. Jap., p. 123, pl. 66 A.
DORÉE OU MIROIR DU JAPON, Tilesius, Krusenst. Atlas, pl. LXI, fig. 1.

NOTES.—From Simoda. (22 inches.)

The Japanese Zeus appears to resemble the European *Zeus faber* very closely. It seems to have a few basal spines less near the dorsal and anal fins than the *faber*. The drawing shows only six spines on each side of the soft dorsal, and six near the soft anal. Schlegel gives about the same number. Judging from the figures, it would seem that the profile from the dorsal to the snout is much more arched, particularly near the snout, than in the *Z. faber*, whose profile is nearly straight. The figure in the Faun. Jap. does not show the dorsals sufficiently separated, and is not colored from life. In the Hist. des Poissons its colors, given from a Japanese painting, are nearly correct.

The present drawing shows the fish of a pale dusky purple over the head, with opercles rather darker. Back and part of sides dark dusky purple, with three or four darker stripes, broken in one or two places, and extending from the shoulder to near end of anal fin. Upper stripe broad, but indistinct, following curve of back; next one more distinct, narrow, and also parallel to back; third (a fragment only,) under anterior portion of second; the last extending around upper part of the great lateral spot, like an eyebrow, and with a little extension on each end. Spinons dorsal and anal also dark, the first with a broad darker band across the rays, inclining downwards. Back of ventrals and margin of caudal also of same dark color. Sides below the spot yellowish; pectorals, soft dorsal, and anal, with base of caudal same. Irides pale yellow. The large lateral spot is nearly circular, larger than the eye, of a dusky blue, with a well-defined dusky ring around it darker than the four stripes above it. Schlegel describes another species, the *nebulosus*. He gives no native name for either of them. Diengkitsch calls it *mati-owoo*, meaning target fish, an appropriate name.

30. CLINUS POLYACTOCEPHALUS, Pallas.

BLENNIUS POLYACTOCEPHALUS, Pallas, Zoog. Ross. Asiat. III, 179.
GUNELLUS " C. and V. 11, 448.

PLATE VII, fig. 4. Reduced.

NOTES.—From Hakodadi, (12 inches,) D. 61, A. 46, P. 13, C. 13, (Gashinagi.)

From the drawing, it would be difficult to pronounce this positively a Gunellus; but Mons. Valenciennes, in the Hist. des Poissons, places it in this genus, though only from the description of Pallas, which is as follows:

"*Species anomala.*—BLENNIUS POLYACTOCEPHALUS.

"*B. pedunculis quatuor supraciliaribus uniramosis majoribus, verticis octonis simplicibus.*

"*Specimen anomali hujus piscis, inter alia curiosa e Camtschatca transmissum, siccatum, sine ulteriore adnotatione accepi, et sic descripsi:*

"DESCR. *Longitudo pedalis, forma Bl. vivipari et corpus aeque molle ac fluxum, squamulis minutis, mollibus tectum. Caput retusum, brevissimum, subtetragono-convexum, maxilla inferiore longiore, utraque plane edentula. Frons inter orbitas approximatas, majusculas, depressa, spinulis* 2. *cartilagineis, minutis in medio, una pone alteram; in utroque supercilio pedunculi duo cartilaginei, cathetoplatei, postico margine acutiores, uniramosi, quorum posteriores paulo majores, crassioresque. Vertex pone orbitas subexcavatus, quasi muricatus cirrhis cartilagineis erectis, in duplici serie octonis, quorum postici, iidem et exterius positi, uniramosi. Praeterea apophyses aliquot molles per operculorum discum sparsae: Opercula subtriangula, postice acuta; flabella radiis sex osseis, teretibus, arcuatis, quorum proximus sub operculo adnatus. Corpus compressum. Pinna dorsi non longe a nucha incipiens, fere ad caudam continua, radiorum* 60. *P. ani bipollicari fere intervallo ab ano, ad ipsam caudam continuata, postice in laciniam productiuscula. Candae pinna subaequalis, radiorum* 13."

The drawing seems to have less tentacles on the head; but some of these have, no doubt, been overlooked by the draughtsman. In its size, form, and number of rays, it corresponds exactly with the species noticed by Pallas. The fin rays seem to have been carefully counted, and are D. 60, A. 46, P. 13, C. 13, V.? It has distinct ventrals, though they were not noticed by Pallas.

The fish seems high for a Gunellus, and may, perhaps, belong to a new genus. The *Bl. alectorolophus* of Pallas (p. 174) is either a young of this species or one belonging to the same genus.

COLORS. Head and body olive brown, mottled or clouded in irregular darker bands on sides, with three still darker bands across middle of body, over anterior part of anal, reaching from dorsal to anal. Irides pale dull yellow. Back dark, abdomen leaden grey. Body along base of anal mottled for half its length, and tinged towards tail with brick-red. Head brownish, tinged with red, and less mottled than body. Pectorals dusky blue, tinged with brick-red around margin. Dorsal very dark dusky olive, of rather uniform tint. Anal dull leaden grey, paler along the base. Caudal brick-red, with very broad, dark, dusky, irregular bands across the middle, and margined irregularly with same.

31. GUNNELLUS DOLICHOGASTER, Pallas.

BLENNIUS DOLICHOGASTER, Pallas, Zoog. Ross. Asiat. III, 175.
GUNNELLUS " C. & V. 11, 436.

PLATE VII, fig. . Reduced.

NOTES.—From Hakodadi, ($9\frac{1}{4}$ inches, D. 95, A. 42, P. 10, C. 10.

This fish is described as follows by Pallas: " BLENNIUS DOLICHOGASTER. Tab. XLII., f. 2.*

B. pinna ani corpore dimidio breviore, verrucis osseis loco ventralium, cauda pinnis coadjuncta. Circa insulas Americae vicinas, aeque ac circa Camtschatcam observatur, interdum et in lacubus maritimis. D. D. MERK.

DECSR. *Fere pedalis, crassitie digiti, compressus. Caput oblongum, compressum, rostro retuso brevissimo. Os adscendens, maxilla inferiore longiore, sursum claudenda, urtraque denticulis distantibus, obtusiusculis, in apice maxillarum paulo majoribus et duplicato ordine positis. Oculi ad verticem laterales, angusto spati dirempti, margini oris proximi, iridibus aureis. Opercula branchiarum oblonga, laevia, postice subacuta; Flabella branchiostega quadriradiata, subtus cute coaduncta. Corpus longissimnm, compressum, lubricum, squamis minimis, mollibus, sparsis punctatum; lineae laterales obsoletissimae; anus pone dimidium longitudinis, sed abdomen ovariis plenum pone anum productum, longissimum inter congeneres et ventricosus. Color olivaceo fuscus, virescente flavoque nebulosus supra lineam lateralem viridi maculatus, in ventre longitudinaliter fulvus; pinnae ani et caudae fulvsecentes, pectorales flavescentes, dorsalis fusca tranversis fasciis pallescentibus, ad dorsum perpendicularibus, distantibus, quales et in p. ani. P. pectorales minimae, ovatae duodecimradiatae loco ventralium verrucae osseae e cute prominulae. P. dorsi longissima, non longe a nucha incipiens, radiis rigidis, intra cutem spinosis* 93. *cauda coaduncta; p. ani radiorum* 52. *pariter pinnae caudae continuata; radiis* 2. *primis aculeatis, reliquis inermibus. Cauda brevis, rotundata,* 20. *radiorum. In specimine: longitudo toto*† *11.″ caudae 6.′″ capitis cum operculis 1.″ ½.′″ a summo rostro ad pin. ani 5.″ 8.′″ altitudo corporis ad nucham 9.‴ in medio alvi ultra 1 poll. post initium pinnae ani 10′″.*"

Except in the count of fin rays the description applies very accurately to the drawing. It, however, has not the greenish spots above the lateral line alluded to by Pallas, and no distinct bars across the dorsal. General form that of a Gunellus, but high for its length, the abdominal outline sinuous. Dorsal very low, anal twice as high as dorsal. Both these fins joined to caudal, which is rounded. Ventrals represented by a recumbent spine.

The colors of the drawing are of a dull olivaceous green over head and body, rather lighter below the lateral line and underside of head, with a well marked stripe of burnt sienna along the abdomen from the head to anus. Irides yellow. Dorsal of a dusky umber brown, lighter along the base. Pectorals bright orange. Caudal dusky orange. Anal bright carmine red, with nine white bars running obliquely across it from the margin towards the tail, each bar crossing four or five rays, and widening as they approach the base; the last bars less distinct.

* The plates accompanying this great work were lost by the failure of the person entrusted with their engraving in Leipzig; six plates only, representing mammalia, accompany the work, which was printed in 1811 and published in 1831. A few plates have since been added to the illustrations.

† Pallas elsewhere states that he uses English measures.

32. CALLIONYMUS VALENCIENNEI, Schlegel, Faun. Jap., &c. 153, pl. 78, f. 3.

NOTES.—From Lew Chew, 5¾ inches, No-migutsi.

The drawing corresponds exactly to the description of the above species by Schlegel. The name given to it at Nagasaki, *Tengurikutsi*, seems to mean that it has a mouth like the net called *Tenguri*.

The name given to it on the drawing, *Nomigutsi*, means chisel mouth.

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33. JULIS POECILEPTERUS, Schlegel, Faun. Jap., &c., 169, pl. 86. bis. fig. 1.

JULIS POECILEPTERUS, Richardson, 15th meeting Brit. Assoc., 1845, p. 260.

NOTES.—From Simoda, 9⅝ inches, Bera.

Besides the description of the above fish in the Faun. Jap , Richardson gives another one in the report above quoted. Both these authors give the colors, which are much variegated, and appear to vary in different specimens.

The Japanese name *Kusabi*, or *Kfoosabi*, means that it is of a grass-green color. At Simoda it seems to be called *Bera*, from a note on the drawing.

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34. JULIS LUTESCENS, Solander.

LABRUS LUTESCENS, Sol. mss.

JULIS " E. T. Bennett, Zool. Beechey's Voy. Blossom, Fishes, p. 65. pl. 19, f. 2.

PLATE VIII, figs.3 and 4.

NOTES.—From Napha, Lew Chew, (6⅝ inches,) D. 7. 13, A. 2. 7, P. I4. Operculum smooth, teeth interlacing, long retractile mouth.

Though varying in some respects from the description of Solander, this is certainly the same fish. He observed it also at Lew Chew and Tahiti. His description as quoted by Bennett is as follows:

"*Piscis lutescens, strigis numerosis rubicundis transversalibus. Caput viridi lutescens, areis pluribus latis rubicundis. Abdomen virescens, vittis duabus luteis. Pinna dorsalis e viridi-lutescens, vittâ paulo infra medium croceâ, limite superiore coeruleo. Pinnae pectorales lutescentes, apicibus nigris. Pinnae ventrales lutescentes. Pinna ani viridi-lutescens, basi croccâ, limite coeruleo. Pinna caudae e flavo lutea, vittis marginalibus croceis. Iris argenteo virescens. Pupilla nigra.*"

The figure published by Bennett is taken from the one brought home by Solander. It does not agree with the description, particularly in wanting the numerous cross bands of red. Mr. Bennett adds, that the Zoological Society has received specimens from the Mauritius, which however will probably prove to be the *Julis annulatus*, Val., vol. 13, p. 501, pl. 388, from that Island.

The figure brought home by the U. S. Expedition is not a very good one, but is interesting as having been taken from life.

35. JULIS QUADRICOLOR, Lesson.

JULIS QUADRICOLOR, Lesson, Voy. Coquille, Poissons, pl. 35. Tahiti.
" " Hist. des Poiss., 13, p. 443.
LABRUS ERYTHROGASTER, vel FORMOSUS, Sol. Ms. Tahiti.
JULIS " Hist. des Poiss., 13, 447. Ulea.
LABRUS CYANOGASTER, Sol. Ms. Tahiti.
JULIS " Hist. des Poiss., 13, 444.
SCARUS QUINQUEVITTATUS? E. T. Bennett, Voy. Blossom, Fish., p. 66, pl. 19, fig. 3, Lew Chew.

PLATE VIII, fig. 2.

NOTES.—From Simoda, (6 inches.)

With but slight variations in color all the above synonyms seem to be referable to one species.

The colors on the drawings are as follows: Of a general uniform rich indigo-blue, with strong tinge of green on sides of head, back above lateral line, and caudal. A stripe of carmine runs from the snout through the eye, becoming bifid behind it; the upper portion short, the lower one declining and reaching to below the tip of opercle. A short stripe runs back to beneath the eye from the corner of mouth. Two spots or bars above the eye, and a bar from occiput along upper margin of opercle. All these markings are carmine. Three parallel series of scales on upper part of sides are spotted with red, and a stripe of same runs from the axilla of the pectorals back to above base of anal. Membrane at base of pectorals and caudal red also. Balance of caudal rich green. Pectorals violet-blue. Dorsal and anal of same violet-blue with a stripe of green, and a narrow edging of red. There is no yellow on the figure, though the green may, in some specimens, run into that color.

There is but little difference in form between most of the *Julidae*, and the species are distinguished by their coloring from each other; an uncertain character and one leading to much confusion. Some particular organ might be selected whose minute differences would serve to fix the species.

36. GOMPHOSUS FUSCUS, Val. Hist. des Poiss., 14, p. 25.

NOTES.—From Lew Chew, (5½ inches.)

The figure corresponds in form and coloring with the first description given in the Hist. des Poiss., with but little variation. There is no spot on the anal, and the black stripe through the eye does not reach the end of the snout.

M. Valenciennes describes other varieties with bright colors. He gives the whole Indian Ocean and Tahiti as its habitat.

37. CHEILIO HEMICHRYSOS, Val. Hist. des Poiss., 13, p. 351.

CHEILIO AURATUS, Quoy, Voy. Uranie, 274, pl. 54, fig. 2.

NOTES.—From Lew Chew, life size 9 inches.

This drawing corresponds to the description above quoted; the general color brown, white under head and breast, light brown under body, with series of distinctly marked black dots along the lateral line. The specimens seen by M. Valenciennes were from Tahiti.

38. HIPPOGLOSSUS OLIVACEUS, Schlegel, Faun. Jap., &c., 184, pl. 94.

NOTES.—From Yedo Bay, life size 8¼ inches.

The Japanese name *Makarei*, in the Faun. Jap., by which it is known at Nagasaki, is also given to it at Osaka. *Karei* is the local name given to the *Platessoidae*.

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39. SYNAPTURA OMMATURA, Rich.

SOLEA OMMATURA, Richardson, Rep. Brit. Assoc., 1845, p. 279.
SOLEA ZEBRINA, T. and S., Faun. Jap. Pisces, 185, pl. 95, f. 1.

NOTES.—From Simoda, (4¾ inches;) cow's tongue—Simushinoshta.

This drawing agrees with the above quoted figure, except that the caudal markings are orange. Richardson is no doubt right in supposing this species to be distinct from the *Solea Zebra* of Bloch. Bleecker doubts it, and classes it in his "Nalezingen op de Ichthylogie van Japan," (1853,) p. 19, under the old specific name but in his genus *Synaptura*. In his paper on Pleuronectidae, (1852,) p. 17, he observes that it seems only to be a local variety of the *Zebra*. As he however had not seen the fish, while Richardson had compared specimens of those allied species, it seems but proper to adopt the specific name of the one and the generic name of the other of these distinguished Ichthyologists.

It bears the same local name in the Faun. Jap. as that above given. *Sim*, is "to dye;" *ushinoshta*, a "cow's tongue."

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40. PLAGUSIA JAPONICA, T & S.; Faun. Jap., Pisces, 187, pl. 95, f. 2

NOTES.—From Simoda, Ushinosta, 8½ inches.

The above distinct specific name is given to it in the Fauna Japonica, until it can be shown to belong to one of the described species of *Plagusia*, which are as yet not well characterized.

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41. SALMO PERRYI, N. S.

PLATE IX, fig. 1. Reduced.

NOTES.—From Hakodadi, May and June, (33 inches,) D. 11, A. 11, P. 15, V. 8, C. 25.

After a careful comparison of this figure with all the species of salmon from the Pacific described by Pallas in his Zoographia, or by Valenciennes in the 21st volume of the Histoire des Poissons, this fish would seem not to have been described before. It resembles the *S. Purpuratus* of Pallas in some points, and may be an adult specimen of it; but the Pacific salmon are not well known, and no one species has been placed on a sure basis. Pallas, Richardson and Valenciennes describe some twenty-five distinct species from the Pacific, which number will probably be reduced considerably. The surveying expedition to the North Pacific, under Commander John Rodgers, has brought home 550 species of fish, among which many Salmonidae

must occur; and these collections will probably assist in clearing up the confusion now existing in this group.

The Salmo herewith figured has been named after the able commander of the United States Japan Expedition, to whose efforts alone we owe the scanty yet interesting zoological collections and drawings, made under disadvantageous circumstances, while the squadron was in those distant seas.

In its general form and coloring it resembles the *Salmo hamatus* of Europe, and the New Brunswick salmon of North America,[1] and no doubt is the representative of that type in the Pacific, the figure having probably been taken from a female.

Head large and thick, four and a half times in total length of fish. Jaws very strong and thick, the upper one rather pointed, with stout curved maxillaries, the lower one longest when depressed, with a strong curve upwards. Teeth strong and recurved. Profile from snout to occiput nearly straight, curving thence gently into the dorsal outline, which is straight also to behind first dorsal. Abdominal outline not prominent, but gently tapering to base of caudal. Height of body in front of dorsal $\frac{5}{6}$ of length of head; at base of caudal $\frac{1}{3}$ of same. Eyes small, $\frac{1}{12}$ of head. Opercles rounded, branchial rays stout. Scales distinct and rather large, but too distinctly marked in the engraved figure. Lateral line straight. Fins large, with pointed lobes. Anterior base of dorsal slightly nearer to snout than to margin of caudal. Second dorsal large, for the fish. Pectorals and ventrals long and pointed. Anal under adipose dorsal. (Both these fins seem, in the drawing, to be too near to the base of the caudal.) Caudal with broad pointed lobes, posterior margin deeply emarginated and indented at the centre.

Proportions, from the original drawing, in hundredths of total length, measuring from snout to centre of margin of caudal:

Height of body at pectorals	18.00	Base 1st to base 2d dorsal	31.00?
Height in front of dorsal	19.00	Second dorsal long	5.00
Height at base of caudal	7.00	Snout to base ventrals	53.00
Snout to margin opercle	22.50	Ventrals long	16.00
Snout to orbits	7 50	Base ventrals to base anal	25.00?
Diameter of orbits	2.00	Anal long	14.00
Pectorals long	15.00	Snout to end scales on lat. line	95.00
Snout to first dorsal	46.00	Lobes of caudal	16.00
Anterior rays long	17.00	Emargination of open caudal	6.00

Colors: Dusky along the back of head, and becoming blue on the opercles, and dirty white beneath. Margin of lower jaw bluish dusky. Back of head, snout, opercles and maxillaries, covered with round, irregular sized blackish spots, rather closely set. Eye golden yellow. Back dusky, soon however fading into dirty purplish red on the sides, which on the under parts fades again into dirty white. The dusky back and colored sides are covered with blackish spots of irregular form, smaller than those of the head and rather more sparsely distributed. Lower part of dorsal spotted also. This and all the other fins are of a brownish black of rather uniform hue, the caudal inclining to brown. Ventrals and anal of a lighter shade, with their anterior rays lighter still.

[1] This salmon, if not identical with the *S. hamatus*, will form a new species. It has not been described or noticed by any author that has written on American Ichthyology. In October, 1856, large numbers of them, weighing from eight to fifteen pounds each, were brought to the New York market. The males invariably had straight and pointed upper, and hooked under jaws; the females, which were full of roe, had the jaws like the figure here published. It could not be confounded with the *Salmo Salar*.

42. SALMO ORIENTALIS, Pallas.

SALMO ORIENTALIS, Pallas, Zoog. Ross. Asiat. III., 367.
" " C. and Val. 21, 356.

PLATE IX, fig. 2. Reduced. (Named *Salmo masou* on the plate.)

NOTES.—From Hakodadi, May and June, (21½ inches,) Masou.

The *S. orientalis* of Pallas is a fish of large size, reaching to 60 pounds in weight, ascending large rivers only, in the months of April May and June, in great numbers. In Kamschatka it is considered the best food in the world, and it is a common saying there, "that he who has tasted the head of this fish will never wish to return to Russia."

Pallas's description, in brief, is as follows: "Resembling the *Salmo nobilis* (S. Salar. L.) in form, but broader. Head 4⅓ times in total length, conical, a little compressed. Jaws equal, and pointed, the lower one slightly recurved. Lips fleshy. Anterior lower teeth hooked. Triple series of teeth on palate,* a double row on tongue. Opercles large and rounded. Eye of medium size. Body slightly compressed, dorsal and ventral outline convex. Lateral line straight, rising towards the opercles. Scales large. Rays, B. 17; D. 12; A. 15; P. 16; V. 10. Dorsal with single rays in front. Ventrals with a thin scale at their base, nearly as long as the fins, carinate and bilamellate? (*carinata bilamellata*,) differing from any other species. Caudal large, crescent-shaped on margin. Colors dusky blue or black, abdomen white. Irides silvery. Head jaws and tongue dusky leaden blue. Opercles silvery blue. Dorsal and caudal spotted; adipose dorsal dusky. Pectorals dusky inside, bluish white outside. Anal bluish. Flesh, when fresh, red, often fulvous, becoming paler by coction."

Mons. Valenciennes, who examined dried specimens of this fish in Berlin, describes it as being "broader and thicker, in proportion to its length, (plus large et plus trapu,) than the common salmon, with jaws slightly curved, the upper one a little the longest. Outline of back and abdomen rather convex, of a silvery color, dusky blue on the back, and white beneath." He says of a drawing made in Kamtschatka by Mertens, from a female, that it was of an "ashy blue, darker on the back, sides and abdomen lighter, with a rosy-red tinge. Numerous crescent-shaped spots above the lateral line. Anterior margin of pectorals, ventrals, and anal pink." Mr. Mertens observed that the males have longer opercles than the females.

The drawing by the American draughtsman represents a fish formed as above described, with outline of back and head regularly arched. Height in front of dorsal nearly equal to length of head; at base of tail 3½ times in height of body. Head four and a quarter times in total length. (This is much larger than in the common salmon.) Head pointed, conical; upper jaw rather the longest, both armed with strong teeth. All the fins short and stout, with pointed tips and emarginated borders. Anal very small for the fish. Tail with pointed lobes, and regularly lunate. Dorsal wholly anterior to ventrals; anterior base of last ray half way between snout and edge of caudal. Adipose dorsal over front of anal, and of moderate size. Lateral line rises near the opercles. Scales rather small, but represented too large in the figure. Head dusky above, leaden blue on sides, with a few dark blotches; white beneath; tongue dusky. Irides silvery yellow. Body dark dusky, above the lateral line lighter, and tinged with purple

* The text of Pallas is, "*dentes in palato triplici series*," a vague expression, which seems to prove that he was counting the teeth on the palatines as two series, leaving one for the vomer.

on sides, and shading off rather abruptly below the lateral line into white, with tinege of red. Lateral line conspicuously placed on a narrow pale stripe from opercles to caudal. Dorsal and caudal almost black, ventrals and pectorals pale dusky. Anal dusky yellow.

The *S. Japonensis* of Pallas, (op. cit., p. 382,) from the Kurile Islands, of which he had two dried specimens, brought home by Merk, seems to resemble the *orientalis*, judging from the vague description of it by the Russian naturalist. Valenciennes (op. cit., p. 363) examined these specimens. One of them, he thinks, answers to Pallas's description, but still remarks that the species does not seem to be well founded. Had it resembled the *orientalis*, the distinguished French naturalist would have noted such a fact.

The name *Masu*, or *Masou*, seems to be a designation for salmon generally in Japan. Medhurst gives it as *Mas. Sake*, which also means "wine," is another name for it. The scientific names attached to those given in the Japanese encyclopedia by Mr. Remusat, in his notice of this work, are not always correctly applied, as the rough native figures seem to have been his only guide. The name of number 21, in book 49, page 8, is "*Kamasu*, in Chinese *Sotseuiu*, poisson navette,) *esox sphyraena*, murène." No doubt a salmon was represented in the accompanying figure. *Kamasu* seems to signify a "slender salmon." Kämpfer alludes to a fish under the name *Kamas*, which he calls a pike.

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43. SALMO (FARIO) LEUCOMAENIS, Pallas.

SALMO LEUCOMAENIS, Pallas, Zoog., Ross. Asiat., III, 356.
" " Val. Hist. des Poissons, 21, 243.

PLATE X, fig. 3. Natural size.

NOTES.—From Hakodadi Bay, (Lat. 41° 49′,) May and June. 8 inches.

This seems to agree with the descriptions above quoted, though it may prove to be a new species. The figure represents a fish of a uniform dusky blue, with tinge of greenish on the back, sides, and top of head, becoming silvery white on the lower parts of head and body. Large round spots of rather uniform size, and distinctly defined, are sparingly scattered over the whole of the back and sides. They are of a paler blue than the ground color, and become white below the lateral line, and are distributed in five rows, three above and two below the lateral line in irregular quicunx order. The largest are about $\frac{3}{4}$ of the diameter of the eye, or eight times in the greatest height of the body. The upper row of 6 or 7 run close to the back, beginning under the first dorsal; the second commences near the back of the head, and count nine to half way between the dorsals, where it unites with the third row. This numbers eleven spots, running parallel to the lateral line, with some confused spots on the base of caudal. The fourth row follows the under side of the lateral line and close to it, with about eight spots. The fifth is short, with five or six white spots, just distinguishable from the pale blue of the sides. Irides pale yellow, and tinges of same on opercles. The fins are all colored of a pale umber brown, the first dorsal being darkest. Ventrals quite pale.

In form it resembles a brook trout, the snout being rather blunt. The expression of Pallas, in describing its teeth, "*series in palato parallela*," may perhaps mean that it has a double row on the body of the vomer, in which case it would belong to the genus *Salar* as defined by

Valenciennes, (op. cit., p. 163,) who however, places it with *Salmo*, understanding the phrase of Pallas to refer to the teeth of the palatines only. The specimen examined at Berlin by M. Valenciennes had lost its tongue, palatines, and vomer. This question cannot, therefore, be settled from present data.

Pallas says of its habits, that "it is found in the Arctic sea as well as in the eastern ocean, in bays and estuaries, in great abundance, particularly in the spring, not ascending the streams a great distance. In the most northern waters it appears in the middle of June, when it is caught during the rest of the month. In the rivers of Kamtschatka, where it runs larger, it appears about the middle of April. It is a marine shore fish, not remaining long in fresh water, returning about the middle of May to the sea. It is one of the most palatable fish of its kind, either smoked or salted, and is brought under the name of *Somgha* from Archangel to St. Petersburgh and Moscow." This is a great range for one species of salmon. Pallas adds that it is generally a foot and a half in length; the largest of the eastern seas reaching to a yard and and a half. His specimen was almost seventeen inches long. In describing it, the principal characteristics given are as follows: "Resembling the common salmon. Snout rather obtuse. Lower jaw rather the shortest when mouth is closed, often hooked at the apex in the old Kamtschatka specimens. Large hooked teeth in the jaws, with a parallel series on the palate, and on the tongue a double row of large claw-like teeth, composed of six large ones, and a small one at the apex. Small rounded opercles. Twelve branchial rays. Body full, tapering, compressed, and with small scales. Lateral line straight, rising towards the head. Fins fleshy. Adipose dorsal small, narrow, dilaled at the end, with upper margin serrated, and placed behind the anal. Tail forked, with equal lobes. Fin rays. D, 1. 12, (rarely 11 or 12); A, 1. 10 or 11; P, 14; V, 9; C, 19. Color silvery; above and for a little distance below the lateral line bluish; back dusky, abdomen brilliant white. Orbicular white spots scattered (over body,) becoming greenish towards the back. The pectorals, ventrals, and anal, white; dorsals dusky. These colors are sometimes darker throughout. The flesh of the northern ones red; of the eastern ones white."

A comparison of the measurements given by Pallas, with the drawing, corresponds in several important parts so nearly that there can be but little doubt as to the identity of his *Leucomaenis* of Kamtschatka with the figure of the fish taken at Hakodadi.

44. SALMO ——. Young?

PLATE X, fig. 1.

NOTES.—From Hakodadi Bay, (6½ inches.)

This seems to be a young salmon of uncertain species. It cannot be a brook trout, the young of which are barred as in the figure, but which remain in fresh water, and lose these distinctive markings when three or four inches long. The young salmon of the first season, known as the *Parr* on the English coast, have the same bands, and it is no doubt a salmon of the Northwest Pacific, in this state, which was figured at Hakodadi.

The figure represents a gracefully proportioned fish with rather pointed jaws, the under ones longest; head four and a half in total length. Eyes large. Dorsal rounded in outline, with

13 rays. Caudal with pointed lobes, and deeply forked. Anal in the figure seems placed too far forward. Lateral line straight. Scales rather small and rounded.

Colors. Deep indigo blue on back of head and body, shading off on under side to white. Eight strongly marked bars of same color as the back, and equally spaced, extending vertically down on sides; the first and last ones not reaching the lateral line, while the intermediate ones just pass over it. A large blue spot on the lateral line just behind the opercles. Three smaller spots below the lateral line at unequal heights, but placed vertically under the spaces between the first four bars. These bars and spots are shaded around their margins. Dorsal pale blue, with membrane between tips of first six rays darker. Pectorals, ventrals, and anal, nearly colorless. Caudal pale dusky, with dark-tipped lobes. Lateral line lighter than body.

45. OSMERUS OLIDUS? Pallas.

SALMO, (OSMERUS) OLIDUS, Pallas, Zoog. Ross. Asiat., Vol. III, p. 391.

PLATE X, fig. 2.

NOTES.—From Hakodadi, ($6\frac{1}{4}$ inches. Ugoi.)

No species of smelt is described in the Fanna Japonica, and as the fish noticed in that work seem to have been collected around the southern shores of Japan, it is probable that it is not found so far south.

Diengkitsch pronounced Medhurst's name for the smelt, *Kisgo*, to be erroneous, and also said that *Ugoi* was not its true name. Ugoi, or Foogoi, means that it is not a carp, but he could not remember the name of the smelt.

Many Russian travellers have noticed smelt in the Pacific, and describe two species of Osmerus and one of Mallotus. (Vid. Kracheninnikow, Gmelin, and Pallas, op. cit., p. 386.) Mr. Collie appears to have met with two species of Osmerus in Awatscha bay, according to the notes on page 49 of the Zoology of Beechey's Voyage in the Blossom. Pallas seems to have supposed that the *Osmerus Eperlanus* and *Spirinchus* of Europe were also found in the Pacific, which M. Valenciennes (vol. 11, pp. 378 and 388) seems to admit, though the species can hardly have so wide a range. Pallas (op. cit.) describes an *Osmerus olidus*, as peculiar to the Pacific, which is not noticed or even quoted in the Hist. des Poissons. In the absence of more certain data, it it is assumed to be the fish herewith figured, though the species is said by Pallas rarely to exceed a length of four and a half inches. It is the first time that an *Osmerus* from the North Pacific has been figured. Specimens of this and of other species, if any exist, will no doubt be found among the collections brought home by the North Pacific Surveying Expedition.

46. CHATOESSUS PUNCTATUS, Temm. and Schleg.

CHATOESSUS PUNCTATUS, T. and S., Faun. Jap. Pisces. 240, pl. CIX., fig. 1.

NOTES.—Yedo Bay, April, 1854, Konoshiro, (8 inches.)

The drawing corresponds exactly with the quoted figure. The name given to the Herring in Medhurst's vocabulary is the same as the one marked by a Japanese on the figure. *Siro* or *Shiro* signifies "white."

47. CLUPEA MELASTOMA, Temm. and Schleg.

CLUPEA MELASTOMA? Schneider, (Bloch.,) 427.
CLUPEA MELASTOMA, T. and S., Faun. Jap. Pisces, p. 237, pl. CVIII., fig. 1.

NOTES.—Yedo Bay, (8¾ inches,) Isagi. The drawing indicates the dark dots on the lateral line very distinctly.

Though no drawing was brought home of the fish which is described in the Fauna Japonica (p. 236, pl. 107, fig. 2) as the *Clupea Micropus*, it may not be considered improper to put on record a few remarks concerning it, which may prove interesting as regards the geographical distribution of the *Clupeoidae*.

This Clupeoid has a smooth cylindrical abdomen without serratures, and evidently does not come under the genus Clupea proper. M. Valenciennes, in a supplement to the 20th vol. of the Hist. des Poissons, describes a fish which seems to have given him some trouble to place in its proper position in the family. He however puts it between *Butyrinus* and *Elops*, and names it *Dussumiera acuta*. It was brought from the coast of Malabar and Coromandel by Dussumier, but had been observed there previously by Leschenault and Sonnerat. M. Valenciennes adds that the *Clupea Micropus*, referred to above, may perhaps be of the same species, but that if distinct it would be a second species of his new genus.

Bleecker, in his "Nalezingen op de Ichthyologie van Japan," page 48, admits the close connection of the *Micropus* with *Dussumiera*, but separates it from that genus, owing to his having detected teeth on the vomer. He makes a genus *Etrumeus* to receive it, its Japanese name being *Etrumeiwasi*. It however seems to belong to Valenciennes' genus, who distinctly describes the vomer as having rudimentary teeth on some specimens. Bleecker describes, also, two new species of *Dussumiera* in his "Bijdrage tot de Kennis der Chirocentroidei," &c., page 12, from the Moluccas.

The most curious fact, however, in the geographical distribution of this new genus is, that the same, or a closely allied one, is found on the Atlantic coast of the United States. Dekay, in the Natural History of the State of New York, (Fish, p. 262, pl. 40, fig. 128,) describes a fish as the *Alosa teres*, of which he had only seen one specimen. It is, however not rare on our shores, where it is found in the lower bay or on the coast outside, in summer, in small numbers, near the surf, and is known to the fishermen as the round herring and bass-bait. Its size and form enable it to pass through the nets. This fish is closely allied to the genus *Dussumiera*, if not in reality belonging to it. M. Valenciennes, in the Hist. des Poissons, vol. 20. page 423, describes a herring found by Lesueur near Philadelphia as Dekay's *Alosa teres*. It is certainly not Dekay's fish, though it would be difficult to say where it ought to be placed. It has, besides other differences, 19 anal rays, while the *teres* is stated by Dekay to have but 12. In most of the specimens caught here but 10 were counted, rarely more, which makes it correspond to Schlegel's *Micropus*, which had but 8 anal rays. Its formula is as follows: P. 15, V. 8, D. 19, A. 10, C. 4, 19, 4. It requires to be redescribed, but enough is known of it to place it either in *Dussumiera* or very near it. It resembles Schlegel's *Micropus* more nearly than Valenciennes' *Dussumiera*, judging from the published figures of them.

48. BELONE GIGANTEA.

BELONE GIGANTEA, T. and S. Faun. Jap., p. 245.

PLATE VII, fig. 2. Reduced.

NOTES.—*From Lew Chew.* Life size, 46 inches.

This species is not figured in the Fauna Japonica, so that the rough figure herewith published may prove interesting. Messrs. Temminck and Schlegel seem to feel confident that it is distinct from the Indian species. It is said to attain a length of twelve feet.

49. HEMIRAMPHUS JAPONICUS. N. S.

NOTES.—*From Lew Chew.* Total length, 15 inches.

This very large Hemiramphus is not included in the Fauna Japonica, which contains but one Japanese species. In its general form and proportions it corresponds very nearly to the *H. Commersonii* of the Histoire des Poissons, (vol. 19, p. 28,) but has not its four large lateral spots, nor is it of a greenish gray color. It differs from the *H. Russeli*, (p. 32,) in having a more forked caudal, higher dorsal and anal, and in not having a red beak. Its beak is longer than that of the *H. Quoyi*, (p. 35,) but it resembles that species in having a deeply-forked caudal, and similar coloring, with the exception of the red beak. Bleecker, in his paper entitled "Bijdrage tot de kenniss der Snoekachtige Visschen, &c.," does not describe any species coming nearer to it than those above mentioned.

Its proportions, as taken from the drawing, are as follows: Tip of lower jaw to edge of opercles three times in the length from same point to centre of margin of caudal. Tip of upper jaw to edge of opercles half of last, or six times in total length. Height of head or body nine times, and origin of dorsal to centre of caudal a little less than one-fifth of same. Origin of anal to do. one-seventh, and origin ventrals three and three-quarters in same. Lower lobe of caudal six and one-quarter times in same distance, and upper lobe nearly one-third shorter, and much narrower. Eye two and a half times in height of body. Head and beak strong and stout. Body of equal height as far as ventrals. Pectorals pointed, and equal to height of body in length. Ventrals with emarginate border, first and last rays of equal length. Dorsal with first rays nearly as long as height of body, with emarginate border, and last rays quite short. Anal commencing under middle of dorsal, and resembling it in form, but smaller. Caudal so deeply forked that it appears separated in two distinct lobes. Lower lobe longest and broadest, both pointed. The scales large, and appear to resemble those of *H. Commersonii*.

Of a general bluish color, darkest on the back, and lighter below. A tinge of green on sides and upper lobe of caudal. A narrow stripe of green on middle of sides reaching from pectoral to caudal, with a broader stripe of pale silvery blue, tinged with greenish, bordering it on each side. Lower jaw dark indigo blue towards the tip, lighter towards the head. Fins all pale-bluish, caudal dark dusky blue. The scales on the back appear to have been darker on their margins.

This fish may be found to come under one of the species already known, when specimens of it can be examined, but it appears in many respects to be a distinct species. A figure of it would have been given had it not at first been considered as the well known *H. Commersonii*.

50. SCOMBERESCOX SAIRA, N. S.

PLATE VII, fig. 1. Reduced.

NOTES.—*From Simoda.* 11¼ inches, Saira-owoo.

This curious fish is evidently a *Scomberesox*, but in some points so different from the known species of that genus that it will perhaps be found to constitute a new one when specimens can be examined. No *Scomberesox* has been hitherto described as from Japan. The *S. Forsteri* of New Zealand, (Cuv. and Val., XVIII, 481,) seems to come nearest to it, but that fish has the usual prolonged mandibles of the others.

The body is regularly fusiform in profile, and probably cultrate in section; head and jaws tapering to a point; these last acute, of even length, and not prolonged, as in other *Scomberesocidae;* nostrils large; eyes large and round; head and body covered with rather large scales. Ventrals not indicated in the figure. Dorsal with nine or ten rays, a little in advance of the anal, both low and of subequal height, with five accessory finlets above, and four below. Lateral line indistinct. Caudal small, and deeply forked, with pointed lobes.

If the length (11¼ inches) from the snout to centre of caudal margin be divided into one hundred parts, the following proportions are found:

Jaws	4.50	Snout to ventrals	48.00?
Snout to eyes	9.00	Snout to dorsal	63.00
Diameter of eyes	3.00	Base of dorsal, long	10.00
Snout to opercles	21.00	Anterior rays of dorsal	5.00
Greatest height of body (at 40.00 from snout)	11.00	Snout to anal	64.00
Height over opercles	8.00	Base of anal, long	11.00
Height at base of caudal	2.00	Anterior rays, do	4.00
Snout to pectorals	22.00	Outer caudal rays	13.00
Pectorals long	7.00		

It will thus be seen that the jaws form but $\frac{1}{6}$ of the length of the head, that the whole head is but $4\frac{2}{3}$ times in the total length, and that the eyes are rather nearer to the snout than to the opercles—in all which it varies from all others of the genus.

Colors.—Back of head and body dark greenish blue, becoming lighter on sides of head and body and white beneath, as far as the anal. Irides pale green. Pectorals dark dusky blue, dorsal and caudal dull green, finlets dusky blue, anal pale dusky.

The figure seems to have been drawn of the natural size. But one specimen of it was observed.

The local name *Saira-owoo* signifies "spear fish," which has been adopted as its specific name. A similar name, *Saiwo*, occurs in the Japanese Encylopedia.—(See Abel Remusat. *Notices et extraits des manuscrits.* Vol. XI, p. 216, No. 30.) Judging from the Japanese figure only, either Cuvier or Remusat has added to the local name "sorte de fistulaire." Owoo and Iwo both signify "fish," and are simply dialectic variations.

51. CONGER HAMO, T. and S.

CONGER HAMO, Temm. and Schleg., Fann. Jap. Pisces, p. 262, pl. 114, f. 2.

NOTES.—From Simonda, (length four feet.)

The drawing is colored over the back of head and body of a rather uniform dusky slate, with tinges of olive, lower parts nearly white. Irides silvery. Pectorals like back. Dorsal and anal darker along the margin.

In the Fauna Japonica it is said to attain a length of ten feet. The authors had received it also from the Straits of Sunda, and consider it different from the *C. Tala-Bon* of the same locality. Dr. Kaup, in his "Uebersicht der Aale," in the Archiv für Naturgeschichte, 1856, part 2, p. 74, places the *Talabon* in the genus Muraenesox of McClelland, where this species also belongs. Bleecker, in his Nalezingen op de Ichthy van Japan, p. 54, seems to suppose that the Hamo is the same as the *C. bagio* of McClelland. Under the name of *Fammo* this fish is probably the one copied in Kaempfer, plate XII, No. 4.

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52. ANGUILLA MYRIASTER, N. S.

PLATE XI, fig. 2. Reduced.

NOTES.—From Hakodadi. (Length 22 inches.)

This distinctly marked species seems to be entirely new. It may be the *Congre à chapelet* of Cuvier, so named from a figure of Krusenstern's Atlas, pl. 60, fig. 7—a reference which could not be consulted.—(See note at foot of page 262 in the Fauna Japonica.)

In its general appearance and form it resembles a common eel, and probably belongs to the genus *Anguilla*. Snout to tip of caudal 22 inches. Snout to eyes $\frac{3}{4}$ inch. Eyes $\frac{5}{16}$ inch. Snout to pectorals $3\frac{1}{4}$ inches. Pectorals $1\frac{1}{4}$ inch. Snout to origin dorsal $4\frac{1}{4}$ inches. Snout to origin anal $9\frac{1}{2}$ inches? Height of body about $1\frac{1}{4}$ inch. Dorsal rising very gradually, and highest near the caudal. Anal of sub-equal height.

Colors.—Rich wood-brown over the back, shading off lighter, but in blotches, below the lateral line. Snout and head to back of eyes, and all the lower parts of the head and body of a very pale slaty-blue tinged with brown towards caudal. Irides silvery. Dorsal of a pale dusky slate, becoming more bluish towards caudal, and with a narrow margin of dark dusky along its whole length. Towards the caudal, where the dorsal is higher, this margin is broader, and shades off less abruptly. Anal of same color as the lower parts of the body, but towards the caudal it has a margin like the dorsal. The most distinctive markings of this eel, however, consist in two regular series of snow white spots or dots on each side of the back, commencing a short distance back of the eyes and running nearly to the caudal, becoming fainter as they approach it. The uppermost series consists of very small dots about the diameter of the eyes apart and set in very regular order, dropping a little, however, as they recede from the head. The second series is composed of spots of twice the size of the first, much more closely set, and apparently following the lateral line. Towards the caudal they seem to form a broken white stripe only. The engraving represents the appearance of these spots very accurately as they are given in the original drawing.

53. OPHISURUS MACRORHYNCHOS. Bleecker.

OPHISURUS SERPENS, T. and S., Faun. Jap., 264, pl. 115, fig. 1.
" " Kaup. Archiv. Naturges, 1856, 2, p. 44.
" MACRORHYNCHOS, Bleecker. Muraenoiden &c., p. 28. (1852.)

NOTES.—From Simoda, 2 figures, one 4 feet 6 inches long, the other 2 feet 2 inches. The small one named *Unagi*.

Bleecker, in his paper on the Indian *Muraenoids*, in the 25th vol. of the Transactions of the Batavian Society, separates this species from the *Serpens* of the Atlantic, with a notice of their difference.

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54. MURAENA KIDAKO? T. and S.

MURAENA KIDAKO, Temm. and Schleg., Faun. Jap., Pisces, 266, pl. 117.

PLATE XI, fig. 1. Natural size.

NOTES.—From Simoda, (17½ inches.)

This figure varies somewhat from the one given in the Fauna Japonica. It may be a young specimen of that species. The ground color of the whole body is a light brown, becoming pinkish towards the tail. The whole surface is dotted, blotched, and striped rather irregularly with darker brown. No other colors on the drawing. Irides white. Head rising to back of eyes; lower jaw rather the shortest; the gape of the mouth large, reaching back to twice the distance of the eyes from the snout. Height of body back of the head ¾ inches. Dr. Kaup, in the before quoted paper on eels, does not enumerate this species, but as it resembles the *M. Minor* of T. and S., which he places in his new genus *Poecilophis*, it may possibly belong to it also.

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55. TETRAODON BICOLOR, N. S.

NOTES.—From Simoda, (7¼ inches.)

The figure is colored light green over the back of head and body, the lower parts being pale blue. Back and sides, from the eyes to behind the dorsals, with about forty small brown spots on each side of the body, on the green ground color; pretty regularly scattered. Irides bright yellow. All the fins pale dusky black.

Form increasing rapidly in height from the obtuse snout to the pectorals, thence tapering gradually to the tail. Eyes large and oval, 1¼ inches from snout, and ½ inch in diameter. Pectorals 2¼ inches from snout, and 1¼ long. Dorsal 5 inches from snout, ¾ high. Anal 5¼ inches from snout, and much smaller than dorsal. Caudal deeply lunate, with pointed lobes, its base 6¾ inches from snout. No spines pores or lines are indicated in the drawing.

In its proportions it comes nearest to *T. Argenteus* of T. and S., but differs from all the species of the genus in color.

56. TETRAODON NIVEATUS, N. S.

NOTES.—From Simoda, (4 inches, Fooghoo.)

In form like the last, with more obtuse snout and rounded fins and caudal. Back of head and body dark sap-green to a line passing below the eyes, and above the pectorals, with many small blotches of bluish white. Lower parts white. A large dark spot behind the pectorals. Irides purple. Fins pale olive brown. Eyes $\frac{1}{2}$ inch from snout, $\frac{1}{4}$ in diameter. Pectorals 1 inch, dorsal $2\frac{3}{4}$, base of caudal $3\frac{3}{8}$ inches from snout.

The local name signifies "big belly," or "big sack." It no doubt has some more specific name to distinguish it from others of the genus.

57. TETRAODON BRUNNEUS, N. S.

NOTES.—From Simoda, ($4\frac{1}{4}$ inches.)

Forehead excavated, eyes close to profile, the dorsal outline convex, base of caudal very stout. Fins and caudal rounded. Snout to eyes $\frac{3}{4}$ inch, diameter $\frac{3}{8}$. Snout to pectorals $1\frac{1}{4}$, to dorsal $2\frac{1}{2}$, to anal $2\frac{5}{8}$, and to base of caudal $3\frac{1}{2}$ inches. No lateral line or spines on the drawing.

Upper parts and sides, to a line passing below the pectorals, of a rich bistre brown. The back very dark. Blotches and confluent spots of darker brown in two or three series from eyes and pectorals to tail, besides other paler spots between and below them, and on the sides of the head. Throat and abdomen white. Irides pale slaty blue. Fins, except caudal, of a pale brown. Caudal dark brown, with the membrane between the rays orange brown.

58. DIODON NOVEMMACULATUS, T. and S.

DIODON NOVEMMACULATUS, Temm. and Schleg., Faun. Jap. Pisces. 289, pl. 128, fig. 2.

NOTES.—From Simoda, ($7\frac{1}{2}$ inches.)

Agrees with the figure above quoted. The species is said to be quite rare in Japan.

58. MONACANTHUS CIRRHIFER, T. and S.

MONACANTHUS CIRRHIFER, Temm. and Schleg., Faun. Jap. Pisces. 290, pl. 130, fig. 1.

NOTES.—From Simoda, ($8\frac{1}{2}$ inches.)

Corresponds with the published figure, except that the bluish grey color is deeper, and the oblong spots more strongly defined.

60. OSTRACION IMMACULATUS, T. and S.

OSTRACION IMMACULATUS, Temm. and Schleg., Faun. Jap., Pisces., 296.

NOTES.—From Simoda, ($4\frac{1}{2}$ inches, Gihagi.)

From the description above quoted, there can be little doubt that the figure represents the same species. Bleecker, in his "Nalezingen, &c., p. 55," considers this a variety of the *O. Cubicus*, Bloch.

Diengkitsch observed that at Osaka it is called *cog-owoo,* which signifies rowing or paddling fish. Whoever has looked at a live box-fish in water would agree that this name was quite appropriate.

61. TRIAKIS SCYLLIUM, M. and H.

TRIAKIS SCYLLIUM, Müller and Henle; Beschreib. der Plagiostomen, p. 63, pl. 26.
WATT'S SHARK, Latham, Phillips' voy. to Botany Bay, 1789, p. 285, and plate.

PLATE XII, fig. 1. Male reduced.

NOTES.—From Simoda, (4 feet, Sa-me.)

Of this curious fish but one specimen was brought home by Mr. Bürger, which is now in the museum at Leyden, and on it Messrs. Müller and Henle founded a new sub-family, genus and species. Mr. Gerrard, in his list of *Chondropterygii* of the British Museum, 1851, p. 55, enumerates this and another species, the *T. Californica,* from a foetal specimen procured in California, but without adding any description. A dried skin of the *T. Scyllium* was brought home by a member of the United States Expedition, and is now in Philadelphia. It seems to have escaped the notice of the above naturalists, who quote the next species from Governor Phillips' voyage, that this one is also figured there, from a female, and described as Watt's shark in the same work. The figure there given resembles the one now published so nearly in form that there can be no doubt of their identity, though Phillips' seems to have annular spots, arranged in regular series.

The colors are, brownish slate above, and rather purplish below, blotched and clouded with dark brown on body and fins in an irregular manner. Throat and abdomen white. Irides yellow. The two appendages on the anterior part of the snout are longer than the others, and have a short branch on the outside of their base. Behind those, on each side, are three pair of shorter barbels. Some of these appear in another sketch to have short branches also. Eyes oval. Nostrils not indicated. Large spiracles behind and below the eyes. Branchial openings large, and above base of pectorals. Pectorals set far back, broad and heavy. Dorsals close together, and behind the ventrals, which last are large and broad. Male appendages long. Anal below and behind the second dorsal. Lobes of caudal small, with deep indentation near the end of the upper one. The figure in the voyage de la Coquille does not indicate this feature.

62. HETERODONTUS PHILLIPPI.

PORT JACKSON SHARK, Latham, Phillip's voyage, ed. 4to. 283, and plate.
HETERODONTUS PHILLIPPI, Blainville, Bull. Soc. Phil., 121, (1816.)
" PHILLIPPI, Gerrard, List of fish, &c., pt. 1, p. 66.
CESTRACION PHILLIPPI, Cuvier, R. A., 3d ed., II., 391, (1829.)
" PHILLIPPI, Lesson, (1830,) Duperrey. Voy. II., pt. 1, 97 Poiss., pl. 2.
" PHILLIPPI, J. E. Gray, Ann. and Mag., Nat. Hist., I., (1838,) p. 109.

CESTRACION PHILLIPPI, Temm. and Schleg., Faun. Jap., Pisces, 304.
" " Müller and Henle, Plagiost, p. 76, 199, and plate.
" QUOYI, De Frémenville, Mag. de Zool., (1840,) and plate.
" ZEBRA, Gray, Zool. Misc., 5.
" ZEBRA, Richardson, Report, (1845,) p. 195.

PLATE XII, fig. 2. Natural size.

NOTES.—From Simoda. Life size, 8½ inches.

This remarkable form among the *Squalidæ* seems to be found from New Holland to Japan, if the *C. Zebra* is the same as the more southern species, which seems probable. Gray (Annals of Nat. Hist., 1, 109) doubts if Messrs. Müller and Henle had ever seen a specimen, when they expressly state that they had found nine specimens in various museums.

The figure here published seems correct in outline, and nothing can be added as to its proportions.

Its general color is of a pale sepia-like brown, darker on back and fins, with a pinkish tinge on lower parts of body. Irregular bands and large blotches of several shades of the same brown are distributed from the pectorals to caudal, grouped in five principal bands, with smaller ones near the back between the first three large ones. The first of these last is just back of pectorals, the second back of the first dorsal and in front of ventrals, spreading laterally near the abdomen. The snout and cheeks are shaded also with darker brown cloudings. Small pale brown dots besides the above cover the back of the head and body and about one half of the pectorals, dorsals and caudal. Ventrals, anal, and lower lobe of dorsal of a more uniform brown.

Lacépède calls it the *Squale Philip*, and in Schneider's Bloch it appears as the *Squalus Philippi*. It is figured also in Gen. Hardwicke's Illustrations, pl. 5. Mons. Bourdet de la Nièvre, in the *Annales de la Soc. Linn. de Paris, Sep.*, 1825, p. 361, alludes to the discovery of fossil teeth of a *Cestracion*. Davila, Agazziz, and Owen have also described the teeth of this remarkable genus. Gerrard, on account of a difference in the markings, seems to consider the *Zebra* as distinct from the *Philippi*; but the currents of the southwestern Pacific will account for its being found over so wide a district. Among the *Plagiostomes* the colors are subject to great variations. Latham's figure in Phillipp's voyage is very correct, while the one by Lesson is defective, the caudal being figured with its margin unbroken.

It attains a larger size than is here represented, not exceeding however three feet, according to the Fauna Japonica, where it is stated to be common in spring and autumn, and much sought after as food by the Japanese, who eat it raw or boiled. The local name given to it in the same work is *Sa-siwari*, derived, no doubt, from *Sas-ir*, to "stick in," and *war*, "to cleave," in allusion to the spines in front of the dorsals.

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REPORT

ON THE

SHELLS COLLECTED BY THE JAPAN EXPEDITION,

UNDER THE COMMAND OF

COMMODORE M. C. PERRY, U. S. N.,

TOGETHER WITH

A LIST OF JAPAN SHELLS:

BY

JOHN C. JAY, OF NEW YORK.

REPORT

ON THE

SHELLS COLLECTED BY THE U. S. NAVAL EXPEDITION TO JAPAN.

In making a report of the shells brought home by the Japan Expedition, we are entirely indebted to the officers who collected them, and who could afford but little time from their official duties to give to scientific purposes, for whatever information we have of their localities, &c.

Shells were collected at the following places:

At Port Louis, in the island of Mauritius, a fine suite of shells were received from Mons. Robillard.

At Ceylon, a great number of the Helix hæmastoma.

At Singapore, a few more were added from the coast of Mallacca, Sumatra, and the adjacent islands.

Canton river was dredged, and numerous varieties of Cytherea meretrix, Cytherea petechialis, Cytherea morphina, Cytherea formosa, also Paludina ampullacea, Charp., and Paludina leceythoida, Bens., were found.

At Lew Chew, other varieties of the Cythereas above mentioned abounded.

At the Bonin Islands, a single specimen of the Helix horiomphola, Pff., was picked up.

The Bay of Yedo was dredged, but little of interest found except the Bullia Perryi. If this should prove not to belong to the genus Bullia, it ought to constitute a new genus.

A few land shells were collected in the vicinity of Yedo, resembling very closely some of our American Helices, especially Helix Simodæ, which in shape and color is allied to Helix profunda, Say, but has not the tooth of the latter. A new Lymnea was also found near Simoda.

At Volcano Bay the Mya Japonica was gathered in great abundance, and found to be very good eating; this shell bears a close resemblance to the Mya arenaria of New York, it being nearly in the same latitude. Here also a number of very large specimens of the Mytilus ungulatus, Lam., were taken, which likewise proved delicious to the palate.

At Hakodadi the large Pecten Yesoensis was found in great abundance; also the Ostrea, which is very similar, if not identical, with ours.

The Fusus fornicatus, Gmel., and Purpura septentrionalis, Reeve, were among the collection, but whether they were found in Japan is uncertain.

A fine box of shells was also received from Manilla, containing a large number of land shells from the Philippine Islands, which, however, were all found to have been previously described.

At the suggestion of Commodore Perry I have prepared with great care a list of all the shells which have been described as being found at Japan and the adjacent islands. It is arranged according to the system of Lamarck, and, as a reference, will be valuable to conchologists.

The collection brought home was large and numerous, but, among them all, the following only may be described as new.

MYA JAPONICA.

Plate 1, figs. 7 and 10.

Testa ovata, convexa, incrassata, posterius rotundata—impressionibus muscularibus duabus, lateralibus, distantibus, antica ovata, postica, quadrangularis, impressiones muscularis pallii sinu magno.

Shell ovate, convex, very thick, transversely wrinkled, rounded at both extremities, but slightly attenuated at the posterior end, color dingy white and chalky, tooth robust, its inner face smooth and rounded, its outer face divided near the posterior side by a deep furrow, and the anterior edge turned up in shape like a tooth, anterior muscular impression oval, posterior quadrangular ; the pallial impression very profound.

Habitat, Volcano Bay, Island of Yedo.

This shell is very similar to the Mya arenaria, but differs in the pallial impressions, which are much more profound, the tooth more thickened, a deep notch on its posterior, and an elevation on the anterior side, and the whole shell much more ponderous and incrassated.

PSAMMOBIA OLIVACEA.

Plate 1, figs. 8, 9.

Testa ovata, tenui, violacea olivaceo-brunnea, striis concentricis, valva dextra planiuscula, sinistra subventricosa, intus violacea.

Shell ovate, thin, purple, covered with a shining olive epidermis, concentric striæ ; right valve nearly plane, but the other is somewhat ventricose, radiated with two white rays ; within violet.

Habitat, Bay of Yedo.

The two rays are on the posterior slope ; the shell is about one inch long.

CYTHEREA MERETRIX.

Plate 2, figs. 1, 2.

Cytherea testa ponderosa, ovali subtrigona, lævi alba postice cærulea, prope umbones vel omnino angulatim fusco-maculata ; margine ventrali subinflato ; latere postico vix angulato, subelongato, ad terminum subacuto ; lunula magna indistincta ; ligamento magno.

Habitat, Canton river, China.

CYTHEREA MERETRIX, (Linn.)

Mr. Sowerby, in his monograph of the genus Cytherea, remarks that Lamarck has made nine species of this shell and its varieties on the mere ground of variations in color.

I found upwards of five hundred of these shells in the collection of all colors and sizes, and yet they run so one into the other that it is not easy to say where one species stops and another commences.

I have only been able to identify the four species that have been figured, and which I trust will tend to elucidate this group of shells more fully.

CYTHEREA FORMOSA.

Plate 1, figs. 1, 2, 3, 4. Var. figs. 5, 6.

Cytherea testa C. meretrici simili, sed magis obliqua et elongata ; latere postico elongatiusculo ; colore pallido, fasciis griseis suffuso, prope umbones castaneo biradiato.

Habitat, Lew Chew.

CYTHEREA FORMOSA, (Sowb., jr.)

This shell is more oblique and more elongated than C. meretrix, which it otherwise greatly resembles. The hinder part is colored with grey, and there are also two broad chestnut-colored rays, commencing at the umbones, and interrupted near the centre.

CYTHEREA MORPHINA.

Plate 2, figs. 3, 4, 5 ; fig. 10, var.

Cytherea testa, C. meretrici simili, sed lateribus suffusis, lunula magis inflata, marginibus crassioribus ; colore pallide fulvo, griseo radiatim fasciato.

Shell thicker, more spreading at the sides, with a rather straighter and thicker margin and more turned lunule than Cytherea meretrix ; no posterior purple band ; the color pale reddish brown, with greyish rays.

Habitat, Canton river, China, var. Lew Chew.

CYTHEREA MORPHINA, (Lam.)

CYTHEREA PETECHIALIS.

Plate 2, figs. 6, 7, 8, 9.

Cytherea testa C. meretrix simillima, sed multum altiore ; margine rotundissimo ; latere postico rotundatim angulato ; colore subgriseo fusco-rufescente angulatim lineato.

Shell rounder and higher than C. meretrix, the ventral margin very much rounded ; the lateral angle rather more distinct ; colored in much the same way as Cytherea meretrix, but without the purple posterior area.

Habitat, Canton river, China, and also at Lew Chew.

CYTHEREA PETECHIALIS, (Lam.)

Found in great abundance and of very large size.

DIPSAS PLICATUS.

Plate 3, fig. 1, 2.

I have figured this shell on account of its size, and also to show the way in which these shells are ornamented by the natives.

A piece of lead of any fanciful shape is inserted under the mantel of the animal while yet alive, after which the shell is returned to the water ; in a short time the leaden ornaments are found covered with pearly matter as seen in the figure.

The specimen in my own collection is marked as coming from Shanghai.

PECTEN YESSOENSIS.

Plate 4, figs. 1, 2.

Plate 3, figs. 3, 4.

Testa orbiculari, inæquivalvi, valva sinistra plano convexa, æquilaterali, costis triginta convexo planis, sublente tenuissime et criberrime concentrica striata, valva dextra convexiore costis

duabus et viginti rotundatis, elevatiusculis, interstitiis latiusculis, auriculis valvæ, sinistræ æqualibus, dextra inæqualibus, antica subtus emarginata.

Shell orbicular, inequivalve, left valve flatly convex, equilateral, with thirty convexly flattened ribs, very broadly and closely concentrically striated, right valve more convex, with twenty-two ribs, rounded, rather raised, interstices rather broad, ears of the left valve equal, of the right unequal, the front one being emarginated below.

Habitat, Hakodadi.

This shell grows to a very large size. One in the collection measures seven by eight inches. The right valve is used by the natives as a scoop.

Since the above was written the author has visited the collections of the British Museum and of Mr. H. Cuming, and also those in the museum at Leyden, which were brought from Japan by Mr. Sieboldt, and did not see this shell.

HELIX SIMODÆ.

Plate 5, figs. 1, 2, 3.

Var. figs. 4, 5, 6.

Testa umbilicata depresso-orbiculari, pallide straminea, striis radiantibus crebris, sculpta spira obtusa, anfractibus quinque, depresso convexciusculis supreme infimo medio fascia castanea ornata, umbilico subperspectivo apertura semi-ovata.

Shell umbilicated, depressly orbicular, pale straw-color, sculptured with close set radiating striæ, spire obtuse, whorls five, depressly convex, the lowest encircled round the middle with a chestnut band, umbilicus subperspective, aperture semi-ovate.

Habitat, Simoda, Japan.

Allied to Helix profunda, Say, but wanting the tooth. It is very variable. In some specimens the peripheric band is not seen, in others it is plainly visible, and in others again the last whorl has another band on its lower surface, with the umbilicus colored dark brown.

HELIX PERRYI.

Plate 5, figs. 7, 8, 9.

Testa profunde umbilicata, sinistrali depresso—globulosa, intense virente olivacea, anfractibus septem, arcuatim tenui-striata, ad peripheriam pallide fusco-fasciata, umbilico perspectivo, intus fusco-lutescente.

Shell sinistral, umbilicated, depressly globose, tawny epidermis, whorls seven, regularly striated, with a dark band around the last whorl, the interior of the umbilicus dark brown.

Habitat, Yedo.

This fine shell is somewhat similar to the Helix cicatricosa Müller, but differs in the striæ being regular, and the color of the umbilicus.

LYMNEA JAPONICA.

Plate 5, figs. 10, 11, 12.

Testa ventricosa, ovata, umbilicata sutura impressa et conspicua, anfractibus quatuor, spira anguste, acuta, breve, apertura inflata.

Shell ventricose, ovate, suture impressed and conspicuous, whorls four, spire narrow, acute, and much shorter than the aperture, aperture very large, more or less expanded, umbilicus not covered.

Habitat, Simoda.

This Lymnea approaches Lymnea ovata, but has a shorter spire, which is less exserted, less acute, the whorls more rounded, and differs in color. The columella lip is reflected on the body whorl.

PURPURA SEPTENTRIONALIS.

Plate 5, figs. 16, 17.

Purpura, testa, subfusiformi, ovata, crassa, ponderosa; basi subcanaliculata et recurva; anfractibus lævibus, transversim obsolete liratis; apertura parva, labro intus obscure denticulato; castaneo-fusca, intus alba.

Shell somewhat fusiformly ovate, thick, ponderous, slightly channelled and recurved at the base; whorls smooth, transversely obsoletely ridged; aperture small, lip obscurely denticulated within; chestnut brown, interior white.

Habitat, Sitka, on authority of Reeve.

Reeve Conch. Iconica, pl. 10, fig. 50.

There were several specimens of this interesting shell brought home, but without any habitat being attached. Whether it was found in the Japanese waters, therefore, is uncertain.

BULLIA PERRYI.

Plate 5, figs. 13, 14, 15.

Testa, ovato globulosa, tenuicula, basim versus inflata, spira breve, acuta, suturis impressis, anfractibus lævigatis, flavido, cinerea, aperturæ fauce rubiginosa.

Shell ovately globulose, rather thin, inflated towards the base, spire short, acute, sutures impressed, whorls smooth, color yellowish ash, interior of aperture rusty brown.

Habitat, Bay of Yedo.

It is extremely difficult to place this shell. It does not agree in many of the characteristics of the genus Bullia, but comes closer to it than to any other. It looks like a Cymba on the first glance, but has no plaits on the columella. There was only one found, and that was taken by the dredge.

LIST OF JAPAN SHELLS.

Solen constrictus, Lam.
Panopaea Japonica, A. Adams.
Mya Japonica, Jay.
Corbula erythrodon, Lam.
Lutraria Sieboldii, Desh.
Lutraria Chemnitzii, Ph.
Mactra veneriformis, Desh.
Mactra rostralis, Desh.
Mactra corbicula, Ph.
Mactra pellicula, Desh.
Mactra eburnea, Ph.
Venerupis Nuttallii, Con.
Psammobia olivacea, Jay.
Tellina secta, Conrad.
Astarte Japonica, Jay.
Cytherea morphina, Lam.
Cytherea petechialis, La n.
Cytherea meretrix, Lin.
Cytherea lusoria, Lam.
Artemis Japonica, Reeve.
Artemis scabra, Phil.
Artemis bilunata, Gray.
Artemis Sieboldii, Reeve.
Artemis sericea, Reeve.
Artemis biscocta, Reeve.
Artemis orientalis, Sowb.
Venus striata, Chemn.
Venus donacina, Chemn.
Venus Japonica, Gmel.
Venus æquilatera, Sowb.
Tapes decussata, Lin.
Tapes Japonica, Desh.
Meroe excavata, Hanley.
Isocardia tetragona, A. Adams.
Arca Japonica, Reeve
Arca obtusa, Reeve.
Nucula Japonica, A. Adams.
Nucula mirabilis, A. Adams.
Modiola siliqua, Ph.
Mytilus ungulatus, Lam.
Lithophagus caperatus, Ph.
Avicula Japonica, Dunker.
Chama Japonica, Lam.
Pecten Yessoenis, Jay.
Pecten nobilis, Reeve.
Pecten Japonicus, Gmel.
Pecten molitus, Reeve.
Pecten pleuronectes, Lin.
Ostrea borealis, Lin.
Terebratula Japonica, A. Adams.
Terebratula angusta, A. Adams
Terebratula rubella, Sowb.
Dentalium octogonum, Desh.
Patella lanx, Reeve.
Patella saccharina, Lin.
Parmophorus emarginatus, Ph.
Fissurella Sieboldii, Reeve.
Fissurella Tongana, Quoy.
Stomatella Japonica, A. Adams.
Sigaretus papillus, Recluz.
Haliotis gigantea, Chemn.
Haliotis Japonica, Reeve.
Haliotis Discus, Reeve.
Haliotis Sieboldii, Reeve.
Bulla viridis, Reeve.
Bulla ampulla, Lin.
Helix Perryi, Jay.
Helix Simodae, Jay.
Helix Lorillieri, Phil.
Helix Sieboldiana, Ph.
Helix elegantissima, Pfr.
Helix Japonica, Pf.
Helix horiomphala, Pf.
Helix conospira, Pfr.
Bulimus rimatus, Pfr.
Clausilia Buschii, Kust.
Clausilia valida, Pfr.
Clausilia Sieboldii, Pfr.
Auricula hepatica, Ph.
Lymnea Japonica, Jay.
Lymnea flava, Ph.
Melania Bensoni, Ph.
Natica Antoni, Ph.
Natica duplicata, Say.
Natica mamilla, Lam.
Natica olla, Desh.
Actaeon Dianae, A. Adams.
Ianthina communis, Lam.
Ianthina prolongata, Bl.
Obeliscus pulchellus, A. Adams.
Obeliscus brunneus, A. Adams.
Globulus giganteus, Less.
Xenophora pallidulus, Reeve.
Monodonta catenulata.
Monodonta exigua, A. Adams
Trochus Japonicus, Dunker.
Trochus triumphans, Phil.
Clanculus Smithii, Wood.
Turbo Japonicus, Reeve.
Littorina Sieboldii, Phil.
Littorina Cecillii, Ph.
Turritella aquila, Reeve.

Eglisia Cumingii, A. Adams.
Cerithium Cecillii, Ph.
Cerithium nebulosum, Ph.
Fusus fornicatus, Gmel.
Pyrula ficoides, Lam.
Cancellaria nodulifera, Sowb.
Pleurotoma flavidula, Lam.
Murex falcatus, Sowb
Murex inermis, Sowb.
Murex Eurypteron, Reeve.
Strombus Japonicus, Reeve.
Cassis saburon, Lam.
Cassis Japonica, Reeve.
Columbella versicolor, Sowb.
Purpura septentrionalis, Reeve.
Dolium variegatum, Lam.
Buccinum Chinense, Ph.
Buccinum achatinum, Lam.
Nassa Japonica, A. Adams.
Nassa ponderosa, A. Adams.
Desmoulea crassa, A. Adams.
Desmoulea Japonica, A. Adams.
Bullia Perryi, Jay.
Eburna Japonica, Reeve.
Terebra serotina, A. Adams.
Mitra impressa, Anton.
Mitra incisa, A. Adams.
Voluta Megaspira, Sowb.
Voluta Cassidula, Reeve.
Cypraea caput-serpentis, Linn.
Cypraea miliaris, Gmel.
Cypraea fimbriata, Gmel.
Cypraea pallida, Gray.
Ovulum concinnum, Sowb.
Ovulum birostre, Lam.
Ovulum striatulum, Sowb.
Ovulum volva, Linn.
Conus Sieboldii, Reeve.

EXPLANATION OF THE PLATES.

PLATE ONE.

Cytherea formosa, fig. 1, 2, 3, 4.
Cytherea formosa, var. fig. 5, 6.
Psammobia olivacea, fig. 8, 9.
Mya Japonica, fig. 7 and 10.

PLATE TWO.

Cytherea meretrix, fig. 1, 2.
Cytherea morphina, fig. 3, 4, 5, and 10.
Cytherea petechialis, fig. 6, 7, 8, 9.

PLATE THREE.

Dipsas plicatus, fig. 1, 2.
Pecten Yessoensis, fig 3, 4.

PLATE FOUR.

Pecten Yessoensis, fig. 1, 2.

PLATE FIVE.

Helix Simodae, fig. 1, 2, 3.
Helix Simodae, var. fig. 4, 5, 6.
Helix Perryi, fig. 7, 8, 9.
Lymnæa Japonica, fig. 10, 11, 12.
Bullia Perryi, fig. 13, 14, 15.
Purpura septentrionalis, fig. 16, 17.

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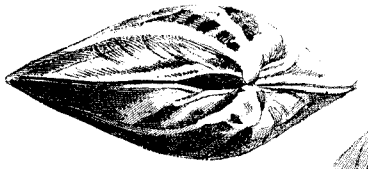

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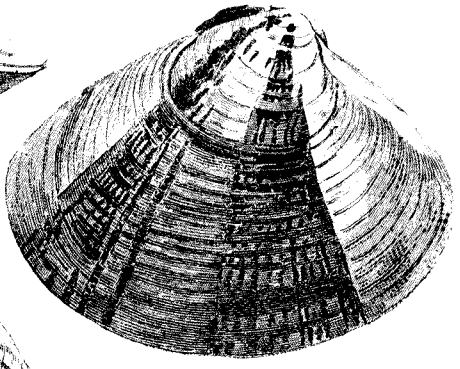

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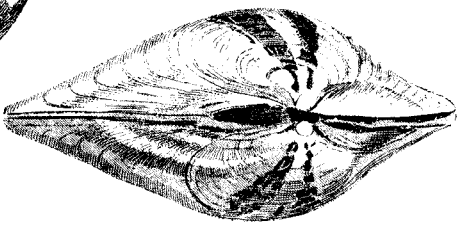

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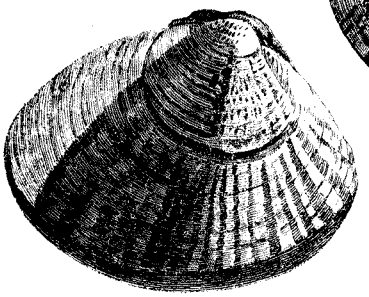

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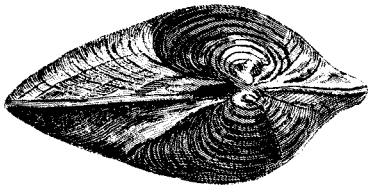

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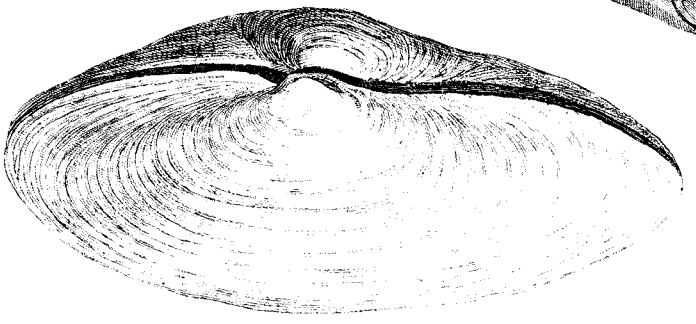

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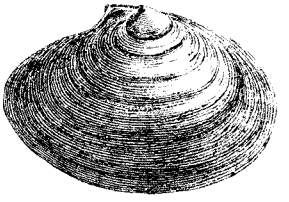

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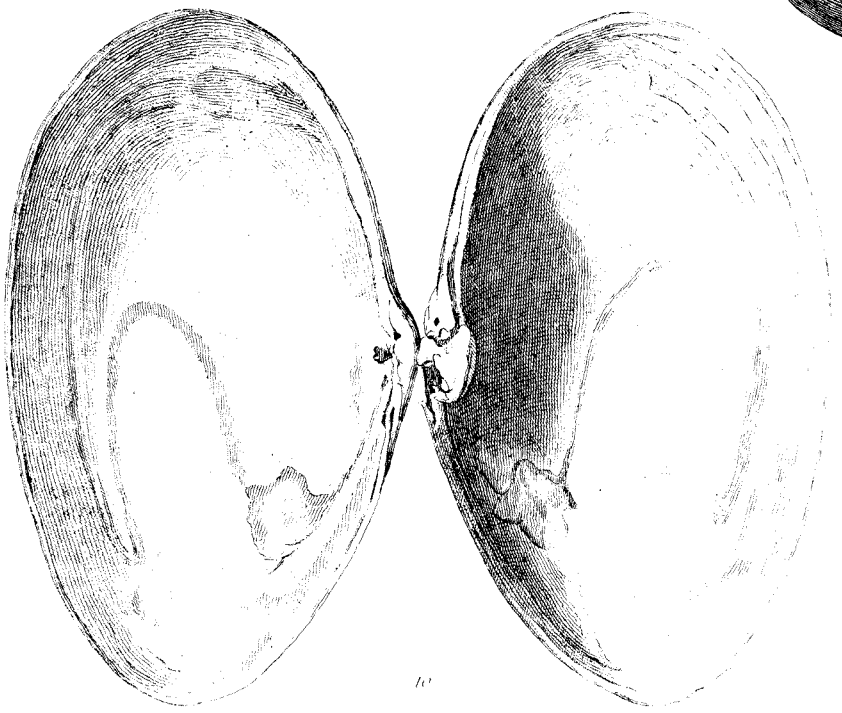

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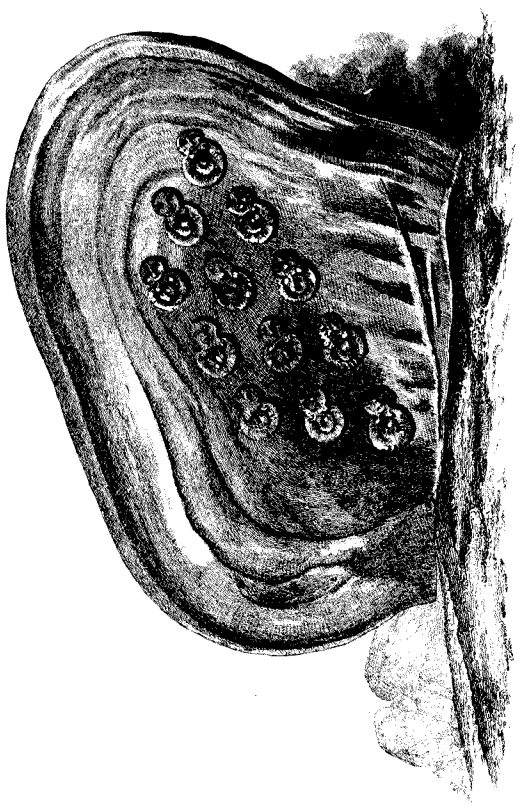

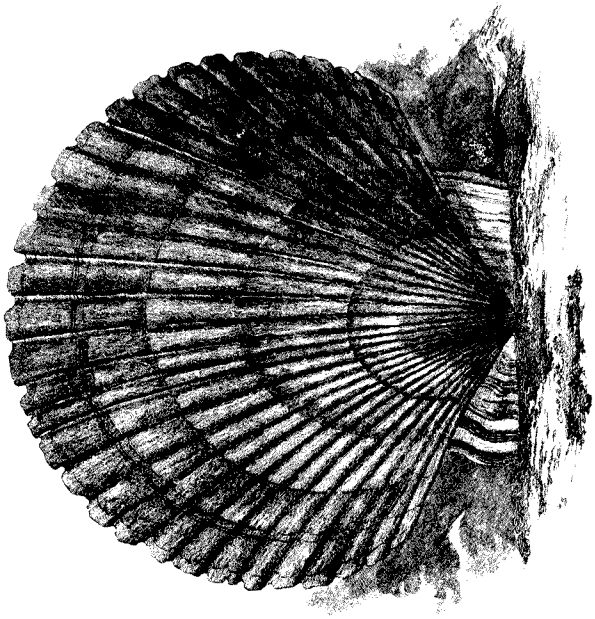

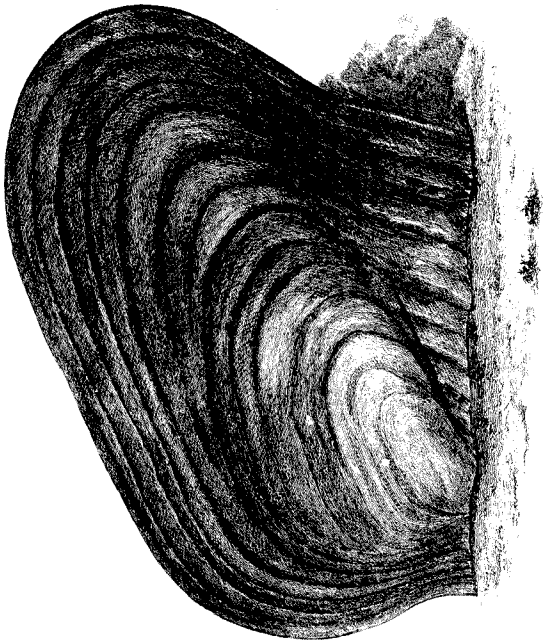

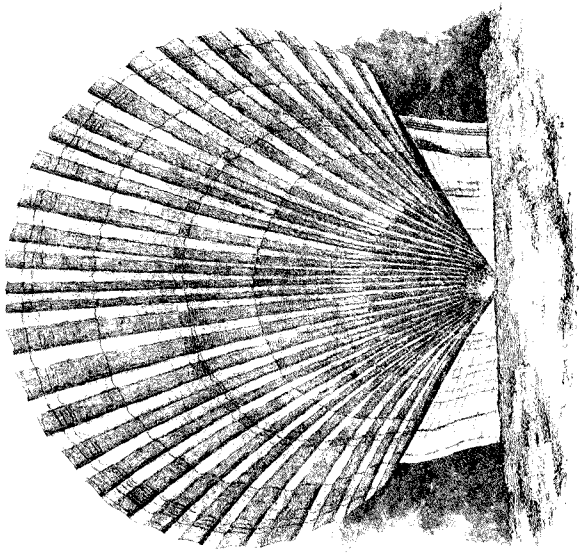

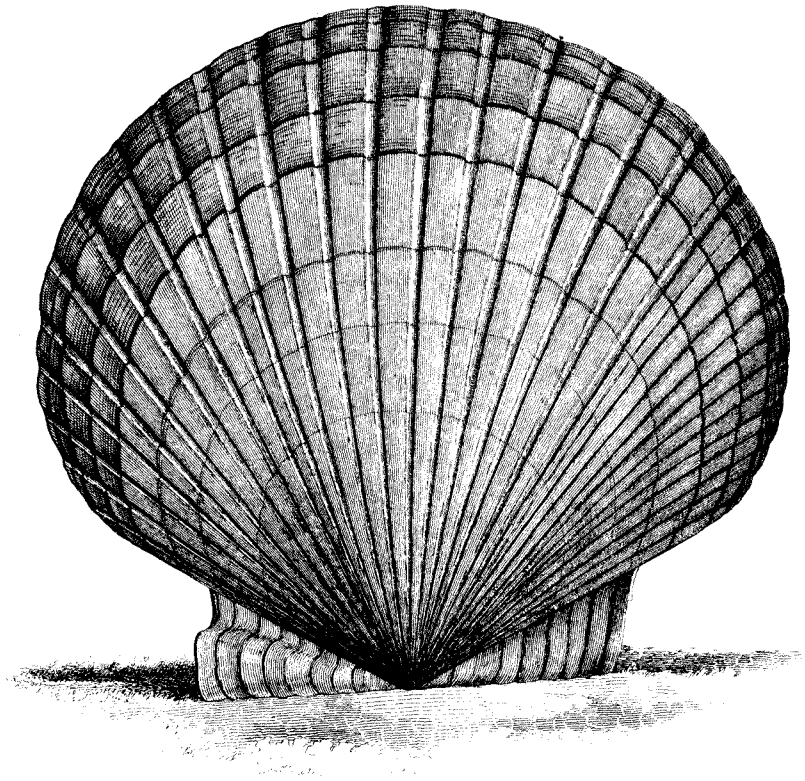

Fig 1

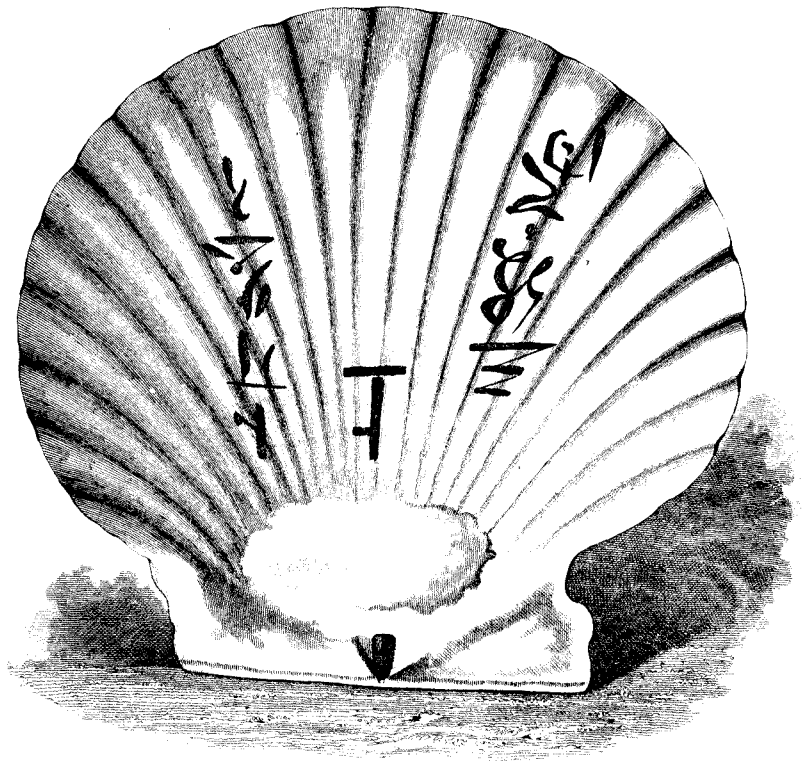

Fig 2

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CORRESPONDENCE.

Referring to the introductory note at the commencement of the papers on Natural History, it may be proper to explain how it is that the following descriptions of plants should now appear in this volume, and I can offer no better explanation than will be found in the letters herewith presented.

My best thanks are due to the distinguished naturalists who have thus contributed so largely to the interest of this report, and I trust that their valuable services will be duly appreciated by the powers under whose authority it has been prepared.

M. C. P.

DEPARTMENT OF STATE, *Washington, April* 14, 1857.

SIR: I transmit herewith a copy of a letter, dated the 8th instant, from Dr. James Morrow, agriculturalist to the late Expedition, under your command, to Japan. The papers received with it, as well as his report, No. 2, referred to by him, will be held at your disposal if you wish to avail yourself of them for publication in your account of the Expedition; otherwise they will, as requested, be transmitted to Professor A. Gray, of Cambridge, for the pupose indicated by Dr. Morrow.

I am, sir, your obedient servant,

LEWIS CASS.

Commodore M. C. PERRY, *U. S. N.*

CHARLESTON, SOUTH CAROLINA, *April* 8, 1857.

SIR: I have the honor to enclose two papers: one page, the determination of the mosses which I collected in Japan, made by Mr. S. Sullivant, and four pages, in two sheets, the description of the algæ, by Professor Wm. H. Harvey, of Dublin University, Ireland. These are important additions to the manuscript report, No. 2, on the botany of Japan, which I had the honor to make to the Department of State, in February last. They have just been finished by the naturalists.

I enclose, also, two sheets of notes from Professor Asa Gray, of Cambridge, Massachusetts, (who has had charge of getting the very best description of these plants that could be procured in the scientific world,) in reference to the publication of the papers.

Professor Gray can procure the publication of this addition to science, of one hundred pages, describing forty-one new species of plants, and one new genus of plants, with no expense to the government, by the American Academy of Sciences, by whom the circulation, among scientific men, is made most extensive. While, if Commodore Perry does not desire it for his second

volume, now being published, it cannot be published until some time during next Congress, if at all; before which time the French and English, who have each been over the same ground since we explored it, may publish and take all the credit and priority from our government, to which we are entitled, having been the earliest visitors.

I would, for these reasons, beg you to send the manuscript to Professor Asa Gray, Cambridge, Massachusetts, who will attend to the publication, if you should deem such a course proper.

I have the honor to subscribe myself, your obedient servant,

JAS. MORROW,
Agriculturalist to the Japan Expedition.

Hon. LEWIS CASS, *Secretary of State, Washington.*

CAMBRIDGE, *April* 16, 1857.

DEAR SIR: For a month or more the Secretary of State has been in possession of a report made by me upon the botanical collection made in Japan by Drs. S. Wells, Williams, and Morrow. Should you wish to print it in your work, I am disposed to think that it would be at your service. If not so used it will probably be published elsewhere. In any case it would be needful that I should read the proof.

Very respectfully, yours,

ASA GRAY.

Commodore PERRY, *U. S. N.*

NEW YORK, *April* 23, 1857.

SIR: I have the honor to acknowledge the receipt of a communication from the Department of State, bearing date the 21st instant, together with a packet containing descriptions of certain botanical specimens, collected by Dr. Jas. Morrow and other persons attached to the late Expedition to Japan.

Although the materials for my report had been, as I had supposed, entirely completed and prepared for the press, and the greater part actually printed, I have thought it advisable to urge upon the Superintendent of Public Printing the propriety of inserting the valuable papers of Professors Gray, Sullivant, and Harvey, as well out of respect to these scientific gentlemen as because of the very great interest which is attached to the natural productions of a country hitherto so little known; fortunately this can be done without inconvenience, as the printers are now engaged upon the department of Natural History.

I cannot refrain, however, from repeating the expression of my regret that these descriptions of the plants had not come into my possession at an earlier period, as in such case I could have published, in connexion with the letter-press, the beautiful botanical drawings which I had caused to be made from nature, and which have now become useless.

It would have given me much pleasure to have introduced into my report the whole or at least a part of papers No. 2, or the diary of Dr. Morrow, had it been received in time to be printed with other matter upon the subject of agriculture, already in print. It only reached me yesterday, and of course too late for insertion in its proper place.

The general orders promulgated in the squadron, by authority of the Secretary of the Navy, required that all notes, journals, and collections in every branch of science should be considered

as public property, and sent to the commander of the Expedition, to form the materials of a report to be made at the termination of the cruise. By some cause, of which I am still ignorant, the reports and collections in relation to botany have been diverted from the prescribed channel, and hence the delay which has prevented as full and complete a publication in this department as I had contemplated.

With great respect, I have the honor to be, your obedient servant,

M. C. PERRY.

Hon. LEWIS CASS, *Secretary of State, Washington, D. C.*

NOTE.—See General Order in Appendix.

ACCOUNT

OF THE

BOTANICAL SPECIMENS.

PREPARED BY

PROFESSOR A. GRAY:

ASSISTED BY

MR. SULLIVANT, DR. HARVEY, ETC.

LIST

OF

DRIED PLANTS COLLECTED IN JAPAN,

BY S. WELLS WILLIAMS, ESQ., AND DR. JAMES MORROW.

This collection, hastily made as their small opportunities permitted, by Dr. Morrow and my early friend, Mr. Williams, of the American Mission at Macao, has proved a very interesting one, as might have been expected. No part of the world beyond his own country offers, as to its vegetation, a greater interest to the botanist of the United States than Japan. This is not the place to dwell upon the very remarkable relations which subsist between the Flora of Japan and that of the United States, which have been more or less noticed ever since Thunberg's *Flora Japonica* was published. As the present collection was principally made in the northern part of Japan, it was naturally anticipated that it would add to the Japanese Flora a considerable number of species identical with, or closely allied to, those already known to inhabit Kamtschatka and Northwest America. This proves to be the case; and at the same time it has brought to view an equal number of Eastern United States forms, no insignificant portion of which are specifically identical. These interesting facts will arrest the botanist's attention as he turns over these pages. I refrain from commenting upon these relations until another and perhaps a larger collection of Japanese plants shall be made known, namely, that made by that excellent and most assiduous collector, Mr. Charles Wright, in the North Pacific Exploring Expedition, under Commodore Rodgers.

The present collection makes known nearly forty new species and one new genus; a very considerable number under the circumstances of the case. Thirteen of these are Carices; but as most of these were gathered too early in the season, it is probable that the number will be somewhat reduced when they are better known. I have to thank my excellent friend, Dr. Boott, of London, the most learned Caricologist of the age, for having studied the specimens of this genus, and furnished the descriptions for this report. I have also to thank my promising young friend, Mr. Daniel C. Eaton, for having studied the Ferns of the collection, a department of botany to which he devotes special attention. Mr. Sullivant has obligingly determined the Mosses, and Prof. Harvey, of Dublin, the Algæ of the collection.

ASA GRAY.

CLEMATIS FLORIDA, *Thunb. Fl. Jap., p.* 240; *Sieb. & Zucc., Fam. Nat. Fl. Jap.*, (*in Act. Acad. Monac.*) *p.* 68. Simoda. This is the very showy, large-flowered species, now well known in cultivation under the name of *C. Sieboldii*. The plant from which the specimens were taken was cultivated at Simoda.

CLEMATIS JAPONICA, *Thunb. l. c.?* Simoda. The specimens are insufficient for positive deter-

mination, but they nearly accord with Thunberg's and Zuccarini's descriptions. The flowers resemble those of C. Viorna in size and shape, but the sepals are not so thick and leathery; and the peduncles are fully as long as the petioles.

CLEMATIS WILLIAMSII (n. sp.): sericeo-pilosa; foliis ternatisectis; foliolis supra laxe glabratis oblongis vel cuneato-ovatis inciso-trilobatis, lobo intermedio acuminato, lateralibus nunc inciso-dentatis; pedunculis solitariis folio brevioribus basim versus bibracteatis; staminibus sepalis orbiculatis paullo brevioribus, filamentis ligulatis glabris; ovariis stylisque villosissimis. (Simoda, April 20; in flower. "A vine on the ground.")—This belongs to De Candolle's section *Cheiropsis*, and ranks with C. Nipalensis and C. montana, of the Himalayas, but is clearly different from both. The blossom is about an inch and a half in diameter when the (apparently purplish or bluish) sepals are fully expanded. The filaments are linear-ligulate and much broader than those of C. montana, and the anthers shorter. The bracts are small (barely 2 lines long) and distinct. The leaflets are not serrate, but mostly incisely three-lobed above the middle, and often the lobes of the lateral ones again sparingly incised or 2–3-toothed. All the leaflets are short-petiolulate, and are rounded or roundish at the base. The species is named for one of the collectors, S. Wells Williams, Esq., of Canton, a cherished friend and correspondent, author of one of the best works that have appeared upon the Chinese empire, and a good naturalist, as well as a learned oriental scholar.

ANEMONE BAIKALENSIS, *Turcz. Cat. Baikal; Ledeb. Fl. Ross.* 1, *p.* 17; *Sieb. & Zucc. l. c.*: var. ? LÆVIGATA. Hakodadi. The base of the stem and the radical leaves were not gathered. It is doubtless the plant referred by Zuccarini to A. Baikalensis, and accords with his notes; but the foliage is nearly or quite glabrous. Its relationship to A. narcissiflora is evident, notwithstanding the elongated and few pedicels, and the pubescent achenia.

RANUNCULUS SELERATUS, *Linn.* Simoda; in rice fields. Zuccarini notes that his Japanese specimens exhibited globular heads of carpels; in these the heads are elongated in the usual manner of the species.

RANUNCULUS TERNATUS, *Thunb. Fl. Jap. p.* 241; *Sieb. & Zucc. l. c. p.* 71.

RANUNCULUS JAPONICUS, *Thunb.* ? Not the plant so named by Zuccarini. The specimen is incomplete, but it very nearly accords with an Oregon plant, gathered by Mr. Spalding and by Geyer (No. 380,) which Sir Wm. Hooker makes a variety of R. Pennsylvanicus, with more slender and diffuse stems, and, I may add, with more beaked carpels collected in a broader and shorter head. From R. Chinensis it is distinguished by the flat and margined achenia, not tricostate on the back.

RANUNCULUS REPENS, *Linn.* ? Hakodadi; May. The specimen (in flower only) appears to be the same as what in North America is called a large form of R. repens.

CALTHA PALUSTRIS, *Linn.* Hakodadi. Both the small-flowered form, mentioned by Zuccarini, and also with large blossoms.

ISOPYRUM JAPONICUM, *Sieb. & Zucc. l. c. p.* 73. Yokohama, and also Simoda; on stone walls. The four (or occasionally three) carpels, when ripe, are not "erect-connivent," but widely divergent. The root resembles a small tuber.

AQUILEGIA FLABELLATA, *Sieb. & Zucc. l. c.* Hakodadi. Remarkable for the great size of the sepals, and for the short, circinate, included spurs of the petals.

GLAUCIDIUM PALMATUM, *Sieb. & Zucc., l. c., p.* 76, *t.* 1, *B.* Hakodadi. The scanty specimens are only in blossom, like those of Siebold, and throw no additional light upon this singular genus. I should take the perianth to be simple, and of the nature of calyx.

PÆONIA OFFICINALIS, *Linn.* (P. albiflora, *Pall. Fl. Ross. t.* 84; but the petals are red or purple.)

ILLICIUM RELIGIOSUM, *Sieb & Zucc. Fl. Jap.* 1, *p.* 5, *t.* 1. This is the false Star-Anise, with fruit nearly destitute of anisate aroma, and which was distinguished specifically by Siebold and Zuccarini.

BURGERIA OBOVATA, *Sieb. & Zucc. Fam. Nat. Fl. Jap., l. c., p.* 79. Hakodadi. In blossom only, so that the generic characters are not determinable. The twigs of the specimens, when split, exhale the odor of camphor-wood.

AKEBIA QUINATA, *Decaisne, Mem. Lardiz.; Sieb. & Zucc. Fl. Jap.* 1, *p.* 143, *t.* 77. A fragment only, in flower, was gathered at Simoda, and another on Webster Island, in April.

AKEBIA LOBATA, *Decaisne, l. c.; Sieb. & Zucc., l. c., t.* 78. From the variation observable in the leaflets, I should not hesitate to unite A. quercifolia with A. lobata, and probably A. clematifolia is not distinct from it.

STAUNTONIA HEXAPHYLLA, *Decaisne, l. c.; Sieb. & Zucc., l. c., t.* 76. A few flowering specimens in the collections.

NANDINA DOMESTICA, *Thunb. Fl. Jap., p.* 9 & 149. In hedges and in wild places.

BERBERIS VULGARIS, *Linn.; Thunb. Fl. Jap., p.* 146. B. Sinensis, *Desf.? ex Sieb. & Zucc., l. c.* Hakodadi. "A large bush in a hedge; May 31." This seems to be exactly the common Barberry as introduced into the United States.

BERBERIS THUNBERGII, *DC. Prodr.* 1, *p.* 106. Hill-sides, Simoda; April 20. This certainly looks like B. Cretica, to which Thunberg referred it, and which Drs. Hooker and Thomson regard as an extreme form of B. vulgaris.

PAPAVER SOMNIFERUM, *Linn.* Probably an introduced plant.

CHELIDONIUM MAJUS, *Linn.* Hakodadi.

DICENTRA SPECTABILIS, *DC. Syst.* 2, *p.* 110. Eucapnos spectabilis, *Sieb. & Zucc. l. c.* Hakodadi; in gardens. The handsome species now common in cultivation; one of the finest of our many valuable acquisitions from Japan.

CORYDALIS INCISA, *Pers. Ench.* 2, *p.* 269. Fumaria incisa, *Thunb.* Hakodadi and Yokohama.

CORYDALIS HETEROCARPA, *Sieb. & Zucc., l. c., p.* 65. Simoda.

CORYDALIS PALLIDA, *Pers., l. c.* Fumaria pallida, *Thunb.* Simoda; on old garden walls, &c.

NASTURTIUM PALUSTRE, *DC.* Simoda.

NASTURTIUM OFFICINALE, *R. Br.* Hakodadi and Yokohama. "Sides of fields near the shore." This wide-spread species, the common Water-Cress, is enumerated by Thunberg in his Japanese Flora. In place of the former species, Thunberg and Siebold mention N. amphibium, but our specimens clearly belong to N. Palustre.

TURRITIS GLABRA, *Linn.* Simoda. (Not in Siebold and Zuccarini's enumeration.)

ARABIS HIRSUTA, *Scop.* Turritis hirsuta, *Linn.; Thunb. Fl. Jap. p.* 260. Simoda. As far as can be judged from the single and incomplete specimen, this appears to be a form of A. hirsuta, and it is doubtless Thunberg's plant. Siebold and Zuccarini do not mention it.

ARABIS ALPINA, *Linn.*, var.? JAPONICA: caule validiore (spithamæo ad subpedalem) plurifoliato; racemo densifloro; siliquis plurimis etiam confertis.—Barren sandy beach, also on rich hills, Simoda; and dry sand of the seashore, Shirahanna, near Simoda; April 19–20; also Hakodadi. The fruit is only half grown, and the seeds not formed. The ripe siliques will be likely to furnish characters which (along with the generally stouter and more leafy stems, and the much more numerous flowers,) will distinguish this plant specifically from A. alpina. It is probably abundant, as numerous specimens were collected at several stations.

ARABIS LYRATA, *Linn.?* Hakodadi. The pods are immature, but if the specimens had been

gathered in the United States they would doubtless be referred to A. lyrata; if in Europe, to A. arenosa.

MATTHIOLA ANNUA, *Sweet.* Simoda. Cultivated.

CARDAMINE IMPATIENS, *Linn.* Simoda. A branching, pubescent form. Not mentioned by Siebold and Zuccarini.

CARDAMINE MACROPHYLLA, *Willd.; DC.; Ledeb. Fl. Ross.*, 1, *p.* 128. Simoda and Hakodadi. The specimens are all corymbose at the summit, bearing from three to five racemes; the flowers apparently white, and the leaves are rather more downy beneath; otherwise the plant exactly accords with large-leaved forms of this striking species from Altai. The fruit not seen. This also was unknown to Thunberg and to Siebold.

DRABA NEMOROSA, *Linn.* D. nemoralis, *Ehrh.*; *DC.; Sieb. & Zucc. l. c.* Hakodadi and Yokohama. Pretty large forms, but clearly the European plant.

CAPSELLA BURSA-PASTORIS, *Mœnch.* With the preceding.

BRASSICA CHINENSIS, *Linn.* B. orientalis, *Thunb.* Low pine forests, Yokohama.

RAPHANUS SATIVUS, *Linn.* Simoda. Mentioned by Thunberg as one of the commonest esculent herbs of Japan.

POLYGALA JAPONICA, *Houtt.; DC. Prodr.* 1, *p.* 324. P. vulgaris, *Thunb.* Yokohama and Simoda. A well-marked species, agreeing with the character given by DeCandolle, except that the stems are assurgent.

VIOLA PALUSTRIS, *Linn.?* A single specimen from Simoda appears to belong to this species (mentioned by Thunberg); but the leaves are cordate-ovate rather than reniform.

VIOLA JAPONICA, *Langsd. ex DC. Prodr.* 1, *p.* 295, not of *Korthals, in Walp. Ann.* 2, *p.* 66? V. obovata, *Thunb.?* Yokohama. Specimen too incomplete to judge of.

VIOLA GMELINIANA, *R. & S.*; var. GLABRA, *Ledeb. Cat. Dorp., & Fl. Ross.* 1, *p.* 246? Simoda; a single and insufficient specimen.

VIOLA GRYPOCERAS (n. sp.): acaulescens, glabra; foliis reniformibus et ovato-cordatis; stipulis lineari-subulatis longe setoso-pectinatis; flore pallide cæruleo; calcare adunco cylindrico obtusissimo petalis omnibus imberbibus fere æquilongo; stigmate nudo inappendiculato, rostro brevi porrecto.—Yokohama, on wooded hill-sides; March. Probably stoloniferous, but this is uncertain. Leaves from half an inch to an inch in diameter, crenulate-toothed, thickly punctate with brown dots, as in numerous species. Scapes filiform. Sepals acutish. Spur when fully developed almost half an inch long, narrow, with a thicker and very obtuse curved extremity. Anther-spurs very long, ligulate. This surely cannot be the V. Japonica of Langsdorff, nor, with its long spurs, could Thunberg have mistaken it for V. odorata. The stipules resemble those of V. adunca, *Smith*, (V. longipes, *Nutt.*) of Northwest America, although more densely and strongly fringed; but the plant is stemless, and the flowers, stigma, &c., very different.

VIOLA CANINA, var.? JAPONICA, *DC, Prodr.* 1, *p.* 298; *Sieb. & Zucc. l. c.* Yokohama. Were the specimens (having only a single blossom) sufficiently complete for determination, this would doubtless be shown to be wholly distinct from Viola canina. The foliage is similar to that of V. canina, but the stipules are much larger and strikingly fimbriate, in the manner of the preceding species, only more conspicuous. It is possibly a caulescent state of the last.

VIOLA LACINIOSA, (n. sp.): subpubescens; caule valido folioso; foliis ovato-cordatis obtuse acuminatis; stipulis foliaceis magnis oblongis eximie pinnatifido-laciniatis summisve lanceolatis superne integriusculis, laciniis lineari-lanceolatis; pedunculis folium subsuperantibus; petalis cæruleis, lateralibus hinc leviter barbatis, calcare brevissimo crasso scrotiformi; stigmate dorso

convexo subpapilloso rostro parvo declinato, ore apicali minuto.—Hakodadi, along the edge of woods. A caulescent species, with a remarkably stout stem, a foot or less in height, leaves as large as those of V. pubescens, and very conspicuous stipules of an inch or an inch and a half in length, (the upper ones as long as the petiole,) and strikingly laciniate-pinnatifid, something as in V. striata, but several times larger. The latter character suggests the specific name. Flowers as large as those of V. Canadensis, and with an equally short and thick spur.

DIANTHUS CHINENSIS, *Linn.* Simoda, in rocky places on the sea-shore; May. There are portions of two other species in the collection; one of them probably cultivated.

HONCKENYA PEPLOIDES, *Ehrh.; Torr. & Gray, Fl.* 1, *p.* 176. Hakodadi. Not before recorded from Japan. The specimens are nearly the var. oblongifolia, (H. oblongifolia, *Torr. & Gray, l. c.*)

MŒHRINGIA LATERIFLORA, *Fenzl.* Arenaria lateriflora, *Linn.* Hakodadi. New to the Japanese Flora, but known in the Kurile Islands, and encircling the Northern hemisphere.

MŒHRINGIA seu ARENARIA, n. sp.: foliis linearibus rigidiusculis; floribus terminalibus longe pedunculatis tetrameris; sepalis petalisque orbiculatis; stylis 4.—Hakodadi. Too uncertain as to the genus to be named.

ARENARIA SEPYLLIFOLIA, *Linn.; Thunb. Fl. Jap., p.* 186. Simoda.

STELLARIA MEDIA, *Linn.* Simoda, Yokohama, and Hakodadi.

STELLARIA ULIGINOSA, *Murray.* S. undulata, *Thunb. l. c.* Same as the European and North American plant.

MALACHIUM AQUATICUM, *Fries.* Cerastium aquaticum, *DC.* Simoda.

CERASTIUM VICOSUM, *Linn.; Thunb. l. c.* Simoda.

CERASTIUM FISCHERIANUM, *Seringe in DC. Prodr.* 1, *p.* 119. Hakodadi. Petals large.

MALVA MAURITIANA, *Linn.; Thunb. Fl. Jap., p.* 271.

EURYA JAPONICA, *Thunb. Fl. Jap. p.* 191. Hakodadi, Yokohama, &c.

CAMELLIA JAPONICA, *Linn.*, flore semipleno. Yokohama.

OXALIS CORNICULATA, *Linn.* Simoda and Yokohama.

ZANTHOXYLUM PLANISPINUM, *Sieb. & Zucc. Fam. Nat. Fl. Jap. l. c. p.* 30; var. foliolis latioribus interdum 7.—Simoda. The female plant, in blossom. The leaflets are mostly oblong or ovate-oblong, little narrowed at the base, and exhibit a few pellucid glands on the lamina, as well as those at the (rather conspicuous) crenatures. The flowers are chiefly digynous, as they likewise are in a specimen (from Burger's collection?) communicated to me from the Leyden herbarium. The spines are often very broad and stout.

ZANTHOXYLUM PIPERITUM, *DC.; Sieb. & Zucc. l. c. p.* 30. Fagara piperita, *Linn.; Thunb. Fl. Jap., p.* 64. Simoda. With male flowers.

STACHYURUS PRÆCOX, *Sieb. & Zucc. Fl. Jap., p.* 43, *t.* 18. Yokohama; on steep hill-sides. Flowering shoots (March); the leaves not yet appearing.

HYPERICUM CHINENSE, *Linn.?* Simoda. A fragment only.

VITIS VINIFERA, Linn. Hills, Simoda. Probably cultivated. The Vine was long ago introduced into Japan.

CELASTRUS ARTICULATUS, *Thunb. Fl. Jap. p.* 97; *Sieb. & Zucc. l. c.* Simoda. "A green flowered, vine-like bush." No reason appears for the specific name.

ILEX CRENATA, *Thunb. Fl. Jap., p.* 78; *Sieb. & Zucc. l. c.* Simoda.

EUSCAPHIS STAPHYLEOIDES, *Sieb. & Zucc. Fl. Jap., p.* 124 *t.* 67. Simoda. In blossom.

STAPHYLEA BUMALDA, *Sieb. & Zucc. l. c., p.* 180, *t.* 95. Hakodadi. In blossom, the plant exceedingly resembles our S. trifolia.

ACER JAPONCUM, *Thunb. Fl. Jap., p.* 162; *Sieb. & Zucc. Fam. Nat. Fl. Jap., p.* 48. Hako-

dadi. The alliance of this fine species is with A. circinatum, *Pursh*, of Oregon. Like that species, it is a shrub. It is said to grow on hill-sides, in dry and sandy soil.

ACER POLYMORPHUM, *Sieb. & Zucc. l. c.* A. septemlobum, palmatum, and dissectum, *Thunb.* Simoda. Two or three forms. A low bush, on steep banks; both in dry and damp woods.

ACER PICTUM, *Thunb. l. c.; Sieb. & Zucc. l. c.* Hakodadi. In blossom. A tree 30 to 50 feet high. Allied to A. platanoides.

VICIA FABA, *Linn.* Yokohama. Cultivated.

VICIA SATIVA, *Linn.* Simoda and Yokohama. On hills and in ditches.

VICIA TETRASPERMA, *Linn.* Ervum tetraspermum, *Linn.; Thunb. Fl. Jap.*, *p.* 284. Simoda and Yokohama.

VICIA OROBUS, *DC.?* Dry hills, Simoda.

LATHYRUS MARITIMUS, *Bigelow.* Pisum maritimum, *Linn.; Thunb. l. c.* Simoda and Hakodadi. On the beach, in sand.

PISUM SATIVUM, *Linn.; Thunb. l. c.* Yokohama. Cultivated.

WISTARIA SINENSIS, *Sieb. & Zucc. Fl Jap.* 1, *p.* 90, *t.* 44. Simoda; May. Flowers purplish.

INDIGOFERA DECORA, *Lindl. Bot. Reg.* 1846, *t.* 22. Simoda. Probably native.

HEDYSARUM CORONARIUM, *Linn.* Simoda. It is not stated whether this is cultivated.

LOTUS CORNICULATUS, *Linn.?* Simoda. Introduced.

MEDICAQO LUPULINA, *Linn.* Simoda. In the sand of the sea shore.

THERMOPRIS FABACEA, *DC.; Prodr.* 2, *p.* 99. Hakodadi. Young foliage, &c., silky-pubescent underneath, much as in some Californian and Oregon specimens, with which the range of this species is geographically connected by means of the Kurile Islands and Kamtschatka.

CÆSALPINIA SEPIARIA, *Roxb. Fl. Ind.* C. Japonica, *Sieb. & Zucc. Fam. Nat. Fl. Jap. l. c.*, *p.* 9. Simoda. On dry hill-sides. "A tree, 30 feet high."

PRUNUS (AMYGDALUS) PERSICA. Hakodadi.

PRUNUS PSEUDO-CERASUS, *Lindl.;* floribus normalibus et plenis. Cultivated everywhere.

PRUNUS JAPONICA, *Thunb.; Sieb. & Zucc. Fl. Jap.*, *p.* 172, *t.* 90.

SPIRÆA CALLOSA, *Thunb. Fl. Jap.*, *p.* 209; *Sieb. & Zucc. Fam. Nat. Fl. Jap.*, *p.* 16. Simoda.

SPIRÆA JAPONICA, *Sieb. & Blume, Bijdr.*, *p.* 1114. Simoda. Cultivated.

SPIRÆA THUNBERGII, *Sieb. & Zucc Fl. Jap.* 1, *p.* 130, *t.* 69. Simoda and Hakodadi.

KERRIA JAPONICA, *DC.; Sieb. & Zucc. l. c. t.* 68. Simoda and Hakodadi. Both the wild, with single flowers, and the double-flowered state, so common in our gardens, under the old name of Corchorus Japonicus.

POTENTILLA FRAGARIOIDES, *Linn.; Lehm. Pot.*, *p.* 50, *t.* 4. Hakodadi, Webster Island, and Yokohama. Both small and diffuse forms, with copious silky villosity; just the Kamtschatka plant of Lehmann, only they show no true runners. Also much less hairy forms; much larger throughout, a foot high.

POTENTILLA GELIDA, *C. A. Meyer; Ledeb. Fl. Ross*, 2, *p.* 59? Simoda. A glabrate form, with dentate, but not incised leaves.

FRAGARIA (DUCHESNEA) INDICA, *Linn.* Simoda.

RUBUS PARVIFOLIUS, *Sieb. & Zucc. l. c.*, *p* 18. Simoda, &c.

RUBUS INCISUS, *Thunb. Fl. Jap.*, *p.* 217, ex char. Simoda. The smaller leaves of our specimens accord with Thunberg's description in size and shape, although they generally have shorter petioles. The larger ones are about two inches in length and breadth, and are either moderately or deeply three-lobed, the lobes ovate and obtuse, the petioles 12 to 18 lines long;

peduncles an inch long. Corolla, white, an inch and a quarter in diameter; petals rounded. R. ribifolius, *Sieb. & Zucc.*, (judging from a specimen supplied by the Leyden herbarium,) is a pubescent state of the same species, with shorter peduncles, acute lobes to the leaves, &c.

RUBUS HYDRASTIFOLIUS (n. sp.): caulibus seu ramis inermibus cum petiolis tenuiter glandulosopubescentibus; foliis glabris e basi truncata vel subcordata subrotundis quinquefidis summisve cuneato-rotundis trifidis, sinubus angustis, lobis fere æquilongis ovato-oblongis acutis nervoso-venosis crebre duplicato-serratis nunc subincisis; stipulis oblongo vel ovato-lanceolatis; pedunculis axillaribus 3–5-floris (raro unifloris) petiolum superantibus; calycis tomentulosi segmentis triangulari-acuminatis petala rotundata alba haud æquantibus.—Simoda. A well-marked, large-leaved and large-flowered species. The specimens are probably short flowering branches from a woody stem, no part of which was gathered, but the plant may be wholly herbaceous. Stipules half an inch long, entire. Leaves from $2\frac{1}{2}$ to 5 inches in diameter, resembling those of a Grape, but with the deep sinuses very narrow, and the lobes equal, glabrous, except a little pubescence on the veins beneath, very sharply and somewhat incisely doubly serrate. Petioles 9 to 18 lines long, stout. Flowers an inch and a half in diameter when fully expanded. Fruit unknown. This is surely distinct from the last, and apparently from any described species.

RUBUS COPTOPHYLLUS (n. sp.): frutescens, mox glaber; ramis gracilibus aculeis sparsis rectis armatis; foliis subcordatis profunde 3–5-fidis tenuibus, lobis ovato-lanceolatis sensim acuminatis incisis crebre argute serratis, terminali productiore nunc trifido, lateralibus parvis, costis pilosulis; petiolis gracillimis leviter aculeolatis; stipulis perulatis deciduis; pedunculis solitariis unifloris calycis glabriusculi segmenta lanceolata acuminata subæquantibus; petalis albis ovalibus calyce longioribus.—Yokohama, on hill-sides. Branches slender. Petioles about an inch, and the leaves mostly an inch and a half long. The latter are very smooth and glabrous except the veins, which, when young, are beset with slender fine hairs, as are the petioles; the lobes are slender, very sharp-pointed, and very strongly and sharply toothed and incised. Petals about half an inch long, at first obovate, at length oblong. The flowers are solitary from lateral buds, accompanied by two or three leaves. This elegant species should be compared with Blume's R. pubinervis, which is very incompletely described.

ROSA MULTIFLORA, *Thunb.;* and fragments of one or two other species.

RHAPHIOLEPIS JAPONICA, *Sieb. & Zucc. Fl. Jap.* 1, *p.* 162, *t.* 85. Simoda. Flowering specimens only.

CYDONIA JAPONICA, *Pers.* Pyrus Japonica, *Thunb.* In hedges and along roadsides, Yokohama and Hakodadi. One of the numerous ornamental shrubs in cultivation for which we are indebted to Japan.

PYRUS MALUS, *Linn.* Hakodadi. Doubtless cultivated for its fruit.

PYRUS SPECTABILIS, *Ait.* P. baccata, *Thunb. Fl. Jap. p.* 207. Hakodadi and Simoda.

STRANSVAISIA DIGYNA, *Sieb & Zucc. Fam. Nat. Fl. Jap. p.* 21. Cratægus villosa, *Thunb.* Simoda. Smoother and smaller-leaved specimens than usual, but plainly Thumberg's plant. There are sometimes three styles. In the young fruit the pericarp appears to become adherent to the fleshy calyx-tube. Perhaps it is as near Photinia (to which Debandolle referred it) as to Stransvaisia.

SAXIFRAGA SARMENTOSA, *Linn.* Simoda. Long a well-known plant in cultivation.

CHRYSOSPLENIUM OPPOSITIFOLIUM, *Linn.* Hakodadi. Thunberg gives C. alternifolium as a Japanese plant, but the present species has not before been mentioned.

STEPHANANDRA FLEXUOSA, *Sieb. & Zucc.* (*in Acad. Monac.* 3, *p.* 70, *t.* 4.) Spiræa incisa, *Thunb.* Simoda. A remarkable plant, which Thunberg very naturally referred to Spiræa.

HYDRANGEA VIRENS, *Sieb. & Zucc. Fl. Jap.* 1, *p.* 114, *t.* 60. A striking and neat species, with very small and narrow leaves, and small cymes bearing few radiate blossoms, or sometimes none at all. "A low bush; sterile flowers greenish-white."

HYDRANGEA HORTENSIA, *DC*, var. AZISAI, & var. OTAKSA. H. Azisai, & H. Otaksa, *Sieb. & Zucc. l. c. t.* 61 & 52. The specimens plainly show that Siebold's two species are only one, and there is no doubt of their being mere forms of the well-known H. Hortensia. The specimens were taken from wild plants growing near Simoda.

HYDRANGEA HIRTA, *Sieb. & Zucc. Fl. l. c. p.* 117, *t.* 62. Viburnum hirtum, *Thunb.* Although not showy, this is indeed a curious species, from its small and rayless cymes, and its thin, strongly-toothed leaves, which have been well compared with those of Urtica urens. The specific name is far from appropriate, although the young shoots are strigosely hairy. None of the other Hydrangeaceous genera, viz: Cardiandra, Platycrater and Schizophragma were collected.

DEUTZIA SCABRA, *Thunb. Fl. Jap.* 1, *p.* 185, *t.* 24; *Sieb. & Zucc. Fl. Jap.* 1, *p.* 20, *t.* 7. Simoda, &c.

DEUTZIA CRENATA, *Sieb. & Zucc. l. c. p.* 19, *t.* 6. Simoda. The specimens of these two species show the distinctions indicated by Zuccarini, though the name of crenata, is not appropriate. The flowers of the present species are larger than those of the last, and the filaments mostly abruptly dilated or lobed on each side below the summit. But the plant we have in cultivation in the United States under the name of D. scabra is D. crenata. The two appear to be confounded in Japan; and will probably prove to be only forms of one species.

SEDUM LINEARE, *Thunb. Fl. Jap. p.* 187. Simoda. A single, imperfect specimen, of which nothing can be made.

HERACLEUEM LANATUM, *Michx. Fl.* 1, *p.* 166. In bloom. Apparently the same as the more hairy form of the species in Oregon, &c.

ARCHANGELICA OFFICINALIS, *Hoffm.?* Simoda, in the sand of the sea-shore. "Eaten by the Japanese." Too young and undeveloped to determine.

CŒLOPLEURUM GMELENI, *Ledeb. Fl. Ross.* 2, *p.* 361. (Archangelica Gmeleni, *DC. excl. syn.* Apium ternat.) Simoda. In blossom. I have neither specimens nor a full description for comparison; but I suspect this plant is rightly referred. It has the habit of an Archangelica, and produces inflated upper sheaths, bearing a short, petioled-trifoliolate, or three-lobed leaf, the leaflets or segments ovate, acute or acuminate, and sharply serrate; and the narrowly linear leaflets of the involcel are remarkably prolonged, exceeding the rays, or sometimes three or four times as long.

TORILIS JAPONICA, *DC. Prodr.* 4, *p.* 219? Simoda.

OSMORHIZA LONGISTYLIS, *DC. Prodr.* 4, *p.* 432. O. Japonica, *Sieb. & Zucc. Fam. Nat. Fl. Jap., p.* 95. Simoda. Exactly the plant of the United States, except that the styles are rather shorter than usual. Zuccarini distinguishes his O. Japonica by the obtuse lobes of the leaves, and the pedicels exceeding the length of the fruit. But our present specimens have the lobes equally acute, and the pedicels not longer than the fruit, while they decidedly are so in some New England and other North American specimens.

AUCUBA JAPONICA, *Thunb. Fl. Jap. p.* 64. Simoda.

ABELIA SERRATA, *Sieb. & Zucc. Fl. Jap.* 1, *p.* 76, *t.* 34. Simoda. A small shrub, in dry woods.

WEIGELA JAPONICA, *Thunb. Fl. Jap., p.* 90, *t.* 16. Diervilla versicolor and D. grandiflora, *Sieb. & Zucc. Fl. Jap., p.* 71, 74, *t.* 31, 33. Simoda, in woods. "A low bush," and (a smaller-leaved form) "a bushy tree." "Flowers white, then reddish, very ornamental." Siebold and Zuccarini have evidently admitted too many species; indeed, the two of Thunberg seem to be essentially the same. The present collection exhibits a variety of forms, (all with the foliage glabrous, or nearly so), but evidently all belong to one species. The genus Weigela appears to be very well distinguished from Diervilla.

LONICERA JAPONICA, *Thunb. Fl. Jap., p.* 89. L. Chinensis, *Wats.; DC. Prodr., p.* 333. Simoda. A species long well-known in cultivation.

LONICERA (XYLOSTEUM) MORROWI (n. sp.); erecta, molliter tomentosa; foliis oblongis basi rotundata vel subcordata supra pubescentibus subtus canescenti-tomentosis; pedunculis folio dimidio brevioribus flores longitudine æquantibus; bracteis lanceolatis vel spathulatis ovariis plerumque discretis duplo quadruplove longioribus; corolla ultra medium fissa basi hinc gibbosa; filamentis basi styloque hirsutis.—Hakodadi, on hill-sides. Whole plant soft-downy, except the upper surface of the leaves. These are about an inch and a half long, by three-fourths of an inch in width, and on petioles a line and a half long. Corolla whitish? somewhat pubescent; the lobes narrowly oblong. Bracts variable in size, sometimes five lines long, foliaceous. The pubescence, and especially the long peduncles, must distinguish this from L. brachypoda, *DC.* The specific name is a deserved compliment to one of the collectors.

SAMBUCUS PUBENS, *Michx. Fl.* 1, *p.* 181. Hakodadi. To all appearance the same as the North American species, which extends from New England to the Russian islands on the northwest coast. There is also an imperfect narrow-leaved specimen, which is perhaps referable to S. racemosa.

VIBURNUM EROSUM, *Thunb. Fl. Jap., p.* 124? Simoda. A species allied to the pubescent forms of our V. dentatum and V. pubescens. Leaves varying from oblong to obovate and orbicular.

VIBURNUM PLICATUM, *Thunb. in Linn. Trans.* V. dentatum and V. tomentosum, *Thunb. Fl. Jap., p.* 123. V. plicatum (floribus omnibus sterilibus difformibus) and V. tomentosum, *Sieb. & Zucc. Fl. Jap.*, 81, *t.* 37, 38. V. lantanoides, *Michx.* Hakodadi. "A bush fifteen feet high." The specimens accord perfectly with the V. lantanoides (but which is seldom so tall) of our own cooler woods, a species which does not extend westward beyond the Alleghany Mountains and Canada. V. plicatum, *Thunb.* (excl. syn. *Kœmpf.*) is plainly merely the Guelder-Rose state of V. tomentosum. But the name is preferable, since the plant is not at all tomentose, excepting a caducous stellular tomentum on very young parts; indeed Michaux's name is much the best one, but is the latest. This adds another to the interesting list of species peculiar to Eastern North America and to the Chino-Japanese region.

ASPERULA ODORATA, *Linn.* Hakodadi. Not before enumerated as a Japanese plant. Probably introduced?

GALIUM APARINE, *Linn.* Simoda, on walls. A very wide-spread species, not before recorded from Japan.

GALIUM TRACHYSPERMUM: caule debili lævissimo; foliis quaternis ovalibus seu oblongis subacutis uninerviis (basi tantum trinerviis) glabriusculis marginibus costaque longiuscule ciliatis;

cymis parvis lateralibus breviter pedunculatis paucifloris; pedicellis fructu muricato-scabro vix longioribus. G. rotundum (rotundifolium), *Thunb. Fl. Jap., p.* 59. Hakodadi. In fruit only.

SERISSA FŒTIDA, *Comm.; DC. Prodr.* 4, *p.* 575. Lycium Japonicum, *Thunb. Fl. Jap., p.* 93, *t.* 17. Simoda. "Cultivated."

DAMNACANTHUS INDICUS, *Gœrtn. Carp.* 3, *p.* 18, *t.* 182. Carissa spinarum, *Thunb.; DC. Prodr.* 4, *p.* 473. Simoda. In the size of the leaves and flowers, and the shape of the teeth of the calyx, approaching D. major, *Sieb. & Zucc.*

VALERIANA TRIPTERIS, *Linn.: DC. Prodr.* 4, *p.* 636. Simoda. This appears to be just the European species; which is the more remarkable as it is not recorded from any part of Northern Asia, nor of Western America. Some of the upper cauline leaves bear five leaflets, the lower pair very small.

PETASITES ALBUS, *Gœrtn.; DC. Prodr.* 5, *p.* 207. Tussilago Petasites, *Thunb. Fl. Jap. p.* 314. Nardosmia Japonica, *Sieb. & Zucc.?* Low woodlands, Yokohama, March. Leaves not gathered; but the broad bracts, &c., are those of P. albus.

ASTER JAPONICUS, *Less.; Nees. Ast. p.* 34. Inula dubia, *Thunb.* Simoda; on mountain tops, April. Low specimens, only a span high, but agreeing well with Thunberg's and Lessing's description, except that the upper part of the stem is not leafless for any great length. The species is nearly allied to A. Unalaschensis, perhaps only a form of it. The rays are large, and were evidently blue or purple.

ERIGERON PULCHELLUS, *DC. Prodr.* 5, *p.* 257? Yokohama.

ASTEROMŒA INDICA, *Blume.* Aster Indicus, *Thunb. Fl. Jap. p.* 316. Yokohama.

DOLLINGERIA SCABRA, *Nees. Ast. p.* 183? Yokohama and Simoda.

TAGETES PATULA, *Linn.; Thunb. Fl. Jap. p.* 320. Simoda. Cultivated.

PYRETHRUM SINENSE, *Sabine; DC.* Cultivated forms.

GNAPHALIUM CONFUSUM, *DC. Prodr.* 6, *p* 222. Simoda.

CALENDULA OFFICINALIS, *Linn.; Thunb.* Yokohama; on hill-sides.

APLOTAXIS MUTLICAULIS, *DC. in Deless. Ic.* 4, *t.* 68, *& Prodr.* 6, *p.* 540? Simoda; common everywhere. I have no Nepaul specimens for comparison; but, judging from the figure and description, this is likely to be De Candolle's plant.

LAPPA MAJOR, *Gœrtn.; DC.* Simoda.

CIRSIUM JAPONICUM, *DC. Prodr.* 6, *p.* 640. Simoda.

ANANDRIA BELLIDIASTRUM, *DC. Prodr.* 7, *p.* 40. Hakodadi. Dwarf forms.

PICRIS HIERACIOIDES, *Linn.; DC. Prodr.* 7, *p.* 128. Picris Japonica, *Thunb.; Sieb. & Zucc. l. c.; Ledeb. Fl. Ross.* 2, *p.* 800. P. Davurica, *Fisch. & Hornem.; DC. l. c.* P. Kamtschatica, *Ledeb. Fl. Alt. &c.* Simoda and Hakodadi. Zuccarini had already joined the North Asiatic plant to the Japanese, but they all may be safely referred, along with the New Zealand and Australian forms, to the European P. hieracioides.

YOUNGIA THUNBERGIANA, *DC. Prodr.* 7, *p.* 192. Prenanthes lyrata, *Thunb.* Simoda.

YOUNGIA DEBILIS, *DC. l. c. p.* 194. Prenanthes debilis, *Thunb.* This is referred by Zuccarini to Y. pygmæa, *Ledeb.*, a polymorphous species which includes Barkhausia and Crepis nana; but the leaves and heads are so much larger in our specimens than in the last named plant, and the habit so different, that I hesitate to refer Thunberg's Prenanthes debilis (which ours seems to be) to that species. The specimens were gathered at Simoda and Yokohama.

YOUNGIA JAPONICA, *DC. l. c., p.* 194? Simoda. A single specimen gathered, with capitula

no larger than those of Y. Thunbergiana (of which perhaps it is only a small state with a naked scape) may be provisionally referred to this species.

TARAXACUM DENS-LEONIS, *Desf.* Simoda and Yokohama. A nearly cosmopolite plant.

CHORISIS REPENS, *DC. Prodr.* 7, *p.* 178. Chorisma repens, *Don, in Edinb. Phil. Jour.* Prenanthes repens, *Linn. Amœn. Acad.* 2, *p.* 360, *t.* 4. Simoda; creeping in deep sand on the beach; April. This very rare plant was, till now, known only from Kamtschatka and the Kurile Islands, and has not been gathered, I believe, since the time of Linnæus. In my opinion Don has rightly established a genus upon it, and Ledebour, who had seen the plant, was wrong in referring it to Nabalus, to which, however, it is manifestly allied. The mature fruit is unknown; but the immature achenia are flat, ribbed with ten narrow and salient nerves, and contracted at the apex into a distinct but short beak. The character of the foliage is that of Nabalus.

There is also in the collection, from Simoda, a Cichoraceous plant, which I am unable to determine from the present materials. It seems to be allied to Barkhausia, the immature achenia being slender-beaked, but they are apparently compressed; the pappus is, perhaps, rather sordid and fragile, and the cylindrical small heads are only five-flowered. It is to be hoped that Mr. Wright, in the North Pacific Surveying Expedition, has obtained further materials.

SONCHUS ASPER, *Vill.* S. oleraceus, *Thunb.* Simoda and Hakodadi. Probably the true S. oleraceus also occurs in Japan, as it does in every other part of the world.

ISOLOBUS RADICANS, *A. DC. Prodr.* 7, *p.* 353. Lobelia radicans, *Thunb.* Simoda.

WAHLENBERGIA MARGINATA, *A. DC. Prodr.* 7, *p.* 433. Campanula marginata, *Thunb.* Dry river-banks. Simoda.

CAMPANULA TRACHELIUM, *Linn.; Thunb. Fl. Jap.* 88. Simoda.

ANDROMEDA (PIERIS) ELLIPTICA, *Sieb. & Zucc. Fam. Nat. Fl. Jap. pars* 2, *p.* 2. Simoda. Probably specifically distinguishable from A. ovalifolia of the Himalayas, but not by all the characters assigned. The style is not more exserted in the Himalayan than in the Japanese plant, and the leaves of the former are by no means always cordate, but sometimes even acute at the base. Those of the present species are sparsely and minutely hairy underneath.

RHODODENDRON INDICUM, *Sweet; DC. Prodr.* 7, *p.* 726.—Simoda and Hakodadi. Several varieties, growing wild.

RHODODENDRON METTERNICHI, *Sieb. & Zucc., Fl. Jap.*, 1 *p.* 23, *t.* 9 ? sed stamina 20 !—Simoda. Cultivated.

AZALEA? SERPYLLIFOLIA (n. sp.): humile; ramulis strigosis; foliis oblongo-spathulatis mucronatis parce setoso-hispidis mox glabris impunctatis; floribus e gemmis plerumque solitariis subsessilibus; calyce brevissimo; corolla regulari, lobis amplis tubo infundibuliformi brevi longioribus; staminibus 5 exsertis declinatis; antheris basi mucronatis.—Simoda. "Cultivated; not common; called by a Japanese name meaning Rice Azalea, on account of its small leaves and flowers." I find nothing like this species described under either Azalea or Rhododendron. The leaves are barely from a quarter to a third of an inch in length, and appear to be deciduous; and the corolla is only one-third of an inch in length and breadth; the color not recorded, but probably pink or white.

PYROLA ROTUNDIFOLIA, *Linn.* Simoda. Not before recorded from Japan. But Zuccarini enumerates P. media. Our single specimen belongs to a small-leaved form of P. rotundifolia.

STYRAX JAPONICUM, *Sieb. & Zucc. Fl. Jap.* 1, *p.* 53, *t.* 23; Simoda.—Leaves and blossoms larger than in Siebold's specimens.

DIOSPYROS' KAKI, *Linn. f. Suppl.*, *p.* 439; *Thunb. Fl. Jap.*, *p.* 158. Simoda.

PLANTAGO MEDIA, *Linn.* Hakodadi. Not before enumerated from Japan. But Thunberg has recorded P. major.

PRIMULA CORTUSOIDES, *Linn.; Thunb. Fl. Jap.*, *p.* 82. Simoda.

LYSIMACHIA CLETHROIDES, *Duby in DC. Prodr.* 8, *p.* 61. L. Ephemerum, *Thunb.* Simoda.

LYSIMACHIA LUBINIOIDES, *Sieb. & Zucc.*, *l. c. p.* 16. Simoda.

PAULLOWNIA IMPERIALIS, *Sieb. & Zucc. Fl. Jap.* 1, *p.* 25. *t.* 10. Simoda.—A fine ornamented tree, now becoming common in cultivation in the United States. Unfortunately the large blossoms precede the leaves.

MAZUS RUGOSUS, *Lour.; Benth. in DC. Prodr.* 10, *p.* 375. Lindernia Japonica, *Thunb.* Simoda and Yokohama.

VERONICA ANAGALLIS, *Linn.; Thunb. Fl. Jap.*, *p.* 20. Simoda.

VERBENA OFFICINALIS, *Linn.* Simoda.

CALLICARPA MOLLIS, *Sieb. & Zucc. l. c. p.* 31. Simoda.

PERILLA ARGUTA, *Benth. in DC. Prodr.* 12, *p.* 164. Ocymum crispum, *Thunb.* Simoda.

BRUNELLA VULGARIS, *Linn.* Simoda.

SCUTELLARIA HEDERACEA, *Kunth. Ind. Sem. Hort. Berol.* 1845, *ex Benth. l. c. p.* 426? Simoda. Leaves resembling those of Veronica hederæfolia, but on very short petioles, the lower, however, not gathered.

SCUTELLARIA INDICA, *Linn.; Benth. l. c.* Simoda.

LAMIUM AMPLEXICAULE, *Linn.* Yokohama.

LAMIUM PETIOLATUM, *Royale, ex Benth. in Hook. Bot. Misc.* 3 *p.* 381, *& Prodr.* 12, *p.* 509. L. barbatum, *Sieb. & Zucc. l. c.* L. Garganicum, *Thunb.* Hakodadi.

NEPETA GLECHOMA, *Benth.* var. HIRSUTA. Glechoma hirsuta, *Waldst. & Kit.* Simoda and Hakodadi.

AJUGA REMOTA, *Benth. in Wall. Pl. Asiat. Rar. & DC. Prodr. l. c. p.* 597. Simoda.—The specimens show indications of stolons.

LITHOSPERMUNN? JAPONICUM (n. sp.): humile, perenne, strigoso-hirsutum; caulibus floridis e candicibus filiformibus aut stolonibus adsurgentibus foliosis (3–5-pollicaribus); foliis oblongo-spathulatis obtusis uninerviis, imis rosulatis majoribus utrinque hispidis, summis oblongis sessilibus; corollæ cæruleæ infundibuliformis tubo laciniis calycis linearibus duplo longioribus, fauce eximie plicata, plicis longitudinalibus cristæformibus antice glanduloso-puberulis (fructu ignoto.)—Simoda, along brooks. Lower or rosulate leaves, which have lasted over the winter, 1½ to 2½ inches long, tapering gradually to the base, nearly sessile, papillose-hispid on the upper surface; those of the flowering stems an inch or half an inch long, hispid with rather soft appressed hairs, cinereous. Calyx deeply 5-parted. Corolla half an inch long, the rounded spreading lobes 3 lines long; the strong salient plicæ underneath them 2 lines long; no fornices present. Stamens below the plicæ: filaments inserted below the middle of the tube, rather shorter than the oblong anthers. The fruit is needed rightly to determine the genus.

MYOSOTIS ARVENSIS, *Linn.* M. intermedia, *Link, DC., etc.* Hakodadi.

MYSOTIS CHINENSIS, *DC. Prodr.* 10, *p.* 106. M. pedunculare, *Bunge! Enum. Pl. Chin.*, non *Trev.* Yokohama. The specimens, although some of them larger, agree with original ones of Bunge's collection. In them, contrary to De Candolle's character, the apex of the pedicel after

flowering becomes thickened and obconical under the calyx; and the pedicel becomes patent, or sometimes even recurved. I have not the fruit of this form, nor of Bunge's Chinese plant. But I have little doubt of its being specifically the same as the next, viz:

ERICHITUM PEDUNCULARE, *DC. l. c. p.* 128. Mysotis pedunculare, *Trev.* M. clavata, *Blume, ex Turcz.* Simoda. Accords well with the plant from Astrachan. Achenia minutely punctate under a strong lens, minutely pilose-puberulent, or soon entirely glabrous, at least on the outer face; insertion lateral, at or near the base, by means of a very small stipe.

OMPHALODES? ———— Apparently undescribed, and not to be properly characterized in the absence of the fruit. It does not accord with the description of Cynoglossum Japonicum, *Thunb.* Hakodadi.

CALYSTEGIA SOLDANELLA, *R. Br.; Chois. in DC, Prodr.* 9, *p.* 433. Simoda; on the sea-beach.

SOLANUM NIGRUM, *Linn.* Simoda; and in almost every part of the world.

PHYSALIS ALKEKINGI, *Linn.* Simoda.

GENTIANA THUNBERGII, *Griseb. in DC. Prodr.* 9, *p.* 108; *Sieb. & Zucc., Fam. Nat. Fl. Jap. l. c. p.* 34. G. aquatica, *Thunb.* Natsima or Webster's island; April, on hill-sides. The smallest plants are only an inch or two in height, and one-flowered; the larger are fastigiately 5–9-flowered. The leaves are all orbicular or round-ovate, and abruptly cuspidate. Corolla an inch long.

GENTIANA SQUARROSA, *Ledeb. Ic. Pl. Alt. t.* 14, *& Fl. Ross.* 3, p. 63? Yokohama.

MENYANTHIS TRIFOLIATA, *Linn.* Hakodadi. Not before recorded from Japan.

MALOUETIA ASIATICA, *Sieb. & Zucc, l. c. p.* 39. Nerium divaricatum, *Thunb.* Simoda. In flower.

VINCETOXICUM JAPONICUM, *Morr. & Decaisne; DC. Prodr.* 8, *p.* 524. Simoda.

LIGUSTRUM JAPONICUM, *Thunb. Fl. Jap. p.* 17; *Sieb. & Zucc, l. c.* Simoda.

LIGUSTRUM IBOTA, *Sieb.; Sieb. & Zucc. l. c.* Simoda.

FRAXIMUS SIEBOLDTIANA, *Blume, Mus. Bot. Lugd.* 1, *p.* 311. Simoda, on dry mountains; also cultivated.

POLYGONUM AVICULARE, *Linn.* The var. *erectum*, or nearly. Simoda; in rice fields.

POLYGONUM JAPONICUM, *Meisn. in DC. Prodr.* 14, *p.* 112. Simoda. Depauperate specimens.

POLYGONUM CHINENSE, *Linn.* var. THUNBERGIANUM, *Meisn. in DC. Prodr. l. c. p.* 130. Simoda.

POLYGONUM THUNBERGII, *Sieb. & Zucc. l. c.* (sine descr.); *Meisn. l. c. p.* 132. P. arifolium, *Thunb.* Simoda. This is indeed closely allied to our P. arifolium, nor is there any difference in the hairiness of the leaves and the shortness of the petioles (which in these specimens are quite as long as in the American plant,) and perhaps not much in the shape of the achenium, but I have not seen ripe fruit. The style, however, is three-cleft, and the stamens 7 or 8! The posterior lobes, as far as the specimens go, are shorter and less acute than in P. arifolium, and (which most inclines me to view the Japanese plant as specifically distinct) the very short ochreæ bear a pretty large and foliaceous, reniform, or 2-cleft, spreading limb, much larger than the sheathing portion, while there is nothing like this in the American plant.

POLYGONUM SIEBOLDII, *Meisn. l. c. p.* 133. P. sagittatum, *Thunb.* Simoda. The specimens are too young and depauperate for full comparison with Meisner's characters, and for demonstrating its distinctness from P. sagittatum, at least from the Siberian form of that species.

POLYGONUM CONVOLVULUS, *Linn.*; *Thunb. Fl. Jap. p.* 169. Simoda. As far can be determined the same as the European and American plant.

FAGOPYRUM EMARGINATUM, *Meisn. l. c. p.* 143? Simoda, &c. The specimens too young for proper specific determination.

RUMEX CRISPUS, *Linn.*, var. NUDINALVIS, *Meisn. l. c. p.* 45? Simoda. There are portions of two other Rumices, too imperfect to be determined.

BENZOIN SERICEUM, *Sieb. & Zucc. Fam. Nat. Fl. Jap.* 2, *p.* 80. Hakodadi. I should have taken this for a species of Sassafras.

MACHILUS THUNBERGII, *Sieb. & Zucc. l. c.?* Laurus Indica, *Thunb. Fl. Jap. p.* 173. Simoda. A tree with a spreading top, sixty feet high.

CINNAMOMUM PEDUNCULATUM, *Nees, Laur. p.* 62. Simoda.

ELÆAGNUS MACROPHYLLA, *Thunb. Fl. Jap. p.* 67. Hill-sides, Simoda.

ELÆAGNUS UMBELLATA, *Thunb. Fl. Jap. p.* 66, *t.* 14. With the preceding.

ELÆAGNUS PUNGENS, *Thunb. l. c. p.* 68? High hills, Simoda. A tree twenty feet high. The branches are not spinescent in the specimens, and the pedicels (of pistillate flowers) either solitary, in pairs, or in fascicles.

THESIUM ALPINUM, *Linn.?* Simoda and Yokohama.

EUPHORBIA HELIOSCOPIA, *Linn.* Yokohama. Also another species too imperfect for determination.

HOTTUYNIA CORDATA, *Thunb. Fl. Jap. p.* 144, *t.* 26. Simoda.

SAURURUS LOUREIRI, *Decaisne in Ann. Sci. Nat. ser.* 3, 3, *p.* 102; *Sieb. & Zucc. l. c.* S. cernuus, *Thunb. Fl. Jap. p.* 154. Distinguished from our S. cernuus by the short filaments, as indicated by Decaisne; also by the distinct pedicels, which are spreading or reflexed after flowering, and by the larger and rounded bractlet they bear at their summit.

PIPER FUTUKADSURA, *Sieb. in Fam. Nat. Fl. Jap. l. c. p.* 107. Simoda.

TRICERCANDRA, Nov. Gen. Chloranthacearum.

Flores hermaphroditi, achlamydei, spicati, singuli intra bracteam navicularem sessiles. Stamina 3, basi leviter coadunati ovario supra basim antice inserta, æqualia, loriformia, intermedium anantherum, lateralia basi extus antheram unilocularem adnatam oblongam longitudinaliter dehiscentem gerentia. Ovarium ovatum, intus gibbum, uniloculare: stylus brevis: stigma magnum, capitato-depressum, vix emarginatum. Ovulum orthotropum, sub apice cavitatis appensum. Fructus haud visus.—Herba Japonica, ut videtur perennis, spithamæa, caule simplicissimo inferne aphyllo ad nodos bisquamato, apice quadrifoliato atque spicam oblongam pedunculatam simplicissimam gerente, stipulis interpetiolaribus parvis.

TRICERCANDRA QUADRIFOLIA.—Hakodadi and Yokohama; on steep and shaded hill-sides; March 20. Stem erect, rather stout, four to six inches high, the naked part having one or two nodes, each bearing a pair of small and bract-like scales in place of leaves; at the summit bearing four leaves in an apparent whorl, but they evidently consist of two approximate pairs. Leaves oval, short-petioled, membranaceous, about two inches long, veiny, tipped with a narrow acuminate point, strongly serrate with sharp-pointed teeth. Peduncle terminal, about an inch long. Spike half an inch or more in length, dense, squarrose with the long and spreading tail-like stamens. Bracts navicular, triangular, shorter than the ovary. Rhachis more or less excavated above each bract. Stamens inserted on the back of the ovary, opposite the summit of the short bract; similar, except the middle one is wholly sterile, porrect, or soon somewhat decurved, becoming three lines long, apparently greenish, rather fleshy, narrowly ligulate, obtuse, the edges apparently vertical; the two lateral bearing a linear-oblong, adnate, one-celled

anther next the base on the lower or outer edge, which opens longitudinally for its whole length. Ovary strongly gibbous on the side towards the axis, tipped with a short but distinct style, which bears a large and terminal stigma. Ovule globular, affixed to the inner suture near its summit, pendulous. A well-marked new genus, evidently allied to Chloranthus, from which it is distinguished by the style, and especially by the stamens. The latter organs naturally suggest the name, each flower bearing as it were three outstretched tails.

CELTIS WILLDENOVIANA, *Rœm. & Schult.* C. orientalis, *Thunb Fl. Jap.*, *p.* 114. Simoda.

BROUSSONETIA PAPYRIFERA, *Vent.* Morus papyrifera, *Thunb.* Simoda. The Paper Mulberry; both with entire and with lobed leaves.

FICUS ERECTA, *Thunb; Sieb. & Zucc. l. c.?* Simoda.

BŒHMERIA NIVEA, *Weddell?* Utica nivea, *Linn.?* Simoda.

CASTANEA JAPONICA, *Blume, Mus. Bot. Lugd.* 1, *p.* 284. Simoda.

QUERCUS GLANDULIFERA, *Blume, l. c. p.* 295. Simoda.

QUERCUS SERRATA, *Thunb. Fl. Jap. p.* 176. Simoda. In blossom.

QUERCUS DENTATA, *Thunb. l. c.*; *Blume, l. c.* Simoda. In blossom.

BETULA CARPINIFOLIA, *Sieb. & Zucc.?* Aments only. Yokohama.

SALIX SIEBOLDTIANA, *Blume, Bijdr. N. p.* 517. Hill-sides, Simoda and Yokohama.

SALIX JAPONICA, *Thunb. Fl. Jap. p.* 24? Hakodadi. Mere fragments.

SALIX INTEGRA, *Thunb. l. c.?* Hakodadi. There are incomplete specimens of another species in the collection.

ABIES POLITA, *Sieb. & Zucc. Fl. Jap.* 2, *p.* 20, *t.* 111. Hakodadi.

CRYPTOMERIA JAPONICA, *Don.; Sieb. & Zucc. Fl. Jap.* 2, *p.* 43, *t.* 24. Simoda. Now introduced into cultivation in the middle States.

THUJOPSIS DOLABRATA, *Sieb. & Zucc. l. c. t.* 119. Thuja dolabrata, *Thunb.* Simoda. Cultivated.

SALISBURIA ADIANTIFOLIA, *Smith; Sieb. & Zucc. l. c.* A single leaf of the well known *Ginkgo* was in the collection.

ARISÆMA THUNBERGII, *Blume, Rumphia*, 1, *p.* 105. Arum Dracontium, *Thunb. Fl. Jap.*, non *Linn.* Simoda, and on Natsu-Sima or Webster Island; April. Well described by Blume in the work above cited. The tail to the spadix is exceedingly prolonged and tendril-like.

ARISÆMA JAPONICUM, *Blume, l. c., p.* 106. Simoda.

ACORUS GRAMINEUS, *Ait.; Kunth, Enum*, 3, *p.* 87. Simoda. In springy ground.

DENDROBIUM CATENATUM, *Lindl. Gen. & Sp. Orchid.* Epidendrum monile, *Thunb.* Locality not recorded.

EPIPACTIS THUNBERGII (sp. nov.); glabra; foliis ovato-lanceolatis conformibus; labelli hypochilio fere E. palustris, epichilio dum explanato panduriformi haud undulato a basi ultra medium usque juxta margines bilamellato, (lamellis prominulis superne unidentatis,) apice elamellato rotundato obtusissimo cucullato parte lamellifero minore.—Serapias longifolia, *Thunb. Fl. Jap. p.* 28, non *Linn.* Simoda. Smooth throughout, more leafy to the top, (with bracts conformed to the leaves, but smaller,) and fewer-flowered than E. palustris, for which Thunberg seems to have taken it; the purple flowers about the same size, and the labellum (as characterized above) decidedly different as to the anterior part.

CEPHALANTHERA JAPONICA (n. sp.): foliis inferioribus oblongis, cæteris oblongo-lanceolatis acutis; bracteis minimis; floribus 2–4 luteis; sepalis petalisque obtusis; labelli hypochilio basi profunde saccato (fere calcarato,) epichilio latissimo subcordato-rhomboideo apice subacuto

glabro intus lamellis 5–7 acutissimis (3 centralibus majoribus) eximie percurso.—Serapias falcata, *Thunb. Fl. Jap., p.* 28? Dry woods, Simoda. Plant about a foot high, with nearly the foliage of C. rubra; the flowers smaller than those of C. pallens; well distinguished from all the described species by the deep and spur-like sac at the base of the labellum, and the remarkably salient lamellæ of the broadly dilated epichilium. It appears to be most allied to C. acuminata, *Lindl.*, (which I have not seen,) but the leaves are hardly acuminate; the epichilium not bearded in any part, much broader than long, and its lamellæ very conspicuous. It is likely enough to be Thunberg's Serapias falcata, the upper leaves being commonly conduplicate in the dried specimens, and then somewhat falcate; but there is not sufficient evidence of it to warrant the adoption of that specific name. I have not been able to consult the figure in Thunberg's *Icones Pl. Jap.*

SPIRANTHES AUSTRALIS, *Lindl. Gen. & Sp. Orchid., p.* 463? Dry woods, Simoda; June. The labellum is glabrous.

ORCHIS ARISTATA, *Fischer; Lindl. l. c., p.* 262. O. latifolia, var Beeringiana, *Cham. & Schlecht.* Hakodadi. The same as the plant of Kamtschatka and the Aleutian Islands. Ledebour, following Chamisso and Schlechtendal, receives it as a variety of O. latifolia; but it appears distinct from the European plant.

CYMBIDIUM: too poor to determine; apparently not C. ensifolium. Simoda. Without foliage.

CALANTHE DISCOLOR, *Lindl. Bot. Reg.* 1840, *t.* 55. Scapo puberulo foliis oblongis concoloribus longiore; racemo laxo multifloro; sepalis petalisque (fusco-purpureis) mucronatis; labello (albo vel roseo) columnæ omnino accreto profunde trilobo ima basi breviter barbato et tricristato, lobis cuneiformibus, intermedio minore basi longius attenuata tricostata, disco lamellis 3 (rarius 1–2 obsoletis) petaloideis conspicuis instructo; calcare tenui incurvo, apice nunc subulato vel acutato ovarium excedente.—Simoda. This handsome species is evidently the one figured by Lindley, above cited, of the habitat of which he was uncertain. But the lamellæ of the lip in our specimen are larger, sometimes half as large as the lobe that bears them, and extended higher up on its disk. They vary in size, however, and the lateral ones are occasionally smaller, or one of them obsolete.

CYPRIPEDIUM JAPONICUM, *Thunb. Fl. Jap., p.* 30. Hill-sides, Simoda. A most striking species, on account of its single pair of large, fan-shaped leaves.

IRIS JAPONICA, *Thunb.* I. squalens, *Thunb. Fl. Jap., p.* 33. Simoda; along water-courses.

IRIS VERSICOLOR, *Thunb. Fl. Jap., p.* 34. Simoda. Too poor for proper determination; but not the North American species.

ALETRIS JAPONICA, *Lamb.*, non *Thunb.* Hypoxis spicata, *Thunb. Fl. Jap., p.* 136. Simoda. Distinguished from the American species by the linear and grass-like leaves, the glandular pubescence of the scape and flowers, and the shorter perianth.

SMILAX JAPONICA. S. China, *Thunb. Fl. Jap., p.* 152. Coprosmanthus Japonicus, *Kunth, Enum.* 5, *p.* 268, licet loculi uniovulati! Simoda and Hakodadi; also Webster Island, on dry hill-sides. This accords so well with the description by Kunth, that for the present I am forced to think it the same species, although I find the ovules solitary in each cell. Even if the ovules were in pairs, I should none the less refer this ligneous and prickly species to Smilax, and consider that it demanded the reduction of Coprosmanthus to a subgenus, for which Dr. Torrey originally proposed it.

TRILLIUM ERECTUM, *Linn.* var. ALBUM, *Pursh.* Hakodadi; in pine woods. I see no difference between this and the plant of the Northern United States, (which we still, with some misgiving,

regard as a variety of the purple species,) except that the leaves are remarkably large and broad, the largest being 5 inches wide and 4 long. That the genus, although not before recorded, should be represented in Japan, is what we were prepared to expect, but the recurrence in that country of one of our own species, and in its rarer form, is remarkable.

SMILACINA (MAIANTHEMUM) BIFOLIA, *Desf. in Ann. Mus. Par.* 9, *p.* 54. Convallaria bifolia, *Linn.* Hakodadi. This was to be expected, although not before recorded, from Japan. It is the same form as the specimens from Kamtschatka and our northeast coast, having larger and rounder leaves than is common in Europe, and longer petioles than are usually seen in the plants of Eastern North America. The leaves are more frequently three than two.

SMILACINA JAPONICA (n. sp.): caule hirto alterne folioso; foliis ovatis oblongisve cum acumine brevi obtuso basi rotundatis subpetloiatis margine nervisque subtus pilosulo-ciliatis; panicula parva pluriflora; perianthii phyllis lineari-ellipticis obtusissimis filamenta lineari-subulata subsuperantibus.—Hakodadi. Near S. racemosa, which ranges across the North American continent; but distinguished by the broader and less pointed leaves, the pubescence, the smaller panicle, the larger perianth, and comparatively shorter stamens. From the habitat, &c., we may suppose this to be Thunberg's Uvularia hirta, (of which the flowers were not seen); but the leaves are 3 or 4 inches long, not cordate, although sometimes almost so, nor clasping, except by the short and broad concave petiole or narrowed base.

CONVALLARIA MAJALIS, *Linn.* Hakodadi. The Lily of the Valley ranges from Western Europe to the province of Dahuria, Siberia, and probably through China. We now have it from Japan. It occurs in North America, likewise, but is here extremely local, being found only in the Alleghany Mountains south of lat. 39°.

POLYGONATUM JAPONICUM, *Morr. & Decaisne, in Ann. Sci. Nat.* 1834; *Kunth, Enum.* 5, *p.* 133. Simoda. Too imperfect for proper determination; but apparently very near P. vulgare. The flowers have fallen.

DISPORUM SESSILE, *Don. Fl. Nepal. p.* 50; *Kunth. Enum.* 4, *p.* 208. Uvalaria sessilis, *Thunb. Fl. Jap. p.* 135. Simoda. Clearly a congener of the three species figured by Dr. Wight; but in an ovary examined, I find *three* collateral ovules in each cell, ascending from near the base. The leaves vary from elongated-ovate to lanceolate, and the flowers are often in pairs, rarely even in threes. They are bell-shaped, almost an inch long. The sepals and petals all saccate at the base, dilated-spatulate in form, and rounded or retuse at the summit. I suspect the fruit is capsular and not unlike that of Uvalaria sessilifolia in shape. The stamens are those of Disporum, a genus which will probably be retained, but with some variation in the character; for while this species has more than two ovules in each cell, the following has only one.

DISPORUM SMILACINUM (n. sp.): caule gracili (6–9-pollicari) simplici; foliis ovatis oblongisve, superioribus sensim acuminatis; flore plerumque solitario; perianthii (albi) phyllis ovato-lanceolatis patentibus; ovarii loculis uniovulatis.—Simoda and Hakodadi; on hills, in Pine woods. Glabrous. Leaves 1½ to 2 inches long, slightly petioled. Flowers single, rarely a pair, short peduncled. Sepals and petals spreading in anthesis, consimilar, slightly gibbous at the base; half an inch or less in length, acutish or obtusely acuminate. Filaments dilated-subulate, half the length of the perianth; twice or thrice the length of the oblong extrorse anther. Style and stigma as in the genus. Ovules in the ovary examined only one in each cell, ascending from near its base.

LILIUM JAPONICUM, *Thunb. Fl. Jap. p.* 133. Simoda. A handsome species, now well known in cultivation.

ORITHYA OXYPETALA, *Kunth. Enum.* 4, *p.* 227; *Ledeb. Fl. Ross. p.* 4, *p.* 137. Open, pine woods; Yokohama.

ALLIUM THUNBERGII, *Don.*; *Kunth l. c. p.* 454. Simoda.

FLUGGEA JAPONICA, *Richard*; *Kunth, l. c.* 5, *p.* 302. Convallaria Japonica, *Linn.*; *Thunb.* Yokohama, on the high land; March. In fruit.

LUZULA CAMPESTRIS, *DC.* Yokohama and Hakodadi. A dwarf and condensed form of this wide-spread species.

JUNCUS XIPHIOIDES, *E. Meyer in Presl, Rel. Hœnk.* 2, *p.* 143, & *Junc. p.* 50. Simoda. Smaller than the California plant usually occurs, but otherwise the same. Stem ancipital. Seeds oblong-oval, with a conformed testa, apiculate at each end.

COMMELYNA POLYGAMA, *Roth, ex Kunth. Enum.* 4. *p.* 37. Simoda; common. Probably only C. communis, for which Thunberg took it.

MARISCUS UMBELLATUS, *Vahl. Enum.* 2, *p.* 376. Simoda.

CAREX: By DR. BOOTT, of London.

CAREX PUMILA (*Thunb. Fl. Jap. p.* 39): spicis 5, masculis 2, terminali cylindrica pedunculata, altera breviori sessili contigua, fœmineis 3 oblongis crassis, inferioribus exserte pedunculatis longiuscule bracteatis; stigmatibus 3 longis; perigyniis ovatis rostratis bifurcatis nervatis glabris (vel rostro interdum apice serrato) lutescentibus, squama lanceolata vel ovata acuminata cuspidata purpurea vel pallida margine hyalina medio serrata brevioribus et longioribus.—Simoda, in the sands of the sea-shore. Culm about 5 inches high, stout, the base sheathed with purplish rudiments of leaves; the spike-bearing portion about 4 inches long. Leaves firm, longer than the culm, carinate, the margin very scabrous. Bracts all, except sometimes the uppermost, exceeding the culm; the sheaths of the upper 5 lines long. Sterile spikes remote from the fertile, purple, the terminal one an inch long. Fertile spikes 9 or 10 lines long, 3 or 4 lines wide; the uppermost not sheathed. Peduncles ochreate at the base. Scales of the sterile spikes purple, with a white hyaline margin, the lower obtusish, with the pale midrib a little exserted. Scales of the fertile spikes purple, or in one form pale, cuspidate, with hyaline margins; the lower ones narrower and longer, lanceolate; the upper broader, ovate-acuminate, shorter than the perigynium. Perigynium 3 lines long, nerved, yellowish, ovate, with a broadish and bifurcate beak; its teeth obtuse, glabrous, or the beak sparingly serrate above. A variety occurs with seven spikes, which are paler, four of them sterile, the lower scales of the fertile spikes long-acuminate. I have no hesitation in referring the specimens here described to Carex pumila of Tunberg, although Schkuhr's figure (Y Y) shows the scales shorter than in Dr. Morrow's specimens. These are not fully mature, and therefore not in all respects to be compared satisfactorily with my specimens of C. littorea, *Labill.*; but I have little doubt of the identity of the Japanese plant with that of New Holland, Van Diemen's Land, and New Zealand. The age would determine the subcoriaceous character of the female scales, the thick and spongy consistence of the perigynium, and the more or less obliteration of its nerves in the Japanese plant. In size, form, habit, leaves, and place of growth, the two plants agree; but in that of Japan, the female scales are longer, the nerves in some peryginia extend to the base of the beak, and the leaves are shorter. In C. littorea the nerves are occasionally prominent, but become apparently obliterated upwards as the perigynium swells, and in some cases they disappear, except at the base, leaving a slight groove in their place. I have seen no specimens of C. littorea like the variety of C. pumila, noticed above, though in some the lower scales are elongated.

C. littorea varies considerably in the number of its spikes; and occasionally one or more of the fertile ones are masculine or sterile at the summit. A New Zealand specimen, with two culms from the same root, has on one of them the terminal spike fertile at the base and two fertile spikes, while the other has two male and two female spikes. A New Holland specimen, from the herbarium of Mr. Brown, has four spikes, all masculine at the summit, while another has six spikes, three of them male and three female. In both C. pumila and C. littorea, I observe the ochrea at the base of the peduncle of the female spikes; and in both plants I see occasionally the lower male spikes to issue from a modified perigynium, which is open and expanded at the orifice, having the tumid base of the normal organ, and at times showing stigmas. This explains the nature of the ochrea, and of the saccate scale at the base of the spiculæ in the panicled group of Carex, which I described in C. Hartwegii, and which is common in the Indian species of this group.

CAREX MONADELPHIA, *Boott*, (n. sp.): spicis 4 pallidis gracilibus cylindricis stricto erectis, terminali mascula sessili (filamentis basi monadelphis!), reliquis fœmineis, superioribus masculæ arcte contiguis, inferioribus vaginatis bracteatis, infima remota longe exserte pedunculata; stigmatibus 3 brevibus; perigyniis oblongo-ellipticis stipitatis erostratis (ore emarginato) costato-nervosis puberulis pallide viridibus oblique divergentibus squama oblonga obtusissima truncata vel abrupte apiculata albo-lutescente apice ciliolata (nervo vividi) longioribus.—Simoda? Culm a foot high, slender, triquetrous, erect, smooth, or slightly scabrous between the spikes, leafy at the base, the spike-bearing portion $3\frac{1}{2}$ inches long. Cauline leaves a line broad, shorter than the culm; the radical ones 2 lines wide, flat, grassy, equalling or perhaps surpassing the culm. Lowest bract two-thirds of a line wide, equalling its spike; the others narrower, and somewhat exceeding the culm. Lowest sheath half an inch long. Lowest peduncle $2\frac{1}{2}$ inches long. Male spike 10 lines long, half a line wide. Filaments short, whitish, borne on a flat body 3-cleft at the apex, and as long as the scale. Anthers short, yellow. Female spikes 10 lines long, a line broad, the two superior ones close to the male spike, and almost equalling it in length, the lowest 3 inches distant. Scales of the male spike very obtuse; the lower ones of the female spikes truncate, with the green midrib evanescent below the ciliolate apex, or in the upper scales reaching the abrupt apex. Perigynium $1\frac{4}{10}$ lines long, $\frac{4}{10}$ of a line wide. Achenium oblong-triquetrous, produced at the base, pale, obtuse at the apex, annulate; the annulus surrounding the thickened base of the style, deciduous.

CAREX LEUCOCHLORA, *Bunge:* spicis 3–5 albo-viridibus oblongis breve pedunculatis, terminali mascula, fœmineis 2–4 laxifloris masculæ arcte contiguis vel inferioribus subremotis exserte pedunculatis bracteatis; stigmatibus 3; perigyniis ellipticis obtuse triquetris stipitatis erostratis (ore emarginato) nervosis puberulis pallide viridibus squama lanceolata obtusa vel acuminata albo-hyalina, nervo viridi longe excurrente serrato, sæpe duplo triplove brevioribus. ("C. spica mascula terminali solitaria, fœmineis binis, inferiore sulpedunculata, superiore sessili, oblongis approximatis multifloris erectis; stigmatibus 3; squamis oblongis acuminatis, acumine aculeolato, glabris fructum oblongum utrinque attenuatum pubescentem superantibus; culmo basi foliato. Nangasaki Japonia, *Langsdorff. Bunge in Mem. Acad. St. Pet.* 2, *p.* 132, 1835.) C. Langsdorffii, *Boott. in Linn. Trans.* 20, *p.* 144. Culm 5–10 inches long, weak, acutely triquetrous, scabrous, leafy at the base, the spike-bearing part from 1 to $2\frac{1}{2}$ inches long. Culm-leaves 1–$1\frac{1}{2}$ lines wide, shorter than the culm. Bracts either setaceous and a little exceeding the spikes, or foliaceous and surpassing the culm, the lowest a line wide. Lowest sheath 1–4 lines long. Lowest peduncle 3–5 lines long. Male spike 4–7 lines long, 1–$1\frac{1}{2}$ lines wide.

Female spikes 5–7 lines long, 2 lines wide. Scales nearly all long-cuspidate, sometimes those of the male flowers obtuse or merely apiculate; the lower female ones often obtuse, and the upper acute or acuminate, but in all with the green midrib long-excurrent. Perigynium with its stipe (at first winged and $\frac{3}{10}$ of a line long) $1\frac{1}{2}$ lines long, half a line wide, towards the apex transversely constricted, the membranaceous orifice slightly emarginate. Achenium $\frac{8}{10}$ of a line long, $\frac{5}{10}$ of a line wide, oblong-triquetrous, produced at the base, obtuse, annulate, the annulus surrounding the thickened base of the style. Anthers 3, fastigiate and sessile on the apex of a common normal filament. There is a variety in the collection with only 2 or 3 spikes, the male scales obtuse and muticous, the female scales obtuse, short-cuspidate, and somewhat ferrugineous. In the 20th volume of the Linnæan Transactions I described, under the name of C. Langsdorffii, a plant sent to me by the late Dr. Fischer, of St. Petersburg, as C. Japonica; and this I identify in the present collection. Having since had the opportunity of examining, in the Hookerian herbarium, an authentic specimen of Carex leucochlora of Bunge, from China, I am disposed to refer the Japanese specimens to that species. The Chinese plant, however, has only three contiguous spikes, short setaceous bracts, and abbreviated culmeal leaves; a difference probably depending on locality, as Bunge found his plant "in montosis." The variety above mentioned more nearly approaches Bunge's plant, but differs in having occasionally only 2 or 3 spikes, very blunt and muticous male scales, and the lower female ones shorter cuspidate; the culmeal leaves, also, are longer and broader than in Bunge's specimen. But I observe variations which lead me to consider it a variety only. The three anthers sessile on the summit of a common filament, as observed in some specimens, exhibit a remarkable peculiarity. Why Bunge should speak of his plant as allied to the C. distans I cannot make out.

CAREX PUBERULA, *Boott*, (n. sp.): spicis 4 brevibus congestis sessilibus albido-lutescentibus, terminali mascula, fœmineis 3, inferioribus longe bracteatis evaginatis; stigmatibus 3; perigyniis globosis basi productis conico-rostratis (ore subintegro) puberulis pallide lutescentibus leviter nervatis squama albo-hyalina ovata acuta nervo viridi hispido cuspidata brevioribus.—Simoda. Nearly allied to C. pilulifera, *L.;* but differs in its nerved and much less puberulent perigynia, its white hyaline and cuspidate scales, longer upper bracts, flaccid leaves, and weaker culms.

CAREX PISIFORMIS, *Boott*, (n. sp.): spicis 3–4 remotis erectis stramineis, terminali mascula cylindrica, fœmineis 2–3 oblongo-cylindraceis laxifloris inserte pedunculatis, infima brevi-bracteata; stigmatibus 2–3; perigyniis oblongo-ovalibus obtuse triquetris basi productis pubescentibus valde nervatis pallide viridibus rostratis (rostro basi demum tumido, ore hyalino emarginato) squama lanceolata obtusiuscula vel acuta nervo concolori sæpe ultra apicem excurrente straminea longioribus vel subæquilongis.—Simoda. Culm nearly 8 inches high, weak and slender, striate, scabrous. Leaves flat, grassy, longer than the culm. Lowest bract surpassing its spike; the others shorter than the spikes, setaceous. Sheaths 4–7 lines long. Male spike 10 lines long, a line wide, peduncled, straw-colored. Female spikes 4–8 lines long, 2 lines wide, 1 to 2 inches distant from each other. Scales of the female spikes straw-colored, and with paler or hyaline margins; the lower ones obtuse or truncate, and shorter than the perigynium; the upper ones acute, about the length of the perigynium, or a little exceeding it. Perigynium $1\frac{1}{2}$ lines long, half a line wide. Achenium $\frac{8}{10}$ of a line long, and of half that width, oval, triquetrous, stipitate, pale, punctulate; the base of the style remarkably bulbous and pisiform, deciduous. Differs from its allies in the longer and remote spikes, the exannulated achenium, the bulbous base of the style, &c.

CAREX TRANSVERSA, *Boott*, (n. sp.): spicis 4 approximatis, terminali mascula gracili cylindrica

ferruginea, fœmineis 3 oblongo-cylindraceis subcrassis erectis olivaceis, inferioribus vaginatis exserte pedunculatis longe bracteatis; stigmatibus 3; perigyniis immaturis ex ovali basi in rostrum longum acuminatis (ore membranceo integro oblique fisso!) olivaceis crebre striato-nervosis squama ovata acuminata acuta longe hispido-aristata alba nervo viridi latioribus longioribus vel æquantibus.—Yokohama. Culm slender, about a foot high, triquetrous, smooth; the spike-bearing part 2½–3½ inches long. Culm-leaves 2 lines wide, longer than the culm, with long sheaths. Bracts foliaceous, exceeding the culm, the lowest two lines wide, the uppermost often narrower, equalling the culm. Lowest sheath 6–13 lines long. Lowest peduncle 1 or 2 inches long. Male spike 12–15 lines long, a line wide, in one specimen setaceous-bracted; female spikes 8–15 lines long, 3 or 4 lines wide, the uppermost sessile and destitute of a sheath, the lower ones peduncled, all contiguous. Scales all long-awned; those of the male spikes lanceolate, pale ferrugineous, the lower larger-awned, those of the female spikes whitish, ovate, gradually tapering into a long awn. Perigynium 3 lines long, $\frac{8}{10}$ of a line wide, obliquely ascending. Immature achenium over a line long, oval-triquetrous, apiculate with the persistent base of the style, which is not enlarged. A species of doubtful affinity, approaching the *Lupulinæ* in habit, but differing in the entire and oblique orifice of the perigynium; and receding from the *Vesicariæ* by the same character, as well as by the sheathing bracts and the awned scales.

CAREX DISPALATA, *Boott*, (n. sp.): spicis 4–6 elongatis cylindricis erectis, terminali mascula densiflora ferruginea pedunculata, fœmineis 3–5 olivaceis, superioribus alternatim contiguis, infima longe pedunculata remota longe bracteata evaginata, omnibus laxifloris, flosculis basi subverticillatim interruptis; stigmatibus 3; perigyniis ovatis brevi-rostratis (rostro apice ferrugineo, ore membranaceo obliquo integro) olivaceis obsolete nervosis oblique divergentibus squama lineari-lanceolata acuminata acuta vel obtusiuscula purpurea medio nervata pallida latioribus brevioribusque.—Hakodadi, &c. Culm acute-angled, smooth, or slightly scabrous between the spikes, which occupy 8 or 9 inches of the culm. Leaves wanting. Lowest bract 2 lines wide, nearly equalling the culm; the upper ones narrow, equalling or shorter than their spikes. Ligule purple and clasping. Lowest peduncles very slender, 1½ to 2½ inches long, smooth. Male spike 2 inches long, 2 lines wide; its scales linear and elongated. Female spikes from over an inch to 3 inches long, 2–2½ lines wide, the lower tapering and loosely-flowered at the base. Perigynium 1½ lines long, $\frac{6}{10}$ of a line wide. Achenium $\frac{6}{10}$ of a line long, oval-triquetrous, pale; the style contorted. Perhaps most allied to C. olivacea, *Boott*.

CAREX CONICA, *Boott*, (n. sp.): spicis 4 remotis erectis oblongo-ovalibus, terminali masculâ pedunculata ferruginea, fœmineis 3 exserte pedunculatis, infima radicali; bracteis subaphyllis; stigmatibus 3; perigyniis ovalibus conico-rostratis (ore integro) sparse puberulis leviter nervatis pallidis basi productis squama oblonga obtusissimâ truncata vel subemarginata brevi-cuspidata pallida purpureo-tincta angustioribus brevioribusque.—Simoda? Culm 5 inches high, obtuse-angled, leafy at the base; the spike-bearing portion 4½ inches long. Culm-leaves a line broad, half the length of the culm, firm. Bracts sheathing, subulate, shorter than the peduncles; sheaths 8 or 7 lines long, purple at the base. Peduncles 10 to 18 lines long, rather scabrous. Male spike 7 lines long, a line and a half broad. Female spikes 4 or 5 lines long, 2 lines wide, remote: scales cuspidate, the cusp of the lower ones scabrous; male scales very obtuse; upper female scales narrow. Perigynium a line and a half long, clothed with short scattered hairs, the nerves of the same color. Achenium a line long, obtusely triquetrous, pale; thickened base of the style deciduous. Racheola setaceous, shorter than the achenium, placed at its inner side.

CAREX EXCISA, *Boott*, (n. sp.): spicis 4–5 rubro-purpureis oblongo-cylindraceis remotis pedunculatis erectis, terminali mascula, fœmineis (floriferis) gracilibus laxifloris longe exserte pedunculatis, infima radicali nunc basi composita; bracteis subaphyllis; stigmatibus 3 longis; perigyniis (juvenilissimis) ovalibus? erostratis emarginatis pubescentibus nervatis squama oblonga obtusa emarginata cuspidata apice ciliata rubro-purpurea (nervo viridi) brevioribus.—Near Yokohama, on the margin of ditches by the roadside. This is not unlikely the same as the last species in an immature state; and the suspicion, founded on their general resemblance, is strengthened by a comparison of the racheola of C. conica with the compound lower spike occasionally met with in C. excisa.

CAREX LANCEOLATA, *Boott*, (n. sp.): spicis 3 erectis pedunculatis purpureis, terminali mascula abbreviata pauciflora, fœmineis 2, superiori apicem masculæ attingente, altera longiore paullo remota brevi et exserte pedunculata; bracteis aphyllis; stigmatibus 3 longis; perigyniis ovalibus erostratis emarginatis plano-convexis scabris pallide viridibus nervatis basi glabris spongiosis squama purpurea margine albo-hyalina lanceolata acuminata acuta vel hispido-cuspidata (nervo viridi scabro) angustioribus fere dimidio brevioribus.—Hakodadi, in rocky places. Culms 7 or 8 inches long, weak, rather nodding, very scabrous, with 2 or 3 short and sheathing leaves at the base; the spike-bearing part 1½ to 2 inches long. Radical leaves flat, half a line or a line wide, slender, shorter than the culm. Sheaths 2 or 3 lines long, pale ferrugineous, bearing an awn of a line or two in length. Peduncles scabrous, the lowest one 5–7 lines long. Male spike 4 or 5 lines long, half a line wide, 4–5 flowered, short-peduncled. Female spikes 5 or 6 lines long, 2 lines wide, erect; scales all similar; those of the male spike pointless and ciliate; of the female spikes acuminate, acute, or with a hispid cusp. Perigynium over a line long, nerved (the nerves of the same color,) scabrous, the spongy base pale and glabrous. Allied to C. pediformis of Meyer, and scarcely distinct enough from C. pellucida of Turczaninow. It differs, however, in its very scabrous culms, lanceolate and acute or acuminate scales nearly twice the length of the perigynium, and in the nerved perigynium. From C. tristachya of Thunberg (judging from Schkuhr's figure W W) it is distinguished by its short and few-flowered male spike, the more remote female spikes, and the lanceolate scales.

CAREX MORROWI, *Boott*, (n. sp.): spicis 5 remotis erectis, terminali mascula purpurea cylindrica longiori, fœmineis 4 oblongo-cylindricis laxifloris vaginatis, inferioribus exserte pedunculatis; bracteis subaphyllis; stigmatibus 3; perigyniis ovalibus obtuse trigonis rostratis acute bifidis pallidis divergentibus (rostro ferrugineo plus minus margine serrato deorsum recurvato) costato-nervatis sparsim scabriusculis squama lanceolata acuminata acutissima purpurea basi pallida brevioribus vel æquilongis.—Simoda? Culm 10 inches high, slender, smooth, obtusely angular, clothed at the base with purple rudiments of leaves; the spike-bearing portion 6 inches long. Radical leaves glaucous, flat, rigid, striate, 4½ lines wide, longer than the culm. Culm-leaves all subulate and bract-like, sheathing. Lower bract longer than the peduncle, the others shorter and more subulate. Peduncles 3–17 lines long, rather scabrous; the sheaths 2–12 lines long, pale purple. Male spike 16 lines long, a line wide, acute at both ends. Female spikes 4–9 lines long, 2½ lines wide, an inch or more apart; the uppermost shorter and approximate to the male spike; scales all similar, the male ones larger. Perigynium nearly a line and a half long, slightly scabrous under a lens; the beak often serrulate on the margins, more strongly nerved anteriorly. Achenium $\frac{5}{10}$ of a line long, elliptical, above obtusely triquetrous with convex faces, below with flattish faces, punctulate, raised on an oblique stipe; the base of the style not thickened, deciduous. A fine species of the section *Digitatæ;* distinguished from all its allies by the divergent perigynia with a recurved and acutely bifid beak.

CAREX ANOMALA, *Boott*, (n. sp.): spicis 9 androgynis basi masculis pallidis alternis ovalibus simplicibus longe bracteatis; stigmatibus 3; perigyniis orbiculatis rostratis bidentatis margine anguste alatis serratis enerviis squama subrotunda obtusissima longe aristata albo-hyalina nervo viridi longioribus vel brevioribus.—Simoda? Culm 10 inches high, weak, smooth, leafy at the base; the spike-bearing portion 2½ inches long. Culm-leaf 2 lines broad, surpassing the culm. Bracts foliaceous; the lowest rather narrower than the leaf; the others successively narrower; all but the uppermost exceeding the culm; the lower ones much exceeding it. Spikelets 3 or 4 lines long, a line and a half broad, all simple and sessile, masculine only at the base. Lower scales larger-awned than the upper, the hispid awn exceeding the perigynium, in others equalling it or shorter. Immature perigynium over a line and a half long, less than a line wide. Achenium obovate, obtuse; the base of the style thickened and deciduous. This has somewhat the aspect of C. remota; from which and from its allies it differs in having three stigmas and the spikes all bracteate. From the description of C. gibba of Wahlenberg it differs in its simple spikes, three stigmas, orbicular perigynium, and awned scales. The specimen is too young to show well the achenium, which, from the three stigmas, should be triquetrous. I know of no species among the *Androgynæ basi mascula* to compare with it in this respect.

CAREX INCISA, *Boott*, (n. sp.): spicis 4–5 cylindricis basi attenuatis laxifloris pedunculatis evaginatis, terminali basi mascula, reliquiis fœmineis, inferioribus remotis longe pedunculatis, infima bracteata; stigmatibus 2; perigyniis (immaturis) ovatis erostratis emarginatis bidentatis enerviis resinoso-punctatis squama obtusissima truncata vel emarginata subæquilata (nervo lato viridi, lateribus pallide lutescentibus) longioribus.—Hakodadi, on the sea beach. Culm 6 inches high, slender, smooth, leafy at the base, and there covered with ferruginous rudiments of leaves; the spike-bearing portion 3 inches long. Leaves 2 lines wide, flat, shorter than the culm; the base and sheath spotted with fine resinous dots. Bracts shorter than their spikes; the lowest foliaceous; the uppermost scale-like and cuspidate. Peduncles varying from a line to an inch long, smooth. Terminal spike an inch long, a line wide, its apex bearing few or several fertile flowers, the base tapering, short-peduncled. Fertile spikes ½ to 2½ inches long, a line wide, tapering and loosely-flowered at the base. Perigynium less than a line and a half long. Related to C. lenticularis of Michaux, (which equally has the sheaths dotted,) and somewhat so to C. notha of Kunth.

CAREX LONGEROSTRATA, *C. A. Meyer in Mem. Acad. St. Pet. l. c. p.* 220, *t.* 12. C. bispicata, *Hook. & Arn. Bot. Beech. p.* 118, *t.* 28. C. Camschatcensis, *Kunth, Enum.* 2, *p.* 477. Hakodadi. The specimens are very young.

CAREX PRÆCOX, *Jacq. Fl. Austr. t.* 446. Hakodadi.

CAREX HETEROLEPIS, *Bunge. l. c.? Stig.* 2. Hakodadi. Too young for determination.

CAREX VILLOSA, *Boott.* (n. sp.); spicis 2–3 remotis, terminati mascula cylindrica lutescenti-albida pedunculata, fœmineis 1–2 oblongo-cylindraceis laxifloris vaginatis, infima breve exserte pedunculata; stigmatibus 3; perigyniis (floriferis) ovatis rostratis (ore obliquo bidentato) hirsutis demum excurvis nervatis squama oblonga obtusa brevi-cuspidata longioribus.—Simoda? The weak culm with its leaves, bracts, (the latter shorter than the culm,) sheaths and peduncles all clothed with long white hairs. The species is allied to C. pilosa.

CAREX DONNIANA, *Spreng, Syst.* 3, *p.* 825, *Drejer, Symb. Car. t.* 13. C. chlorostachys, *Don, in Linn. Trans.* 14, *p.* 330. Simoda. This appears to be the same with the Himalaya species, which is well figured by Drejer; but all authors, except Don, omit to notice the ventricose peri-

gynium, which, with the broader fertile spikes and leaves, principally distinguish it from the C. alopecuroides of Don.

CAREX MACROCEPHALA, *Willd.; Spreng. Syst.* 3, *p.* 808; *Boott, in Hook. Fl. Bor.-Am.* 2, *p.* 215, *t.* 216; *Trev. in Fl. Ross.* 4, *p.* 271. Yokohama. By some oversight this was not communicated to Dr. Boott, who has kindly, and with his accustomed thoroughness, examined the other Carices of this collection, and furnished the above account of them. There is no room to doubt, however, that the specimens, though young, are identical with the species of the northwest coast of America, which Pallas also obtained in Siberia, probably in the extreme east; and being a sea-coast species, we should naturally have expected it from Japan.

ALOPECURUS GENICULATUS, *Linn; Thunb. Fl. Jap. p.* 49. Hakodadi, Yokohama, and Simoda. In rice fields, &c.

ALOPECURUS MALACOSTACHYUS (n. sp): caule pedali; foliis caulinis omnibus (nisi infimo) vaginis subtumidis suprema inflata brevioribus; spica laxa cylindrica (bipollicari); glumis basi tantum connatis obtusis carina villoso-ciliatis ad nervos laterales basi hirsutulis cæterum glabris palea obtusa leviter 5-nervi paullo brevioribus; arista paleæ fere basilari glumas plus duplo superante; stylis a basi distinctis.—Simoda and Yokohama. Somewhat glaucous. Root probably annual. Lowest leaves 1½ to 2 inches, the upper an inch in length, smooth and soft. Spike rather lax, soft, greenish. Spikelets 3 lines long, nearly as large as those of A. agrestis, but much more compressed; the villous fringe of the keels softer than in A. pratensis, but nearly as long. Awn scabrous, somewhat contorted. Inner palea wanting. Ligule membranaceous, ovate, obtuse. This cannot be A. Japonicus of Steudel, if that species is at all correctly described as having only one glume ciliate, and two paleæ, &c.

POLYPOGON MONSPELIENSIS, *Desf.* Simoda.

POLYPOGON LITTORALIS, *Smith, Engl. Bot. t.* 1251? Simoda.

AGROSTIS SCABRA, *Willd.; Gray, Man Bot.* A laxiflora, *R. Br.; Griseb. in Fl. Ross.* 4, *p.* 441. Simoda. A. tenuiflora, *Steud.* A form not rare in the United States.

POA ANNUA, *Linn.* Gathered at all the stations. The collection contains one or two other species of Poa not yet determined. Among them is undoubtedly,

POA ACROLEUCA, *Steud. Syn. Glum.* 1, *p.* 256. Yokohama.

GLYCERIA FLUITANS, *R. Br.* Simoda. In rice fields.

FESTUCA PAUCIFLORA, *Thunb. Fl. Jap., p.* 52. Simoda and Yokohama. Probably, also, F. remotiflora, *Steud.;* but the leaves and sheaths are glabrous or nearly so. The awns are as long as the paleæ.

BROMUS CONFORMIS, *Steud. Syn. Glum.* 1, *p.* 323. Dry rice fields, Simoda. Spikelets, including the awns, 2 inches long.

ARUNDINARIA JAPONICA, *Sieb. & Zucc., ex Steud. l. c., p.* 334. Simoda. Inflorescence and flowers only. There are imperfect specimens of one or two other Bambusineous grasses; among them, probably, Phyllostachys bambusoides of Siebeld and Zuccarini.

TRITICUM CANINUM, *Schreb.;* a very long-awned variety. Simoda.

TRITICUM VULGARE, *Linn.* Simoda; cultivated. A long-awned variety of Wheat.

HORDEUM VULGARE, *Linn.; Thunb. Fl. Jap., p.* 65. Cultivated.

HORDEUM HEXASTICHUM, *Linn.* Simoda. Cultivated; various forms of Six-rowed Barley.

AVENA SATIVA, *Linn.* Simoda. The Common Oat. No doubt cultivated.

TRISETUM CERNUUM, *Trin. in Mem. Acad. St. Pet.*, 1830, *p.* 61. Bromus bifidus, *Thunb. Fl. Jap., p.* 53. Simoda and Yokohama. I do not doubt that the Japanese plant is the same

specifically as that of our northwest coast, although the panicle is more densely flowered. The scabrous paleæ and the very long and tortuous awn are characteristic. The smallest specimen accords, likewise, with Thunberg's description of his Bromus bifidus in its short leaves and pubescent sheaths. The larger specimens are glabrous, except the lower sheaths, and sometimes the rhachis of the panicle. Thunberg, however, states that the spikets are scarcely a line long; which I suspect is a clerical error, for he describes the pointed tips of the lower paleæ as half a line long, and he hardly would have referred to Bromus a grass, with the aspect of Avena, and with its spikelets only the twelfth of an inch in length.

HIEROCHLOA BOREALIS, *Rœm. & Schult.* Hakodadi. In a grave-yard.

PENNISETUM JAPONICUM, *Trin. Ic. Gram.* 2, *t.* 19. Simoda.

PANICUM (ISACHNE) LEPIDOTUM, *Steud. Syn. Glum.* 1, *p.* 95. Milium globosum, *Thunb.?* Simoda. In the spikets examined, the lower flower was staminate; the upper pistillate only.

IMPERATA PEDICELLATA, *Steud. Syn. Glum.* 1, *p.* 405. Simoda. Doubtless, only the well known I. arundinacea, which is widely diffused over the world.

FILICES: By DANIEL C. EATON, of Yale College.

EQUISETUM ARVENSE, *Linn.* Hakodadi and Simoda.

DRYNARIA HASTATA? Polypodium hastatum, *Thunb. Fl. Jap., p.* 1335; *Willd. Sp. Pl.* 5, *p.* 164. Simoda.

DRYNARIA ENSATA? Polypodium ensatum, *Swartz, Syn. Fil., p.* 29. P. Phyllitidis, *Thunb. l. c.* Simoda.

POLYPODIUM LINEARE, *Thunb. Fl. Jap., p.* 335? Simoda.

LEPTOGRAMMA ———; the species not determined. Simoda.

DRYMOGLOSSUM PILOSELLOIDES, *Presl, Pterid., p.* 227. Pteris piloselloides, *Linn.; Thunb. Fl. Jap., p.* 331; *Swartz, Syn. Fil., p.* 94, *t.* 2. Simoda.

ONYCHIUM JAPONICUM, *Kunze.* Simoda.

PTERIS CRETICA, *Linn.; Thunb. l. c. p.* 334. Simoda.

ADIANTUM PEDATUM, *Linn.* Hakodadi. The specimens, although too young for proper examination, are apparently identical with the North American species, which extends to Unalaschka and Kamtschatka, and also recurs in the Himalayas. This intermediate station is therefore interesting.

WOODWARDIA RADICANS, *Swartz, Syn. Fil. p.* 117. W. orientalis, *Swartz, l. c., & p.* 315.

WOODWARDIA JAPONICA, *Swartz, l. c.* Blechnum Japonicum, *Thunb. Fl. Jap. p.* 333, *t.* 35. Yokohama or Simoda. Only one imperfect specimen found, which, by the coadunate pinnæ, must belong to this species.

ASPLENIUM ———; a delicate species, not identified, but probably not undescribed. Simoda. With it was gathered an imperfect specimen of an Athyrium, also not identified.

DIPLAZIUM LANCEUM, *Presl. l. c.* Asplenium lanceum, *Thunb. Fl. Jap. p.* 333. Simoda.

CYRTONIUM FALCATUM, *Presl. l. c. p.* 86. Aspidium falcatum, *Swartz.* Polypodium falcatum, *Linn. f.; Thunb. Fl. Jap. p.* 336, *t.* 35. Simoda, Yokohama, and Webster Island; on rich banks.

ASPIDIUM (LASTREA): not identified, nor sufficient for description. Yokohama.

ASPIDIUM (LASTREA) LACERUM, *Swartz, Syn. Fil. p.* 55? Simoda. We have only imperfect specimens of an apparently well-marked species, which does not disagree with Thunberg's Polypodium lacerum.

ASPIDIUM SETOSUM, *Swartz, l. c. p.* 56. Polypodium setosum, *Thunb. l. c.* Yokohama; on steep and rocky banks. A fine species, of nearly coriaceous texture, which accords pretty well with Thunberg's description. What he describes as "pilis atris longis laxis," clothing the stipe and rhachis, are long-awned, narrow, chaffy scales.

ASPIDIUM (LASTREA) ERYTHROSORUM, *Eaton*, (n. sp.): frondibus bipinnatis ovato-oblongis, pinnis sub-oppositis lanceolato-oblongis basi paullo augustioribus, pinnulis oblongis obtusis truncatisve serratis, venulis furcatis; soris margine dissitis in venula superiori; indusio reniformi intense rubro margine albo integro; paleis rhachidis augustis linearibus, costæ secundariæ linearibus e basi orbiculari crispatis.—Simoda. Frond 1 or 2 feet high; pinnæ 2 to 4 inches long, and 6 to 10 lines wide. I do not find this described, nor can I suppose that so remarkable a character as a bright-red indusium would have been overlooked.

ASPIDIUM (POLYSTICHUM) TRIPTERIS, *Eaton*, (n. sp.): fronde trisecto, segmento medio maximo lanceolato, lateralibus 3–4-plo brevioribus nunc pinnas segmenti intermedii vix excedentibus, omnibus pinnatis, pinnis alternis lanceolatis falcatis acutis (in pl. depauperata oblongis nunc obtusis) basi superiori auriculatis inferiori cuneatis argute inciso-serratis, dentibus spinulosis; soris costa parum remotis solitariis nisi in auricula confluentibus; indusio margine dentato; rhachi costis venulisque paleis lanceolatis brunneis instructis.—Simoda. Frond from 6 to 14 inches high; pinnæ 9 to 18 lines long. A remarkable species.

DAVALLIA CHINENSIS, *Swartz; Hook. Sp. Fil. t. p.* 187. Yokohama and Simoda.

OSMUNDA JAPONICA, *Thunb. Fl. Jap. p.* 329. Simoda. This might be taken for a form of O. regalis, except that the sterile and fertile fronds are separate.

MUSCI AND HEPATICÆ: By W. S. SULLIVANT.

1. HYPNUM JAPONICUM (n. sp.): monoicum, lurido-virens, laxe cæspitosum; caule ads cendente fasciculatim diviso; foliis confertis secundis late ovatis brevius obtusiusque acuminatis reticuli densi cellulis minutis subquadratis, costa valida cum vel sub apice desinente; perichætii polyphylli foliis lanceolato-attenuatis erectis obscure costatis; capsula cylindracea erecta vel erecto-cernua annulata; operculo conico obtuso; peristomio normali.—This species belongs to the section Amblystegium of the Bryologia Europæa, and in general appearance is not unlike Hypnum orthocladon and the larger forms of H. serpens, but is easily distinguished by its secund leaves, with a much closer areolation, and distinctly dentate margins.

2. HYPNUM GRACILE, *Br. Sch.* This species is common in Ohio.

3. MNIUM RADIATUM, *Wils. in Lond. Jour. Bot.* 1848, *p.* 274. Related to the Californian Mnium Menziesii.

4. MNIUM TRICHOMANES, *Mitten in Lond. Jour. Bot.* 1856, *p.* 231. Intermediate between M. cuspidatum and M. affine.

5. BARTRAMIA POMIFORMIS, *Hedw.*, var. CRISPA.

6. POGONATUM TORTILE, *Swartz.*

7. RICCIA NATANS, *Linn.*

8. FEGATELLA CONICA, *Corda.*

9. AZOLLA,———? Without fruit; but appears to be the same as the Azolla Caroliniana, found in this country.

ALGÆ: By Dr. W. H. HARVEY.

1. DESMARESTIA VIRIDIS, *Lamour.; Harv. Ner. Bor. Amer.* 1, *p.* 77. Hakodadi.

2. CHORDA LOMENTARIA, *Lyngb.; Harv. Ner. Bor. Amer.* 1, *p.* 98. Simoda.

3. CHORDARIA SIMPLEX, *Harv.* (n. sp.): frondibus densissime cæspitosis filiformibus simplicibus.—Simoda.

4. RYTIPHLŒA LATIUSCULA, *Harv.* (n. sp.): fronde lato-lineari complanata tenui membranacea transversim rugulosa bi-tripinnata, jugamento primario simplici v. furcato crebre pinnato, pinnis acutis inæquilongis sub-oppositis, minoribus pinnatis, majoribus bipinnatis pinnulis subulatis erecto-patentibus strictis.—Hakodadi.

5. POLYSIPHONIA MORROWII, *Harv.* (n. sp.): fronde badia elongata setacea cæspitosa pellucide articulata 4-siphonia alterne decomposita, ramis primariis basi nudis v. ramulis paucis hamatis instructis supra pinnatim compositis; pinnis ambitu linearibus virgatis iterum pinnulatis, pinnulis brevissimis erectis spinæformibus inferioribus simiplicibus superioribus multifidis subcorymbosis; articulis ramorum diametro 6–8-plo longioribus, pinnarum diametro æqualibus, pinnularum duplo brevioribus; cystocarpiis ad pinnulas superiores sessilibus urceolatis, ore maximo crenulato.—Hakodadi. A very distinct and handsome species, densely tufted, 8 to 10 inches long. It is allied to *P. urceolata*, but the ramification is very different.

6. POLYSIPHONIA JAPONICA, *Harv.* (n. sp.): fronde fruticosa gelatinoso-cartilaginosa badia basi ultra-setacea sursum attenuata decomposite ramosissima, ramis quoqueversum egredientibus alternis vel vagis iterum et iterum divisis, ramulis ultimis brevibus simplicibus furcatis vel dichotomis apice fribrilliferis; articulis inferioribus subcorticatis (cellulis secundariis auctis) superioribus nudis 4-siphoniis diametro æqualibus vel sesquilongioribus, articulis ramulorum diametro brevioribus.

7. LAURENCIA VIRGATA, *Ag.(?)* var.; *Harv. Ner. Bor. Amer.* 2, *p.* 71. Hakodadi.

8. LAURENCIA ———: n. sp.? (a single imperfect specimen.) Simoda.

9. LOMENTARIA CATENATA, *Harv.* (n. sp.): fronde tubulosa filiformi pinnatim ramosa, ramis oppositis v. sparsis longissimis crebris obsoletissime et distanter constrictis ramuliferis, ramulis sæpe verticillatis nunc oppositis v. sparsis nunc fasciculatis catenato-constrictis, articulis 3–4-seriatis fusiformibus v. ellipsoideis; soris maculæformibus, tetrasporiis in ramulis immersis. —Simoda. A remarkable species, having much the habit of a *Corallopsis*, but not the structure.

10. CHONDRIA ATROPURPUREA, *Harv.(?) Ner. Bor. Amer.* 2, *p.* 22, *t.* 18, *E.* Hakodadi. A single faded specimen, seemingly referable to this species.

11. AMPHIROA CALIFORNICA, *Decaisne.* (?) Simoda.

12. DELESSERIA SERRULATA, *Harv.* (D. serrulata, *Harv. Alg. Austral. No.* 277, non *Post. & Ruppr.*): fronde costata foliolis a costa crassa prorumpentibus ramosa, foliolis lineari-lanceolatis utrinque acuminatis serratis; cystocarpiis sorisque in foliolis junioribus evolutis, soris diffusis. —Hakodadi. These specimens so nearly agree in character with those from Port Jackson, on which the species was founded, that I venture to consider them as the same. They are less bright in color, rather purplish than rose-red, and the apices of the leaves are more acute. But the nearly allied D. Hypoglossum varies in a similar way.

13. GELIDIUM CARTILAGINEUM, *Grev.; Harv. Ner. Bor. Amer.* 2, *p.* 117. Simoda.

14. GELIDIUM CORNEUM, *Lamour.; Harv. Ner. Bor. Amer.* 2, *p.* 116. Webster's Island, Jeddo, and Simoda.

15. HALOSACCION? (Halocœlia!) JAPONICA, *Harv.* (n. sp.): fronde . . . . ; ramis filiformibus

utrinque attenuatis ramuliferis, ramulis crebris patentibus filiformibus setaceis.—Hakodadi. I have only seen two branches, as they appear to be, and am ignorant of the ramification of the perfect frond. The branches are 6 to 8 inches long, about a line in diameter, and densely set throughout with very patent prolifications. The structure of the frond is much denser than that of *H. sobolifera*.

16. GYMNOGONGYRUS FURCELLATUS, *Ag.* (*?*) Simoda and Webster's Island.

17. GYMNOGORYRUS FLABELLIFORMIS, *Harv.* (n. sp.): fronde pumila, compresso-plana anguste lineari pluries dichotoma ambitu flabelliformi, segmentis apice vix dilatatis fastigiatis obtusis v. emarginatis.—Simoda. Not two inches high, resembles a small specimen of the narrow varieties of *Chondrus crispus*.

18. GYMNOGORYRUS PINNULATUS, *Harv.* (n. sp.): fronde elata stipitata dichotoma et vage prolifera, ramis primariis linearibus compresso-planis, superioribus prolificationbusque complanatis cuneatis furcatis è margine pinnatis, pinnis linearibus obtusis, axillis omnibus latis; cystocarpiis ovalibus maculæformibus immersis.—Hakodadi.

19. CYSTOCLONIUM? ARMATUM, *Harv.*, (n. sp.): caule subsimplici compresso ramis lateralibus densissime onusto, ramis compressis longissimis subsimplicibus flexuosis acutis basi angustatis, ramulis divaricato-patentibus subulatis brevibus secus ramos sparsis, cystocarpiis (sæpe binis) in ramulis immersis oblongis.—Hakodadi. This has the habit of *Gracillaria armata*, and a structure of frond not very dissimilar, but the fruit is that of a *Cystoclonium*. There is no medullary stratum of filaments.

20. NEMASTOMA LIVIDA, *Harv.*, (n. sp.): gelatinoso-carnosa, purpurascens, stipite brevi ramoso, ramis complanatis basi cuneatis mox linearibus plus minus dichotomis, segmentis superioribus angustioribus ultimis attenuatis.—Simoda. A single specimen.

21. GLOIOSIPHONIA CAPILLARIS, *Carm.; Harv. Ner. Bor. Amer.* 2, *p.* 202. Hakodadi.

22. CERAMIUM RUBRUM, *Auct.* Hakodadi; apparently common.

There are 30 species of Algœ in the collection. Besides these, there are fragments of *Hypnea musciformis*, and one or two others not easily determinable; and a specimen of an Alga, not in fruit, whose genus I am unable to determine. It is possibly allied to *Chylocladia*, or to *Rhabdonia*.

OBSERVATIONS

IN RELATION TO

CYCLONES OF THE WESTERN PACIFIC:

EMBRACED IN A

COMMUNICATION TO COMMODORE PERRY,

BY

WILLIAM C. REDFIELD.

INTRODUCTORY NOTE.

The following paper, prepared by the lamented William C. Redfield expressly for this report, may be looked upon as the very last offering to practical science of that eminent man, it having been finished but a few days prior to the illness which terminated his life.

It was my good fortune to enjoy for many years the friendly acquaintance of one, as remarkable for modesty and unassuming pretensions, as for laborious observation and inquiry after knowledge.

To him, and to General Reid, of the Royal Engineers of England, are navigators mainly indebted for the discovery of a law which has already contributed, and will continue to contribute, greatly to the safety of vessels traversing the ocean.

It is true, that subsequent writers, Piddington, Thom, Fryers, Sedgewick and Bosquett, as mentioned in the 1st volume of this work, have furnished additional information upon the subject, but to Redfield and Reid should be ascribed the credit of the original discovery of this undeniable law of nature, and its application to useful purposes; and there can be nothing more beautiful, as illustrative of the characters of these two men, than the fact, well known to myself, that, notwithstanding their simultaneous observations and discoveries in distant parts of the world, neither claimed the slightest merit over the other, but each strove to give to his co-worker in research the meed of superior success in the great object of their joint labors; and thus, without ever meeting, a strong friendship was formed between them, growing out of congenial aspirations for honorable fame, and mutual admiration of the generous and enlightened views exhibited by each other; and this enobling feeling was kept alive to the last by friendly correspondence.*

I recollect, when sent abroad by the government, in 1838, to visit the dock-yards and lighthouses of England and France, I was favored with a letter of introduction from Mr. Redfield to his friend, then Colonel Reid,† and I could well judge, by the many attentions and valuable services rendered to me by that distinguished officer, and his verbal enquiries, how highly he valued the recommendation of a man whom he had never seen.

M. C. PERRY.

* The last letters of General Reid arrived too late to be opened and read by the deceased.

† Now General Reid, and Governor of Malta.

OBSERVATIONS

IN RELATION TO

THE CYCLONES OF THE WESTERN PACIFIC.

BY WILLIAM C. REDFIELD.

NEW YORK, *December* 26, 1856.

DEAR SIR: The return to the United States of the naval expedition placed under your command by our government, for special service in the Asiatic seas, has furnished much valuable information on various subjects of general interest and importance. Of these beneficial contributions, the numerous geographical and hydrographical examinations made by the officers of the squadron, and the observations made and collected in relation to the tempestuous cyclones of the Western Pacific, cannot fail to promote the interests of navigation and commerce. The latter portion of these materials, together with such other notices of the gales and typhoons of the China Sea and the North Pacific Ocean as are now at hand, constitute the subject of this communication.

Cyclone of July, 1853.—The steamships Susquehanna and Mississippi left the bay of Yedo, in Japan, on the 17th of July, 1853, steering a southwesterly course, with the barometer at 30 inches, which is quite above the mean height of this instrument in the summer season on that coast, and was caused, apparently, by the exterior atmospheric wave of the approaching cyclone. On the 18th, the barometer commenced falling, with the wind at E.S.E., and was accompanied on the 19th by a heavy swell from the southeast quarter, in latitude 31° 14′ N., longitude 135° 03′ E.; the center-path of the cyclone, thus approached by the ships, being at the distance of about five hundred and fifty miles, as now estimated. On the 20th, the cyclonic wind had veered to the east, increasing in force, and with "very heavy sea." At 6 P. M., the barometer had fallen to 29.36; below which it did not subside. The Mississippi, after lying twenty-four hours with head to S.E., with no indications of a favorable change, was placed with her head to N.E., when the rise of the barometer was very apparent, as appears by the master's report. The Susquehanna's barometer, at 9 A. M. of the 21st, stood at 29.36; and from this time it continued to rise slowly, and the strength of the gale was found to abate. On the 24th, the Mississippi was in latitude 26° 25′, longitude 128° 10′ E., near to Lew Chew, with barometer at 29.60, and the cyclonic wind had veered to E.S.E. On the 26th, at Lew Chew, the wind had veered round to the southward, and the barometer rose to 29.74; and on the 27th and 28th, attained 29.80, the usual height for July in that region.

From the known law which governs the cyclones in the northern hemisphere it results that these observations, as made by a single ship, are quite sufficient to show that this gale was a great cyclone, and was moving in the direction which is common in the lower latitudes; that it

was of great superficial extent; and that the position of these ships was far to the right of the path pursued by the axis of the gale. It is equally apparent that it belonged to a class of gales which are distinguished by the sluggish rate of their geographical progression. All this was manifested by the persistence of the easterly winds; by the slow and graduated effect of their cyclonic action, as seen in the fall and subsequent rise of the barometer; and by the gradual veering of the winds towards the south, as the cyclone passed off. It has sometimes happened that a ship placed in a similar position in a cyclone, has run in nearly a direct course parallel to its path, for several days, without any considerable change in the direction of the storm wind. Hence it has been inferred, erroneously, that the gale was not a cyclone. A better knowledge of the cyclones will enable the mariner to avoid this error.

But we have further knowledge of the great extent and slow progression of this storm, obtained from direct observations in the adjacent parts of the Pacific ocean. The Saratoga, which left Yedo bay with the steamships, bound for Shanghai, on a track more northerly than was pursued by the steamships, encountered in like manner the heavy sea and strong winds from the eastward; and on the 21st was hove to, in latitude 29° 1′, longitude 129° 37′; and likewise on the 23d and 24th, near latitude 30° N., longitude 124° E., and was off Saddle island, near the mouth of the Yang-tsz river, from 27th to 30th, having then southeasterly winds, with squalls and continued bad weather. The barometer reached its lowest point, 29.60, at noon of 24th, in latitude 29° 28′, longitude 128° 17′, with the wind at E.N.E., and afterwards veering to S.S.E., as with the steamships. We have no observations made nearer to the right border of the cyclone.

Next in order of the gale's progression, we have the observations found in the master's report of the United States store-ship Supply, then lying at Napha, Lew Chew islands, latitude 26° 12′ N., longitude 127° 43′ E., a position much nearer to the center-path of the cyclone. His tables show the maximum of the anterior barometric wave to have reached Napha as early as noon of the 12th, when the barometer stood at 30.02 inches; from which time to the night of the 17th, it slowly subsided to 29.84, with winds from the eastern board. On the 18th the wind had become strong, with an increasing fall in the barometer. On the 19th and 20th the gale blew from the northeast quarter, with increasing violence; and in its greatest force from the northward on the 21st. At 3 A. M. of this day the barometer had subsided to 28.88; and to 28.82 at noon, with a slight reaction at evening. At 3 P. M. of 22d it had settled to 28.74, its lowest point, from which it had only risen to 28.83 at midnight, with improving weather. On the 23d and 24th the wind veered through east to southeast, and the barometer rose more rapidly. It reached 29.80, the July mean of the region, on the 20th, when the wind had veered to south, with no further traces of the departing cyclone. The fall and rise of the barometer at Napha, as also with the other vessels, was not entirely gradual, but with very moderate fluctuations of some hours continuance, as is more or less common under other wide-spread cyclones. The gale, though of much violence at Napha, was not of the greatest intensity of hurricanes. It was observed by the officers "that even when the wind was piping loudest—when the water was whirled violently by in perfect sheets—the scud moved overhead at a remarkably slow rate, and the upper layer of clouds seemed scarcely to be stirred at all;" thus showing the very limited elevation of the superior surface of the cyclone. Its axial center, when near these islands, probably bore south from Napha near noon of 22d, at a distance which I now estimate at about eighty miles.

In further tracing its approach to the western limits of the Pacific, we have the log-book of

the United States store-ship Caprice, Lieutenant Wm. L. Maury, bound from Shanghai to Lew Chew. At 8 A. M., July 17, the Caprice left the mouth of Woo-sung river, and stood down the Yang-tsz river. Barometer at noon 29.71 inches, its maximum for this period. Anchored during the night, with a heavy ground swell from S.E. July 18th, barometer at noon 29.67. P. M., working out of the river with wind at S.E.; barometer at midnight 29.62; force of wind 2; and a heavy swell from S.E.

July 20.—Pleasant, and wind veers from E.S.E. to N.E. by E. with gradually increasing strength, 3 to 4; with very heavy swell from S.E. to E.S.E. Latitude at noon, 31° 33′ N., longitude 123° 18′ E.; in 18 fathoms water. Weather still pleasant, with good breezes. At 6 P. M., barometer 29.42; took in sail and prepared for a gale; barometer rising to 29.50.

July 21.—Commences pleasant, with fresh breezes from N.E. by E., increasing, and heavy sea from E. At 10 A. M., gale at N.E. by N., force 7; barometer 29.40. Noon, latitude 29° 30′ N., longitude 124° 42′ E. 5 P. M., gale N.E., barometer 29.35; at midnight 29.34.

July 22.—Gale N.E.; heavy sea from E. and N.E.; 3 A. M., barometer 29.27; 5 A. M., N.E. by E., increasing; 9 A. M., force 9; barometer 29.27; sea running from N.E., and rapid gale scud flying over. Noon, latitude D. R. 28° 46; longitude, chron., 124° 49′. 1 P. M., gale E.N.E., force 10; 3 P. M., barometer 29.25′; squalls and rain. At 7 P. M., gale E. by N., 10; ship was hove-to; strong gales and high sea; rapid scud flying overhead.

July 23.—Lying-to throughout; a high and regular sea from E.N.E., with rapid scuds flying. 3 A. M., barometer 29.22; 9 A. M., gale east, 10; barometer 29.25. Noon, latitude D. R. 28° 30′ N., longitude, chro., 124° 26′ E.; 3 P. M., barometer 29.23; 5 P. M., gale E. ½ S., force 11; 9 P. M., gale E. by S.; barometer 29.23; spoon drift flying over the ship.

July 24.—Lying-to throughout; gale E. by S., force 10; high scud flying to westward with great rapidity. 3 A. M., barometer 29.22; 7 A. M., 29.20; 9 A. M., gale E.S.E.; barometer 29.18. Noon, latitude D. R. 28° 26′ N., longitude, chro. 124° 47′ E.; 1 P. M., gale S.E. by 10 E., force 11, with heavy squalls of wind and rain, with irregular sea; 3 P. M., barometer at its minimum, 29.16; heavy cross sea, and spoon-drift flying over the vessel; sky overcast with clouds, passing over slowly to the westward; 5 P. M., barometer 29.18, clouds sluggish; 7 P. M., gale S.E., less severe; barometer 29.24; 11 P. M., barometer 29.27; clouds occasionally breaking, and passing to N.W.

July 25.—3 A. M., gale S.E. by S, force 8; barometer 29.25; squally, with light rain. 5 A. M., force 7; barometer 29.28. 9 A. M., gale increasing; rainy and squalls; barometer 29.32; sea moderating. 11 P. M., gale 8; barometer 29.34. Noon, latitude D. R. 28° 51′, longitude D. R. 124° 03′; gale S. E. 8. 3 P. M., gale S.S.E. 7, with cross sea; barometer 29.37. 9 P. M., gale S.S.E. 6; sky brightening to northward and patches of blue sky to S.E., and overhead.

July 26.—Wind strong at S. E. by S., force 6; barometer 29.50; scud passing to northward; sea from S.S.E. 9 A. M., a heavy and cross sea rising; barometer 29.52. Noon, latitude 29° 31′, longitude 125° 16′; in 40 fathoms water. P. M., wind and sea increasing, with heavy squalls; clouds [scud?] passing rapidly to N.W. At 5 P. M., gale still S.E. by S, force 8; barometer 29.49. Ends moderating, (7); barometer 29.51.

July 27.—At 5 A. M., gale S.E., 7; barometer 29.52; squalls increasing. 8 A. M., gale S.E. ½ E., 8; scud low and thin, passing to northward; sea from southward, increasing. Noon, latitude D. R. 28° 55′, longitude D. R. 124° 16′; barometer 29.53; heavy squalls and rain; nimbus clouds passing to N.N.W. At 7 P. M., wind S.S.E. (6); barometer 29.55.

July 28.—1 A. M., strong winds (6) from S.S.E.; barometer 29.54; sea moderating. At 7

A. M., increasing to gale (7) from S.E. by E.; barometer 29.56; noon same, with high, irregular sea; barometer 29.58; latitude 29°, longitude 124° 37′; P. M., wind S.E. by S. (6); barometer 29.56—29.58. Ends with strong winds from S.E. and squalls.

July 29.—7 A. M., gale S.E. (7); barometer 29.55; low scuds flying to northward; high and irregular sea from S.S.W. Noon, latitude D. R. 28° 09′, longitude D. R. 123° 22′; in 45 fathoms water; barometer 29.56; gale S.E. by S. (7); scud flying to northward. At 3 P. M., gale S.S.E. (7); barometer 29.52. 6 P. M., strong gale (9) and squally, with rain and heavy sea. At 11 P. M., gale moderated to 5; barometer 29.58.

July 30.—Clouds breaking, clear to E. and S.E.; strong breezes S.S.E. to S.E.; clouds cumulo-stratus and nimbus, passing to N.N.W. At noon in 43 fathoms; latitude 29° N., longitude 124° 30′ E.; heavy sea from S.E., and swell from S.S.W.; barometer 29.55 to 29.61.

July 31.—Strong breezes (6) from southward; heavy swell from S.S.W. At noon under double-reefed topsail and foresail; latitude D. R. 28° 19′, longitude 124° 17′; barometer ranging between 29.57 and 29.63.

August 1.—Fresh breezes, force 5, moderating to 4; heavy swell from S.S.W. Noon, latitude 28° 35′, longitude 125° 09′, in 50 fathoms. Barometer rises from 29.62 at 1 A. M. to 29.69 at midnight, or nearly to the same point as at the commencement of this very extended period of cyclonic action.

The phenomenon thus presented may be regarded as of much scientific and practical interest. It does not appear that the Caprice was at any time nearer to the axis of the cyclone than about one hundred and fifty miles. The greatly prolonged influence of the cyclone upon her barometer was nearly equable; its movement being unusually steady during its successive gradations. The entire range of the barometer during a period of seventy-two hours, from 3 A. M. of the 22d to same hour of 25th, was scarcely more than one-tenth of an inch, or between 29.27 and 29.16 inches. The lowest depression occurred about 1 P. M. of the 24th, and probably indicated the nearest approach of the cyclonic axis, as it passed the ship. Its nearest approach to the Supply, at Lew Chew, appears to have been about 3 P. M. of the 22d, which is earlier by seventy hours. Hence, the rate of the advance of the cyclone, in this period, for the distance of little more than two hundred nautical miles, appears to be *only three nautical miles per hour.*

The earlier progress of this storm may have been at a faster rate, as has been shown in other cyclones, while moving westward toward the places of their northwardly recurvation. The minimum of the barometer, when properly observed, is believed to furnish more exact evidence of the actual progress of the storm than is afforded by the specific direction and changes of the winds, particularly in a wide spread cyclone.

The entire absence of any winds other than from the eastern board, with the several ships, would perhaps lead many navigators and meteorologists to infer that this gale was not a cyclone, but a direct wind, moving in the manner of a great current; and such inference might seem confirmed, on finding that these conditions must have extended over a breadth of track equal to about ten degrees of latitude. Yet, we might well inquire whether any gales, *other than cyclones,* are ever found to blow with great strength on the broad ocean. But the characteristic movements of the barometer and the coincident changes in the direction and strength of the winds, as also the advanced action and the subsequent changes in the direction of the heavy swell, which often ran in a course different from the winds, as blowing at the several ships, are quite sufficient to establish the cyclonic character of this extensive and slowly advancing gale. Moreover, the direction and strength of the winds with the steamships on the 20th and 21st, was

such that, according to the above inference, the same should have reached the Caprice, and the coast of China, in about eight hours; and yet some fifty or sixty hours are found to have elapsed before this geographical translation had fully taken place.

Although the cyclonic character of this gale is thus fully established, we have still another important series of observations, obtained by the officers of the squadrom from the British schooner Eament, procured from the log-book by Lieut. Wm. L. Maury, which show us a portion of the northerly winds of the cyclone as *veering by the west* to southwest and south, in the *inner portion of its left hand quadrants.* The following is the abridged log, with the old system of nautical dates reduced to civil time:

The schooner Eament, H. D. Brown, commander, from Hong Kong towards Woo-sung, was standing through the Formosa channel, and on the afternoon of July 21, had moderate breezes from the northern quarter, with fine weather.

July 22 begins with light breezes from N.N.W. and fine; heading N.E. by N.; steady breeze and cloudy; 11 A. M., in all studding sails, and braced sharp up. At noon, latitude D. R. 25° 30′ N., longitude by chronometer 120° 46′ E.; barometer 29.40. P. M., moderate breeze from N.N.W., and heavy sea from N.E. Midnight, pitching very heavily, and gale increasing; double reefed the foresail; barometer 29.39. [Off the north end of Formosa, heading up northeastward, and approaching the center path of the storm.]

July 23.—1 A. M., gale still N.N.W.; split inner jib; vessel's course falling off from N.E. to E.N.E., and gale increasing; 10 A. M., Agincourt island bearing S.S.W., distant five miles. Noon, barometer 29.20; strong gale from N.N.E.; 4 P. M., gale increasing, close reefed foresail and mainsail; aneroid falling rapidly. Midnight, strong gale and heavy rain; aneroid 28.50; vessel pitching heavily. [Between Formosa and the Madjico-sima group.]

July 24.—1 A. M., blowing a hurricane from N.N.E., with high sea; at 11 A. M., split the foresail. At noon gale less violent; weather looking very unsettled; 1 P. M., wind W.N.W., and moderate, with dirty looking weather and high sea; aneroid 28.30, and still falling; at 3 P. M., calm! [Vessel on southern edge of the axial area of the cyclone.] At 3.30 P. M. wind increasing, and bearing to S.W.; vessel labors heavily; 5 P. M., gale S.S.W.; 5.30, blowing a hurricane; split fore trysail; 6 P. M., hurricane from south, increasing; scudding under bare poles; very heavy seas; aneroid 28.14. [Vessel behind the storm's centre, and running across the rear of the vortex.] At 7 P. M., gale S.S.E.; 8 P. M., hove-to under bare poles; gale S.E. At 10 P. M., less wind, with heavy rain; set fore staysail and the close reefed fore and mainsails; midnight, strong gale.

July 25.—4 A. M., less wind; aneroid rising; 8 A. M., strong wind and high sea; 9.30, shipped a heavy sea; split foresail; vessel heading N.E. at noon, with strong gale and heavy sea; aneroid 28.00 [?] and [barometer?] 29.51; P. M., gale strong from S.E., and thick weather; vessel running N.E.; rolling and pitching heavily; 6 P. M., strong breezes and thick weather; aneroid 29.40; midnight, same winds and weather.

July 26.—At 4 A. M., less wind; set foresail, close reefed; 8 A. M., set squaresail; course N.; rolling heavily. Noon, strong breezes, with heavy sea; aneroid 29.52; P. M., fresh gale from S.E., and heavy sea; 7 P. M., strong winds and dirty weather; double reefed the foresail; midnight, less wind.

July 27.—4 A. M., fresh breezes and squally; course W.N.W. At 9.30 A. M., saw Video, bearing W.N.W. ½ N., distant 8 miles. [Position of this island, latitude 30° 07′, longitude 122° 46′ E.] At noon, aneroid 29.63.

It is here seen that in the Formosa channel the cyclonic wind had set in on the 21st, settling to N.N.W. at midnight, at the distance perhaps of 90 miles *to the left* of the line on which the axis of the storm was approaching; but pushing northeastward, in order to clear Formosa and the small islands, the vessel was steered almost directly for the approaching vortex, and thus changed her wind from N.N.W. to N.N.E., the proper anterior wind on the path of the gale's axis. When this axis had passed the vessel, she was then enabled to run on her desired course, before the southwesterly and southerly winds, thus crossing the axis path into the second right hand quadrant of the gale, and thus bringing the wind to the southeast quarter.

The axis path of the gale, as indicated by the foregoing reports, is found on the annexed storm chart for the north Pacific ocean, marked (A).

To what limits this cyclone might be traced on the left or southerly side of its path we are unable to determine. In regard to the entire breadth of its path, it appears by the report of sailingmaster Conover, "that on 26th and 27th of July, it blew most terribly upon the coast from Hong Kong to Shanghai; scattering and wrecking the unwieldy Chinese junks, and sending many a poor fisherman to his long home." Its further course over the great alluvial plain of China and the adjacent waters of the Yellow Sea, and the subsequent recurvation of its path to the northward and eastward, are not likely to be determined by direct observations.

The phenomena of this great cyclone are fruitful of instruction, both to mariners and meteorologists, and present many points of practical interest, which cannot be dwelt upon in the limits of this communication. It may be noticed, however, without regard to the slow rate of progression, that the phases of the barometer and winds which were presented in the extensive region on the right side of the axis path, are in perfect accordance with those which are found in the right hand quadrants of the great cyclones which so often sweep over the United States and the north Atlantic ocean, in pursuing their northeasterly course. Thus, as we have already seen, during the W.N.W. progression in the lower latitudes, the true winds of the cyclone, in its two right hand quadrants are chiefly from the *eastern* board, and veering *to the right* towards the south in the progress of the storm; and on reaching the higher latitudes, in consequence of the inversion in the course of progression, the winds of these two right hand quadrants come mostly from the *western* board, and are still found veering *towards the right*, by west towards the north, as the cyclone moves onward over the places of observation. Such cases are constantly presented during the greater part of the year; and our navigators in crossing the Atlantic have great experience of the truth of this position.

CYCLONES AND MONSOONS.

It is doubtless important that the nautical reports which we have already noticed should become available for the better guidance and security of oceanic commerce. For it often happens that seamen are too slow in recognizing the cyclonic character and conditions of the gales which they encounter, and many disasters have resulted from this neglect.

In the Asiatic seas, as elsewhere, the judgment of the navigator is often misguided by the loose and inaccurate statements which are found in various authorities. Thus, it is said that gales or hurricanes rarely occur in these seas, except at the equinoxes, or at the changes of the monsoons. These assumed axioms are greatly erroneous, as the inspection of the storm charts may suffice to show.

The actual relations of the cyclones to the monsoons and local winds of the Asiatic seas are of much interest, and merit a careful examination. It is quite remarkable that these monsoons

should be found to have little, if any, control or influence as regards the regular courses and developments of the cyclones. This may show the predominancy of cosmical laws and influences over the apparently opposing conditions which are so extensively presented by these alternating winds.

The extent of the westerly monsoons, parallel to and on both sides of the equator, appears to be far greater than has been recognized by most writers. In the northern hemisphere these counter winds of the true trades extend from the east coast of Africa, near longitude 45° E., to at least longitude 175° E., in the central Pacific. The proper trade wind appears to consist of a comparatively thin stratum of aerial current moving upon the ocean surface, and is distinguished by its inclination towards the equator. On this stratum there is ordinarily imposed another current, probably of greater depth and volume, into which the trade wind ultimately merges, and which also moves westward while in the trade-wind latitudes, but generally inclines from the equator, as is shown by the rain clouds and squalls which it carries, and by the direction of translation imparted to the cyclones which it embodies. This important wind-current, so little recognized by most writers, frequently alternates with, or displaces, the true trades; and still more frequently it replaces the westerly monsoon, as a surface wind, to the east of Sumatra. Thus, the "southwest monsoon" of the China sea and the western Pacific, and which extends to the shores of Japan, is very commonly displaced from the surface by the main current of southeasterly wind, especially to the eastward of Sumatra. Thus, the "southwest monsoon" of the China sea and the western Pacific, and which extends to the shores of Japan, is very often displaced from the surface by the subsidence of the main current of southeasterly wind, more especially in the regions near the Asiatic coast.

UNIVERSALITY OF THE LAW OF STORMS.

The law of rotation and progression in storms, as developed on the Atlantic ocean, which was substantially discovered by the present writer in September of the year 1821, is essentially cosmical or world-wide in its origin and application. This soon became apparent in examining the accounts of gales which are found in the voyages of Cook, Vancouver, and others, in the several oceans and climatory zones of our globe. Hence, the polar relations of the phenomena presented are necessarily changed in the southern hemisphere, where, in all our relative comparisons, south must be substituted for north; east and west remaining the same.

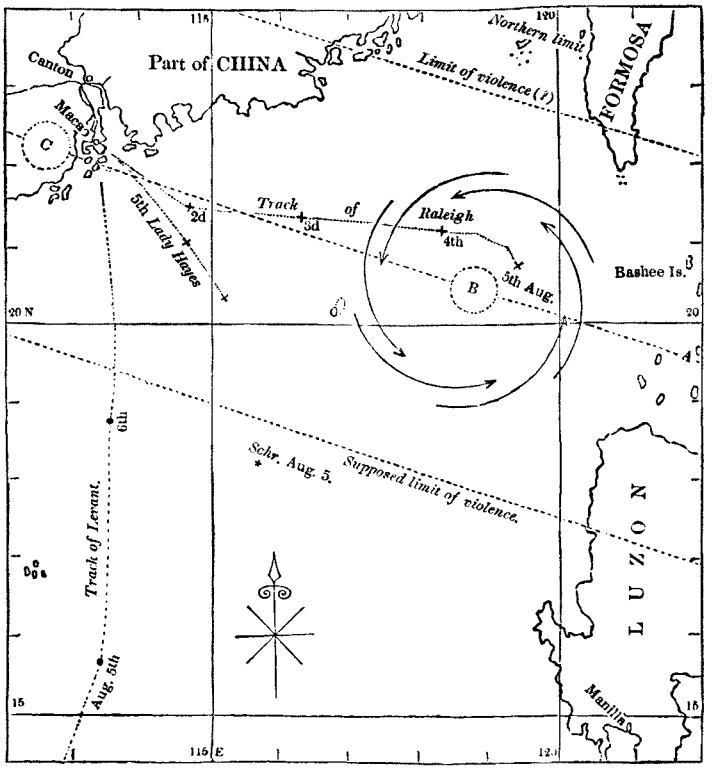
This similarity of polar relations in the winds of the two hemispheres, and the corresponding influence on the barometer, which are shown by the opposite cyclonic changes of these winds, are virtually recognized in P. P. King's account of his surveying expedition in the southern hemisphere about the year 1826, as is seen in his sailing directions. The more complete and satisfactory evidence of this cosmical system, or law, of cyclonic action, which is derived from a series of extended geographical observations in the paths of storms in the southern hemisphere, has since been furnished in the several works of Reid, Thom, and Piddington. The latter author has also investigated many storms of the sea of Bengal and the Indian ocean, and has noticed various gales, or typhoons, of the China sea. Some of the following notices may serve to increase our knowledge of Asiatic storms, and those of the Pacific ocean, north of the equator:

CYCLONES OF THE CHINA SEA.

A cyclone of moderate intensity was experienced by the Mississippi, then flag-ship of the expedition, from the 2d to the 4th of August, 1854, in the harbor of Cum-sing-moon, near

Macao. The wind was from N.E., veering through E. to S.E., S., and S.S.W. Barometer at lowest, 29.26 inches, on the 3d. These phases of the wind show the ship to have been under the two right-hand quadrants of the cyclone.

I have placed on the chart the track of a cyclone encountered by the American ship Panama in the China sea in October, 1831, which storm had previously passed over the Philippine Islands, and was very destructive at Manilla. Also, the track of the cyclone of her Majesty's ship Raleigh, encountered near the Bashee Islands in August, 1835, and which afterwards visited Macao and Canton with great violence. A sketch showing its path of progression on the 5th and 6th of August is here subjoined.



It appears from the ship's log-book, as published by Colonel Reid, that the Raleigh sailed from Macao Roads on the 1st of August, on the track shown in our sketch, which had been prepared before the publication of his work. On the 4th the ship met with northeasterly and northerly winds, accompanying a fall of the barometer, and which increased to a heavy typhoon from N.N.E., veering to N.E. and E.N.E. Barometer at 8 A. M., 29.60; noon, 29.45; 8 P. M., 29.36; and midnight, 29.04, with typhoon increasing. August 5, at 3 A. M., the typhoon had veered to E.S.E., still increasing in violence; barometer 28.50, and falling. At 5 A. M., typhoon blowing from S.E. At 6.30, barometer falling from 28.30 to 28.20; commenced throwing the guns and shot overboard. At 8 A. M., still increasing. At 9.30 A. M. the ship went over. At 9.30 the masts and bowsprit went by the board and the ship righted, with four feet water in the hold; latitude 20° 44′, longitude 119° 18′ E.

It will be seen by the veering of the wind that the Raleigh was on the right side, which is here the northerly side, of the center-path of the cyclone, and was very near to the vortex of the gale when it passed the ship, as is shown by the great fall of the barometer and the intensity

of the storm at that period. At 1 P. M. of the 5th the typhoon was blowing from S.S.E., and had moderated a little. From 6 to 7 P. M., more moderate; but strong gusts of wind, with a heavy sea, from the southward.

At Macao the typhoon was experienced in great force eighteen to twenty hours *later* than with the Raleigh. Of a valuable series of observations, thirty-four in number, which were taken of the barometer at Macao during the passage of the cyclone, the lowest was 28.08 inches, at 1.20 A. M. of the 6th of August. This great depression shows the centre, or vortex, of the cyclone to have passed near to Macao.

At Canton, on the right of the center-path, and about sixty miles north of Macao, the gale began with northerly winds on the evening of the 5th, and continued through the night and the next day. Its violence is said to have been greatest about 2 A. M. of the 6th. At midnight of the 5th the barometer had fallen to 29.37 inches. Its further fall, later in the night, was unnoticed; but at 5 A. M. it had again risen to 29.34 inches, which, respectively, is 0.23 inches and 0.32 inches higher than the two corresponding observations at Macao. The wind, during the typhoon, veered from N., through N.E., to S.E., and at 8 A. M. of the 7th the barometer had risen to 29.94 inches.

The American ship Lady Hayes left Macao Roads before the gale set in, and first encountered it about thirty-five miles from land, being on the *left* side of the line pursued by the storm's center. An attempt was made to return to port; which having failed, the ship, from noon of the 5th, was run off S.E. by E. under all the sail she would bear, and thus was meeting the gale in its approach, the wind then blowing at north, with a tremendous swell from the eastward. At 4 P. M. it was blowing in severe gusts, and the ship was becoming unmanagable. About 8.30 P. M. the wind began to veer to the west, but continued to blow as hard as ever till midnight, and drew round to the south, when it moderated a little. It continued to blow hard from that quarter until noon of the 6th. Had the wind veered eastward, as with the Raleigh and at Canton, it is likely the ship would have been driven ashore among the islands.

A three-masted schooner encountered the gale on the 5th of August in latitude 18° 2′ N., longitude 115° 50′ E., but no particulars are given.

Captain Dumaresq, of the American ship Levant, arrived at Lintin on the 7th, having made a fine run from the southward under the later and more outward winds of the cyclone, which had veered from S.W. by W. on the 5th to S.S.W. and S. on the 6th, with strong breezes, heavy squalls, and rain—ending in fine weather. At 11 A. M. of 6th had heavy squalls, with rain in torrents. Took in all studding sails, royals, and topgallant sails, and double-reefed the topsails, partly from an apprehension of falling too near the land the following night. The track of the Levant is seen on the sketch, as obtained from the ship's log-book and the private journal of Captain Dumaresq, which he has kindly placed in my hands.

From the data to which I have now alluded, the course of this storm appears to have been N. 72° W., and its rate of progress is estimated at about seventeen nautical miles per hour. It is fully apparent that its axis of rotation passed to the northward of the Lady Hayes, and southward of the Raleigh and of Canton, and the anchorages near Macao, and nearly on the line A B C, as designated on the sketch.

If circles, having a radius equal to about one hundred and sixty nautical miles, be drawn around the two points B and C, these will severally comprise the areas of principal violence in this hurricane at the two periods of 9 A. M. of the 5th and 2 A. M. of the 6th of August, respec-

tively. But the more moderate forces of the cyclone must have extended very far beyond these approximate limits.

A more extended notice of this storm may be found in my communications to the American Journal of Science, and the London Nautical Magazine, published in January, 1839, in which I have also comprised accounts of various other cyclones of great violence which have passed over the China sea, and the regions near Canton and Formosa, in different years. The tracts of some of these are well illustrated by the typhoon of the Raleigh. I omit, therefore, the close grouping which their delineation would require on the chart.

On the southern coast of China the semi-annual changes of the monsoons are found to occur in April, and about the end of September, varying somewhat in different years. Typhoons often cross the China sea, more commonly from May to October, on routes corresponding in direction to those of the hurricanes of the West Indies and the lower latitudes of the Atlantic, and with like characteristics. That inquiring old voyager, Dampier, states that on the coast of Tonquin the typhoons are expected in the months of July, August, and September. It will be noticed that these are also deemed to be hurricane months in the lower latitudes of the Atlantic, east of Yucatan, and that no special connexion with the periods of change in the monsoons is indicated. Dampier says that in these typhoons "the wind comes on fierce, and blows very violent at N.E. twelve hours, more or less. When the wind begins to abate, it dies away suddenly, and falling flat calm, it continues so an hour, more or less, when the wind comes about to the S.W., and it blows and rains as fierce from thence as it did before from the N.E., and as long." A better description of the phenomena of a violent cyclone, on its centre path in the lower latitudes, and before its recurvation, could hardly be given.

CYCLONE OF THE ANNIE BUCKMAN, IN FEBRUARY, 1853.

Among the valuable collections of the Expedition is an extract from the log of the American barque Annie Buckman, Henry Barber, commander, and furnished by him to Lieutenant William L. Maury. It will aid in dispelling the error that typhoons and hurricanes are only periodical in their occurrence in the torrid zone.

At noon of February 3, 1853, the Annie Buckman, sailing for Canton, was in latitude 12° 30′ N., longitude 129° 16′ E., several degrees east of the Philippine islands, with the barometer at 29.75, and a double-reefed topsail breeze from the N.E. quarter. In the period between this date and the 9th the vessel was subject to a very violent typhoon, during which both the direction of the wind and the course of the vessel went round the compass, by the north, west, and south, to the N.E. quarter on the 9th. At noon of this day the barque was in latitude 18° 09′ N., longitude 127° 25′ E., barometer 29.80. Of the few entries given of the barometer the lowest was 29.25, at 4 P. M. of February 7th; wind then from the westward, and increasing soon after to its greatest violence.

Captain Barber states that in twenty years navigation, in all oceans, he had not encountered a hurricane so violent. Its path is indicated on the chart.

Bonin Islands.—These islands, according to Commander Hammet, of H. M. ship Serpent, are subject to typhoons, but he states they are not frequent.

In October, 1853, the United States ship Plymouth, belonging to the Japan Expedition, was lying in Lloyd's Harbor, where on the 25th she encountered a typhoon, in which an officer and a boat's crew, then absent from the ship, were lost. According to the report of the acting master to Commodore Perry, it commenced with squalls of wind from E.S.E., under which the

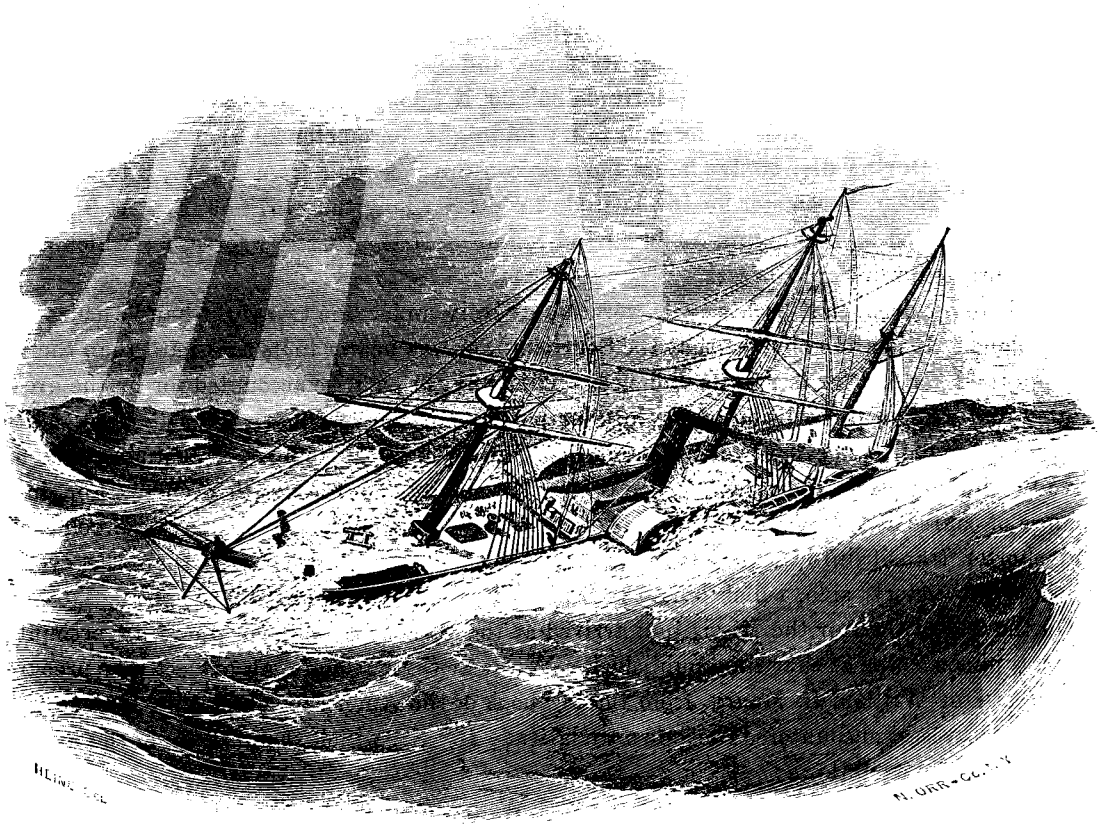
barometer began to fall. "At 9 P. M. it fell calm, and continued so for little less than an hour, when the wind came out again suddenly from the N.W., with terrific violence, blowing, if anything, still harder than from the E.S.E. Barometer, when lowest, 28.97, at which it arrived very rapidly, and when it commenced rising it did so in the same manner."

The position of Lloyd's Harbor (Peel's Island) is in latitude 27° 05′ N., longitude 142° 16′ E.; and the above report affords data for approximating its route on the chart. This cyclone evidently completed its recurvation while passing over the Bonin Islands.

CYCLONE OF THE MISSISSIPPI

Some observations, made in a storm-path of the North Pacific ocean, are afforded by the log-books of the ships Mississippi and Southampton, while on their return from Japan to the Sandwich Islands, and by other reports which have been obtained.

These two ships of the squadron left Simoda on the 1st of October, 1854, and throughout the 2d they encountered a swell from the S.E. On the 7th, when near latitude 36° N., they were overtaken by a cyclone, which increased with the Mississippi to the force of a hurricane.



"MISSISSIPPI," OCTOBER 7, 1854.

The Southampton, early on the 6th, had the wind eastward, force 4, and increasing to 6 at noon, with rain; latitude 35° 28′ N., longitude 146° 43′ E. At midnight the wind had veered to S.S.E., decreasing in force. On the 7th it had veered to S.S.W., moderate in force, and at 9 A. M. became variable in direction. At noon, latitude 37° 08′, longitude 147° 55′ E., the barometer was at its lowest point, and the wind had settled to a gale at N.W., which abated in

the evening. On the 8th wind westward, and moderate; latitude 37° 37′, longitude 152° E., P. M., the wind again passed to N.W., increasing in force; weather cloudy, with rain. I have no report from this ship for the 5th and 9th.

The Mississippi, on the 5th, had the wind from N.E., veering to E.S.E.; its force varying between 4 and 6, and barometer falling from 30.11 to 30.04 at noon; latitude 34° N., longitude 149° E. On the 6th, the wind gradually went to S.S.E., latitude 35° 21′, longitude 151° 33′ E. At 9 P. M., the force of the gale had increased to 9; topsails close-reefed; barometer had gradually fallen from 30.02 to 29.71.

October 7.—During first twelve hours the gale blew from S.S E., veering towards south; force, 7 to 8. "The square sails were taken in, and the ship hauled up to the S.E. to avoid the center of the typhoon, which was evidently approaching from the S.W." At noon, barometer had fallen to 29.39; gale increasing; latitude 35° 59′ N., longitude 153° 47′ E. At 1 P. M., gale S. by W. 10; barometer 29.29. 2 P. M., S.S.W. 11; barometer 29.17, being its lowest. 3 P. M., S.W. 12; barometer 29.21. From noon "until 4 P. M., the wind was blowing with the force of a hurricane, in puffs, flattening the sea, and filling the air with spoon-drift, subsiding then into a heavy gale." At 4 P. M., gale S.W. 11; barometer 29.27. 6 P. M., W.S.W. 10; barometer 29.45. 8 P. M., W. by S. 9; barometer 29.53. 10 P. M., west 7; barometer 29.60.

On the 8th, gale at W.S.W, abating its force, and from 9 A. M. inclining southerly. At noon barometer had risen to 29.71; latitude 35° 30′ N., longitude 155° 11′ E.; P. M. the gale passed to N.W., with increasing force, 7 to 8; midnight, barometer 29.91.

October 9.—During first twelve hours the gale continued strong from N.W., 6 to 8, passing northward. Noon, barometer 30.16; latitude 35° 40′ N., longitude 157° 59′ E. At 8 P. M. the barometer reached its maximum, 30.30; wind round to N.E. quarter; force, 6; which abated on the 10th to an ordinary breeze.

It is here apparent that both vessels were successively under the two right-hand quadrants of the cyclone. It is alike obvious that the Southampton was nearer to its axis-path than the Mississippi, and yet had far less of its violence. This may, in part, be accounted for by the greatly dilated and weakened condition of the interior portions of the cyclone. This dilated condition is very common in the great cyclones while passing through the temperate latitudes, and may have its chief origin in the region where the recurvation of the storm-path occurs. For, in the change of course at this period, the winds of the eastern part of the cyclone have a much earlier and shorter transit into the now inverted path of the temperate latitudes than the cyclonic winds of its westerly side, which left to pursue a wider circuit.

On the 23d of October the Mississippi arrived at the Sandwich Islands, where an account of this "typhoon" was at that time published. While at these islands, an extract was procured, by Lieutenant William L. Maury, from the log-book of the American whale-ship George Howland, which vessel encountered the gale near latitude 46° N., which there set in on the morning of the 8th. See as follows:

Friday, October 6.—Moderate breezes from N.W.; course E. by S.; latter part fresh from W.N.W.; latitude 46° 29′, longitude 161° 09′ E.

October 7.—Wind fresh from W.N.W; latter part moderate breezes; latitude 45° 46′ N., longitude 164° 43′ E. [This, apparently, is the ending of a previous cyclone.]

October 8.—Moderate breeze W.S.W.; course E. ½ S. At 8 A. M., the wind hauled to S.S.W., and increased to a gale; latitude 46° 18′ N., longitude 165° 50′ E. At 4 P. M., wind east, [E.S.E.,

true,] and a heavy gale. At 9 P. M., died away suddenly, and came down from S.W.; course E. by S.

October 9.—Gale moderate from S.W. by W.; at 7 A. M., hove-to; middle part, wind W., with a heavy cross sea. At 4 P. M., kept off E. by S.; latitude 45° 40′ N., longitude 169° 45′ E.

October 10.—Gale fresh from N.W., [noon;] wind moderate, W. by N.; latitude 44° 36′ N., longitude 173° 20′ E.

This further trace of the cyclone increased the desire for observations from the earlier portions of its path in the lower latitudes, but which seemed unattainable. Fortunately, the London Nautical Magazine, for February, 1855, contains the following report from P. Briard, commander of the brig Giffard, addressed to the editor:

"CYCLONE IN THE PACIFIC OCEAN.

"SIR: I forward you an abstract from the log of the brig Giffard during a severe typhoon, experienced on her passage from San Francisco to Shanghai, which will help to investigate the track of cyclones in that part of the Pacific ocean.

"*Tuesday, October* 3, 1854.—Latitude at noon, 25° 32′ N., longitude 137° 48′ E.; fresh breezes from N.E.; hazy weather; a dense bank of clouds in the east; barometer fluctuating between 29.70 and 29.80. At midnight freshening breeze, with squalls and rainy weather; ship heading N.W. by N.

"*October* 4.—Increasing gales, with squalls and thick, rainy weather; double-reefed topsails; furled jib and mainsail. Noon, latitude 27.40 N., longitude 134° 10′ E.; barometer 29.60. At 1 P. M., barometer fell to 29.35; gale increasing, with incessant rain. I begin to suspect we are edging gradually in a typhoon, the winds being east, and our course W.N.W.; consequently, being on the northern edge of it, I decided on heaving to, to allow the center of the cyclone to pass on ahead; sent down royal yards, furled the courses and foretopsail, and brought the vessel to under close-reefed maintopsail on starboard tack; wind east; ship's head N.N.E. At 4 P. M., barometer 29.30; at midnight, barometer 29.25; wind E.S.E.

"*October* 5, *a. m.*—Blowing a severe gale, with incessant rain; lying to under close-reef maintopsail. At 4 A. M., barometer 29.20; wind S.E.; at 8 A. M., barometer 29.15; wind S.S.E.; at noon, barometer 29.05; wind S.S.E.; at 2 P. M., barometer 29.00; wind S. by E., blowing a furious typhoon, with incessant rain; the sea a complete sheet of foam, flying over the ship. At 4 P. M., barometer 28.80; wind south; at 8 P. M., barometer 28.70; wind S.S.W.; were struck by a sea on the starboard bow. This, combined with the strength of the wind, which was now at its height, carried away the bowsprit, foremast, close to the deck, and maintopmast, leaving nothing but the mainmast standing, and shifted the ballast, giving the vessel a heavy list to port. At midnight, barometer 28.70; wind S.W.; no abatement in the fury of the gale.

"*October* 6.—At 1 A. M. the barometer began to rise; at 2 A. M., barometer 28.90; wind W.S.W., moderating a little; still raining incessantly. At 4 A. M., barometer 29.00; wind W. by S.; at 8 A. M., barometer 29.10; wind W. by S.; at noon, barometer 29.30; wind west; moderating fast, but still blowing a heavy gale. My impression is, that on the 4th the cyclone was travelling N.W., but that on the 5th it recurved to north, as we had the heaviest of it when the center bore N.W.

"I remain, &c.,

"P. BRIARD."

We have thus, from Captain Briard, a good account of this cyclone previous to and at the time of its recurvation. On comparing the several reports with those of the previous great cyclone of July, 1853, and in view of other analogies, I am led to believe that the swell from southeast, reported by the ships on the 2d of October, on the Japan coast, is referable to the action of the right border of the cyclone, while passing westward in the lower latitudes.

If we add to the observed track of the cyclone the diameter of its area from the places of the earliest and latest observations, respectively, we may consider its known path as extending more than four thousand nautical miles.

The rate of its advance from the probable position of its center on the 3d to that of the 4th of October I estimate at about seventeen nautical miles per hour; from the 4th to 5th at ten or twelve miles per hour, and from 7th to 9th at about forty miles per hour.

The observations made on board the Mississippi furnish the best data for estimating the probable diameter of the cyclone as it passed over the ship. The time thus occupied in the barometrical transit may be reckoned from noon of 5th to about noon of 9th—a period of ninety-six hours. If we allow an average rate of twenty-five miles an hour for the progression at this period, and deduct the corresponding advance of the vessel, it will indicate a diameter of the cyclonic influence of nearly two thousand miles; but, as the extreme right border of such a cyclone does not commonly increase its latitude in those parallels, we may estimate the extent of its moderate activity on the 7th as equal to about fifteen hundred miles, or perhaps greater.

The approximate track of the cyclonic axis, as deduced from the observations, will be seen on the chart.

Since writing the above, I have received from the British Admiralty, through the kindness of Captain A. B. Beecher, the observations made during the period of the cyclone on board her Majesty's ship Winchester, then lying in the roads of Nagasaki, in latitude 32° 44′ N., longitude 129° 46′ E. At this position, situated nearly three hundred miles northwestward from the nearest part of the axis line on the chart, with the great island of Kiusiu intervening, the earliest indications of the cyclone were from midnight of 4th and 5th of October, at which hour the weather was calm, and the barometer 30.05 During the first twelve hours of 5th the barometer fell to 29.88, with wind veering from E.N.E. to N.E.; force 4 to 3, with squally weather. In the afternoon of 5th the wind had veered to north, and the barometer fell to 29.80, near which it continued during the night and throughout the 6th, with wind nearly at north, but diminishing; its force varying from 4 to 2, but with a calm at 8 P. M. of 6th. In the morning of 7th the wind came from N.N.W.; force .3; and at noon the barometer had risen to 29.97—reaching a maximum of 30.06 in the following night.

This account shows the general accuracy of the recurvation which has been assigned to the track. It exhibits a cyclonic depression of about one-fourth of an inch in the barometer at Nagasaki, and a moderate exhibition of the cyclonic winds. The phenomena do not differ essentially from those of the corresponding border of cyclones in the United States in the like relative position.

REINDEER'S CYCLONE, JULY, 1850.

The American ship Reindeer was dismasted in a furious hurricane on the 19th of July, 1850, in latitude 18° 30′ N., longitude 139° E., about twelve hundred miles from the coast of China. She ran with bare poles under the easterly winds of the cyclone, thus nearing its vortex till the barometer had fallen to 28.85, when the wind veered to S. S. E. in a perfect blast; the ship broached to, and the masts soon went overboard.

With the knowledge of storms which we now possess, our ships should not be thus disabled in open sea.

THE FREAK'S TYPHOON, OF MAY, 1850.

The English brig Freak, T. B Simpson, master, met with a cyclone on the first of May, 1850, in latitude 19° 28′ N., longitude 138° 44′ E., which set in at E. by S. and increased to a hurricane of great severity. During the remainder of that day the brig ran westward, with an increasing gale, which ranged between E. by S. and E. by N. At midnight, the master began to suspect that he was approaching the vortex of a cyclone that was travelling to the northwest, and at 1 A. M. of 2d, he hove to on the starboard tack to allow it to pass him. After heaving to, the wind continued steady at E. by N., and commenced blowing a hurricane, except with a partial remission, at 6 A. M. At noon the wind became E.N.E., with barometer at 29.22, near latitude 19° 40′, longitude 136° 40′ E. Had the strength of the cyclone between 2 and 3 P. M., when the fore-topmast and main-topgallant-mast were broken off by the force of the wind, which at this time was beyond description. At 3.50 P. M. barometer had fallen to 28.87—its lowest point. The wind from noon continued to haul *to the northward*—its greatest strength being from about N.E. by N., and the master thus found, to his surprise, that he was in the northwest quadrant of the cyclone and on the left side of its path, it having already recurved to the northward and eastward. From 4 P. M. the barometer began to rise and the force of the gale to decrease, and it became steady for a time at N.N.W.

The easterly winds of this cyclone having veered by the north, the master's inference, that the recurvation of its path took place during the time in which his vessel was exposed to the gale, appears correct—the center having recurved southward and eastward of the vessel's place. His full account may be found in the Nautical Magazine for 1851, pages 273–275.

Marian Islands.—The island of Guam, in latitude 13° 26′ N., longitude 144° 52′ E., and the other islands of the Ladrone or Mariana group, are understood to be subject to hurricanes, for which the inhabitants prepare by lashing down and securing their houses. They are expected in the months of June, July, and August; also, in December and January.—*Nautical Magazine*, 1843, *p.* 6.

[The delay of the press enables me to state here that Guam was visited on the 23d of September last [1855] by a typhoon of the most violent character. The account states that "the storm commenced in the morning and kept on increasing until 11 P. M., when it burst upon the place with all its power. No tongue can tell nor pen describe the perils of that night. In less than twenty minutes more than eight thousand persons were left without a house or roof to protect them from the fury of the storm.

"All the houses upon the island of Guam, with the exception of ten or twelve stone buildings, were destroyed and scattered in every direction. The rain fell in torrents, and, as it touched the lips, it tasted as salt as though it came from the ocean. Thousands of cocoa-nut trees, (which is a very tough wood,) laden with fruit, were crushed like so many slender reeds, torn up by the roots and thrown into all shapes. Nearly everything that carried its head above ground was destroyed."]

CYCLONE OF THE J. N. GOSLER, MAY, 1855.

The American ship J. N. Gosler, from San Francisco, for Hong Kong, experienced a heavy typhoon on the 28th of May, 1855, in latitude 16° 40′ N., longitude 147° 45′ E., nearly two thousand miles from the Chinese coast. She carried away sails, spars, &c., and was abandoned

on the 30th, with nine feet of water in the hold. The officers and crew succeeded in reaching the Marian Islands in their boats.

STRONG'S ISLAND, AND ASCENSION.

Mr. John T. Gulick, of the Sandwich Islands, in the year 1852, visited several of the Micronesian Islands, near the equator, in company with the missionaries who then settled at these islands. At Strong's island (Ualan,) in latitude 5° 12′ N., longitude 163° E., they were informed by King George, the principal chief, that at a former period the island had been visited by a hurricane which wholly destroyed the bread fruit trees, and thus caused a famine which destroyed a large portion of the inhabitants. He described the gale as blowing first from one quarter of the heavens, and then from another.

At Ascension island (Bonabi,) which is about three hundred miles distant, in a west-northwest direction, a similar account was received. Although it cannot be certainly known that the disasters at the two islands were produced by one and the same storm, yet their relative positions accord with the usual course of progression in the lower latitudes. A cyclone moving on this track, would be likely to cross the China sea, unless prevented by an earlier recurvation of its path into the temperate latitudes.

CYCLONE OF THE AUSTERLITZ; NOVEMBER 1851.

The following notices of this cyclone are contained in letters from Hong Kong, dated December 18, 1851, and made public by the secretary of the New York Board of Underwriters:

"The new clipper Witchcraft arrived at Hong Kong on the 3d of December, from California, with loss of mainmast head and all the topmasts. She experienced a typhoon on the 13th–14th of November, in latitude 22° 40′ N., longitude 150° E."

"About the same period, in latitude 19° 48′ N., longitude 159° E., the American ship Austerlitz was totally dismasted. The chain-plates were torn from her sides, and her hull otherwise much injured. The N. B. Palmer, bound from San Francisco to Shanghai, fell in with her and took from the wreck all on board, and abandoned her."

It cannot be doubted that the two ships, Austerlitz and Witchcraft, fell, successively, nearly into the heart of the cyclone. We have thus two points established in its track, which are distant from each other about five hundred and thirty nautical miles. These positions show its course to have been north 71° west, or W.N.W., nearly. The want of an exact date in the account of the Austerlitz, leaves the rate of progression undetermined. The position of the Austerlitz is more than two thousand five hundred miles from Hong Kong, on the coast of China, and is somewhat nearer to the Sandwich Islands.

I have been informed recently by Captain Rodgers, who commanded the Witchcraft, that he left San Francisco on the 3d of October, and had light, variable winds and calms to the Sandwich Islands. After passing these islands, he found very unsteady winds, veering from N.E. to S.E., and sometimes S.W., with occasional light airs from west; the barometer ranging from 30 to 30.05. In longitude 169° E., the winds veered to S. and S.W., with heavy clouds and swell from westward; barometer ranging about 29.90, indicative of the S.W. monsoon. On reaching longitude 159° 30′ E., latitude 20° N., November 9th, he had a very heavy gale, of short duration, from S.W., veering by S. to S.E., in which his close-reefed topsails were blown away. Hence, he hardly expected the severe gale of the 14th, in the path of which he ran, on a west course, with increasing wind from S.E., veering to south, and finally to S.W. The ship was hove to,

with the wind at south; and at no time was in advance of the center or axis of the cyclone. The barometer stood lowest, 29.20, about 8 A. M. of the 14th, at the time when the topmasts were blown away.

KINGSMILL ISLANDS, GILBERT ARCHIPELAGO.

These islands, situated on and near the equator, longitude about 175° E., were visited by the United States ship Peacock, of the exploring expedition under Captain Wilkes. Variable winds from the northward and westward prevail from October to April; and they have violent gales from the southwest. According to Kirby, who was taken off the islands, these storms are typhoon-like, and last three or four days. The westerly sides of the islands receive most damage, and both land and trees are swept away.

THE RADACK ISLANDS.

These islands are scattered between 6° and 11° N., and longitude 168° to 173° E. Captain Kotzbue ascertained that hurricanes of great violence sometimes occur in September and October, and the natives always anticipate with dread the recurrence of those months.

THE JAPAN'S TYPHOON.

In December, 1832, the Japan, a new ship, encountered a severe hurricane in latitude 13° N., longitude about 160° west.

This position is about on the meridian of the most western of the Sandwich Islands.

The tracks or paths of those cyclones, of which the dates and positions have been given, are indicated on the annexed chart.

SANDWICH ISLANDS.

At the Sandwich Islands, latitude 19° to 22° N., longitude 155° to 160° W., the cyclones which occur are, commonly, not of great severity; although the native huts are sometimes unroofed or destroyed. The *kona*, or southerly wind, by which the trade wind during part of the year is much interrupted, may be referred, at least in part, to those cyclones which have their center-path northward of the islands, or which complete their recurvation in that region. The easterly gales which accord nearly with the trade winds in their direction, indicate an axis-path which lies southward of the islands. The actual presence or influence of a cyclone may, commonly, be determined by the oscillation of the barometer.

The absence of intense violence in any of the cyclones which visit this group of islands, may possibly be due to their geographical position. But it is equally probable that this qualified exemption may result from a diversion of the course of the central vortex of the cyclone, occasioned by the great height and compact form of Hawaii, the most southeastern of these islands. For the group lies in almost a direct line, which is parallel to the ordinary courses of the cyclones in the lower latitudes; being, from the summit of Manua Kea to the centre of Kauai, north sixty-one degrees west. A cyclonic vortex, if moving previously on this line of direction, would be displaced by the eastern angle of Hawaii, which island has an area of near four thousand square miles, a portion of which rises far above the upper horizon of the cyclones, and at two points reaches an elevation of nearly fourteen thousand feet. The protection, or partial diversion of course thus occasioned, must extend in good measure to the high but smaller islands which lay in the same track.

CYCLONE OF THE LARK.

The American barque Lark, Tibbets, master, from Canton for Valparaiso, had a severe gale on the 23d of September, 1843, in latitude 15° N., longitude 138° 40′ W. Found it necessary to make a port after the gale, and put in at Tahiti.

It appears, also, that the Lark encountered a violent typhoon of an earlier date, when off the island of Formosa.

CYCLONES OF THE EASTERN PACIFIC.

In approaching the eastern border of the North Pacific ocean, in the lower latitudes, we fall into the track of the large and increasing trade to California, and a better knowledge is thus obtained of the cyclones in this region. Of these gales, the tracks of twelve, which will now be noticed, are partially indicated on the chart.

Track 1. The *Joseph Butler*, on or about the 24th of June, 1850, encountered a severe gale of wind near latitude 16° N., longitude 107° W., [260 miles from the shore of Mexico,] which carried away her mainmast. I have no further accounts of this gale.

Track 2. The barque *Como*, on the 5th of August, 1850, in latitude 14° 20′ N., longitude 117° W., encountered a severe gale, commencing at N., and veering to W. and S. Lost sails and bulwarks, and sustained much other damage. These winds denote a course of progression corresponding to that of the hurricanes in the West Indies, and that the vessel was in the left side of the storm-path.

Track 3. *Niagara's Hurricane.*—The *Niagara* was dismasted in a hurricane September 9, 1850, about ninety miles south of Acapulco, [latitude 15° 16′ N., longitude 99° 50′ W.]

The *Diana*, September 11, latitude 22° N., longitude 116° W., had a severe hurricane from N.E., veering to S.W.; blew five hours; vessel hove on beam-ends.

The Diana's position was in the left side of the storm-path, but near to the axis line, the progression of the storm being still northwesterly. Its course of progression from the *Niagara* was 34° N. of W., or N.W. by W. nearly. Its rate of progress was nearly twenty-three miles an hour, allowing no error for the nautical dates.

Track 4. The *Laura*, September 26, 1850, latitude 26° N., longitude 123° W., in a severe gale, was thrown on her beam-ends; lost cargo, &c. I have no further account of the progress of this gale.

Track 5. The *Kingston*, from San Francisco for Panama, experienced a severe gale on the Mexican coast, and was thrown on beam-ends, October 1, 1850, in latitude 14° N., and reports that the gale swept the whole coast with great violence, as may be seen in the succeeding statements.

The *Belgrade*, from San Francisco for Realejo, October 1, fine breeze from W.N.W., and heavy swell from S.E. At 10 P. M. wind hauled suddenly to S.E., with increased force and squally appearances; at midnight under single-reefed topsails; 1 A. M. still increasing, with vivid lightning and heavy rain; 4 A. M. split fore-topsail; 8 A. M. lost foresail; gale increasing to a hurricane; thrown on beam-ends, with loss of main and mizen-topmasts, with head of main-mast, when the ship righted a little. At 1 P. M., October 2, hurricane still increasing, ship on her beam-ends; lost fore-topmast, with much other damage; at midnight blowing as hard as ever; at 4 A. M., October 3, more moderate, heavy rain; October 4, latitude 18° 11′ N., longi-

CHART
Showing the tracks or courses of various
GALES & HURRICANES
as traced by
Wm. C. Redfield
1855.
With Additions
ASIA
CHINA
TARTARY
SEA OF OCKHOTSK
Saghalien I.
La Perouse Strait
YESSO
Kuriles
C. Lopatka
Aleutian Archipelago
JAPAN SEA
Straits of Sangar
C. Froen
Sado I.
C. Noto
NIPPON
Yedo
Oki I.
YELLOW SEA
COREA
Quelpaert
Kiusiu I.
Sikok
Shanghae
Lew Chew
Bonin Is.
Formosa Channel
Bashee Channel
Luzon
Manila
PHILIPPINE IS.
CHINA SEA
Ladrones
SANDWICH IS.
OREGON
CALIFORNIA
St. Francisco
MEXICO
NORTH AMERICA
New York
C. Hatteras
New Orleans
FLORIDA
GULF OF MEXICO
Bahama Is.
CUBA
HAYTI
CARRIBBEAN SEA
East Long. 120
West Long. 70

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her beam-ends; lost fore-topmast, with much other damage; at midnight blowing as hard as ever; at 4 A. M., October 3, more moderate, heavy rain; October 4, latitude 18° 11′ N., longi-

tude 104° 5′ W., made for Acapulco. It may be seen that this vessel was on the right of the axis path of the storm.

The *Galindo*, on the same route, experienced a severe hurricane on the 1st and 2d of October; was thrown on beam-ends and dismasted, and arrived at Acapulco at the same time with the *Belgrade*.

The *Lavina*, off Cape San Lucas, the southern point of California, October 5, was thrown on beam-ends in a violent hurricane, and lay twenty-one hours.

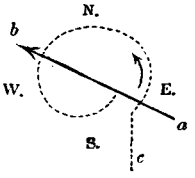
The *Fanny*, from Mazatlan, in the gulf of California, for San Francisco, was damaged in the gale on the 5th and 6th of October, and put back to Mazatlan.

The progress of this hurricane during four days appears to have been N.W. by W. nearly, at a rate not exceeding eight or ten miles an hour.

Track 6. *Amazon's Hurricane.*—The brig *Amazon*, from New York for San Francisco, encountered a severe hurricane October 3, 1850, in latitude 13° 30′ N., longitude 116° 50′ W., which commenced at S.W., veering successively to S.E., E., N., W., ending at S.W., in which lost main-topsail and foresail. Captain Watt states that the gale was equally severe as those in the West Indies. This off-shore hurricane was cotemporaneous with that last noticed. The following is drawn from the account which was published by a passenger of the Amazon.

October 4, latitude 13° 40′ N., longitude 116° 30′ W.; last night the brig encountered a hurricane, preceded by squalls from S.W., with heavy rain. The squalls increased in number and intensity until 5 P. M., when the hurricane commenced; brig under close-reefed fore-topsail and mainsail. Captain Watts put his vessel before the blast, or "scudded" her. The tempest raged during the night, with momentarily increased fury. It veered from S.W. to due south, thence to S.E., and thence to N.E. and north, and from thence to S.W., thus making the circuit of the compass! According to our reckoning, it veered thirty-four points in the space of six hours, during which time the brig was kept before it, in which lay our only chance of escape. At 4 A. M. the foresail was blown from the yard, and the vessel was then brought to the wind, but could not withstand the tornado, and was blown directly down on her side, or beam-ends. Apprehending she would founder, the order was given to put her again before the wind, but the attempt was unsuccessful. As a last resource, the main-topsail was let go, when she paid off, and dashed away like lightning before the tempest. She was kept scudding until the hurricane abated, and was then laid to in a heavy gale from S.W., into which the hurricane subsided.

From the above we may infer that the course of the vessel while scudding was not unlike that shown in the annexed figure.



The short time in which the bring ran entirely around the axis of the gale, after entering its violent portion, shows that its diameter was small, and that its progression was remarkably slow. This slowness is also shown by the manner in which the brig, steering N. for San Francisco, was able to *overtake* the cyclone, and run into it, upon its southeastern side, where its wind was southwesterly. Hence, too, after clearing the vortex of the cyclone, and heaving to, the duration of the exterior portion of the gale was so much prolonged, notwithstanding the drift of the vessel was in a direction opposite to the progression of the storm. It is probable that this progression did not exceed four miles an hour, and it may have been less.

This is a slower rate of advance than I have yet found on the Atlantic; but it accords well with other cases which have occurred within the tropics, in the Indian ocean. It appears, also, as having some relation to the slow rate of advance, already noticed in the cotemporaneous

in-shore hurricane, of the *Kingston*. Hence we may infer that the great current of rotation in which the cyclones are imbedded was at this period and in this region, at least, comparatively sluggish and inactive. We have noticed a similar condition in the eastern Atlantic in the previous month, in the case of the Cape Verde hurricane, of Track 23.

Track 7. *Captain Budd's gale, of October*, 1851.—Capt. Budd's steamer from San Francisco, for Panama, was, on the 21st of October, in latitude 22° 07′, off Cape San Lucas. At daylight of 22d the wind was very high, hauling to S.E., preceded by *a heavy swell from the same quarter*. The gale blew heavy from S.E., and then commenced hauling to N.E., and blew still more heavy; barometer 29.75. He had now crossed the entrance of the Gulf of California, to within sixty miles of Cape Corientes. At 4 P. M. gale abating, and hauling to the westward, going round by the north.

The winds in this case appear to indicate that Captain Budd fell under the right hand or northern side of the gale as it first approached, and that the gale recurvated northward upon the contiguous portion of Mexico before the axis of the storm had reached the position of the ship.

Track 8. *Panama's gale, of July*, 1852.—The *Panama* experienced a hurricane, July 16, 1852, in latitude 15° N., longitude 115° W., which lasted ten hours; carried away top-gallant-masts, yards, sails, &c.

Extract from logbook of ship *Empire*, bound for San Francisco:

July 19, 1852, commences with heavy gales and bad sea from the north; under double-reefed topsails and courses. [Ship in front part of the gale, to the left of its axis path.] At 8 P. M. heavy gale from N.N.W.; at 10 P. M. very heavy gale; hove the ship to under triple-reefed main-topsail; midnight, gale increased to a hurricane; the mainmast went by the board, together with the mizenmast, fore-top-gallant-mast, &c., with everything attached; blowing a complete typhoon. At 5 A. M. succeeded in clearing the wreck; at 7 A. M. gale had in some measure abated, at 8 A. M. got the ship before the wind, then blowing from S.S.W.; at noon of 20th, only a brisk gale from S.S.E.; latitude, by account, 17° 4′ N., longitude 117° 35′ W.

This could have been none other than the Panama's gale, moving on a course between 30° and 40° north of west, and, if there be no error in the Panama's date, at the rate only of about three miles and a half per hour!

This slowness of progression in the three hurricanes of the *Panama*, *Amazon*, and *Kingston*, is of great interest for navigators in the Pacific. For it shows how perfectly the exposure and safety of their vessels, during such hurricanes, are placed in their own control, at least in cases where sea room on all sides is afforded them. Thus, if the master of the *Amazon* had comprehended the character of his hurricane, or its law of rotation and progression, he might have run more eastward, and until the state of the barometer and winds would have allowed him to come up to his desired course. This would have enabled him to make a safe, rapid, and successful run towards his port of destination, while he kept in the outskirts of the gale.

The *Empire*, when headed off by the north wind in the front of the cyclone, could not pursue her course for San Francisco, nor safely heave-to on either tack. But she had opportunity to run southward in the beginning of the gale, keeping the wind on the starboard quarter until the state of the barometer and the diminished strength and westerly changes of the wind should enable her to turn eastward, around the rear of the hurricane, and thus regain her course with a fair wind.

These eight cases were noticed in the American Journal of Science, in 1854; but their relation to the storm chart, as well as their value to navigators, makes it proper that the condensed

statements should here be presented. The following notices of other cyclones in the eastern Pacific have since been obtained:

Track 9. *The Belle's Cyclone.*—The barque *Belle* was dismasted in a severe gale on the 3d of August, 1855, in latitude 18° N., longitude 109° W., while making her passage from Cape San Lucas to Honolulu. Her main and mizen masts being cut away, she righted, with five feet of water in the hold. At 11 o'clock the wind shifted suddenly to southwest, and she was again thrown on her beam ends. The foremast was cut away, and she again righted, sweeping the decks of everything.

It is clear that the Belle was on the center path of the cyclone.

The Dutch ship *Gertrude Maria*, sailed from San Francisco for Callao, July 26, and proceeded on her voyage very well until August 5, in latitude 23° 53′ N., longitude 118° 47′ W., when she experienced a severe hurricane from N.E. to N.N.W., W.N.W. and west to S.W. and south, which lasted to the 6th. During its continuance, lost main topmast, with everything attached.

If we compute the advance of the cyclone in two days, from the position of the Belle on the 3d to that here given on the 5th, as equal to six hundred and sixty nautical miles, it will show a rate of about thirteen and a half miles per hour, on a course which is north 58° west, or N.W. by W., nearly.

Track 10. *Second Cyclone of the Gertrude Maria.*—From the 8th to 9th of August, 1855, in latitude 15° N., longitude 116° 31′ W., the Gertrude Maria experienced another severe hurricane from N.E. to N.N.W., W.N.W. and west, to S.W. south and S.W., during which she lost fore-topmast, &c., and was compelled to put back to San Francisco to repair.

Track 11. *Cyclone of the Edward Stanly.*—The ship Edward Stanly, from Cardiff to San Francisco, September 4, 1855, in latitude 20° N., longitude 121° 50′ W., experienced a violent hurricane from S.E., which lasted eighteen hours; during which, shipped a heavy sea, and sustained much damage.

CYCLONE OF THE UNITED STATES SHIP PREBLE.

Track 12.—The United States ship-of-war Preble, from Monterey towards Callao, at noon of October 24, 1847, was in latitude 17° 19′ N., longitude 106° 46′ W.; wind N.N.E., and squally appearances; took in light sails; at 2.10 P. M., made sail again to topgallant-sails and mainsail; barometer 29.78; at midnight, wind N.E. by N., and squally appearances; barometer 29.78; to 4 A. M., squally; barometer 29.75; from 4 to 8 A. M., strong gale from N.E. by E.; three reefed topsails, &c.; barometer 29.73; from 8 to noon, strong gale; under storm-sails; gale at 10 A. M., E.N.E.; at 11, E. by N.; at noon, east; barometer 29.74; in latitude 15° 20′ N., longitude 106° 15′ W. From noon of 25th to 4 P. M., gale E.N.E.; weather unchanged; barometer 29.63; from 4 to 8 P. M., gale the same; barometer 29.67; 8 P. M., gale strong from E.N.E., with rain; at 9 P. M., gale N.E. by E.; weather unchanged; at 10 P. M., bore up, and ran S.W. by W. to clear the cyclone; at 11 P. M., gale N.E.; barometer 29.62; [probably then nearest to the storm's centre;] from midnight to 4 A. M. continued to run off the course; gale abating; at 1 A. M. the wind was N.N.E.; at half past 1, N. ½ W.; at 2, N.N.W.; barometer 29.64; at 5 A. M., wind S.W., and fresh; at 8 A. M., barometer 29.75; at noon, (October 26,) observed in latitude 14° 32′ N., longitude 106° 43′ W.

This was a severe cyclone, as I am informed by Lieutenant Bent, although it appears to have been of limited extent, and of slow progress. Had the ship bore up at an earlier period, it is likely that much of its force would have been avoided.

Track 13.—The ship Sylph, F. N. Gardiner master, on her passage from Panama for San Francisco, encountered a severe hurricane on the 21st and 22d of June, 1849, in latitude 15° 55′ N., longitude 116° 16′ W. This position is intersected by track 8 on the chart, which thus may represent both storms, as their tracks must have coincided nearly.

In order to bring into one view the storm paths of both the Atlantic and Pacific oceans, I have placed on the eastern border of the chart the tracks of five of the cyclones of the Atlantic basin, which are taken from my storm charts previously published.

RECURVATION OF STORM PATHS IN THE EASTERN PACIFIC.

In the case of the cyclone marked (7,) we find direct evidence of its recurvation on the Mexican coast, near latitude 20° N. It is quite probable that other cyclones of this group had already commenced their recurvation at the time of our latest notices of their progress. Such cyclones as recurvate near latitude 21° N., and near the coast, fall directly upon the Mexican shores of the Californian Gulf. These storms sometimes exhibit great violence at and near the ports of Ipala, San Blas, and Mazatlan.

One of these cyclones, represented as a "terrific gale," occurred so late as June, 1855; and I have seen a number of accounts of similar visitations. On the first of November, 1839, according to Commander Hamilton, of her Majesty's ship Frolic, twelve ships were surprised by one of these gales in the port of Mazatlan, and the greater part were lost, and all on board perished. And on the first of November, 1840, three vessels were lost in the road of San Blas, and several people were drowned, without it being possible to render them any assistance.

Most of the cyclones which I have last described, however, must have recurvated in a more advanced position in the Pacific ocean; and in their subsequent northeasterly progress they would fall almost perpendicularly upon the coasts of the two Californias, or the more northern territories. Thus, instead of sweeping a great length of these coasts successively, as happens on our Atlantic border, these cyclones appear more like local storms, and cannot be traced consecutively on the coast line. At the point of intersection with the coast, the first and main portion of the gale will be felt from the southeast, on its centre path, or more southerly, in its right-hand quadrants. And near the coast, the northeasterly or reflex winds of the cyclone, pertaining to its first left-hand quadrant, will not be strongly developed.

We learn from Lieutenant Commander Wood, of her Majesty's ship Pandora, that from Cape San Lucas to San Diego, or from latitude 23° to latitude 32° N., the coast is subject to violent gales from S.E. from November to April, and that they are more frequent as we go towards San Diego. Before their recurvation, these cyclones are likely to have passed westward in lower latitudes than those which fall on the Mexican coast.

From San Diego to San Francisco, the coast is subject to southeasterly gales, like those of the coast of Lower California, but they are more frequent here, and blow with greater force. These gales, according to Lieutenant Wood, "last from twelve hours to two days, and are accompanied by heavy rain, which lasts till the wind changes, which it often does very suddenly, and blows as hard for a few hours from the northwest, when the clouds clear off, and fine weather again succeeds." This is a clear description of the phenomena of cyclones, as shown on their center-paths, while moving in a northeasterly course.

The same authority states that, from San Francisco to the Straits of Juan de Fuca, hard gales from all points of the compass may be looked for at all seasons. These begin generally from southeast to southwest, bringing thick rainy weather with them. After blowing from

these quarters for some hours, they fly round to the northward, by the west, with little, if any, warning, and blow even harder than before. These changes show the observer to have been in the right-hand quadrants of the gale, as most often will happen, and are but counterparts of the changes met with in the cyclones encountered in the same latitudes in the North Atlantic.

Having referred to the frequent occurrence, and the normal progression and rotation of the cyclones throughout the temperate latitudes of the North Pacific ocean, as shown chiefly by the single reports of various ships and voyagers, I will now only quote two or three notices of this character which have lately came to hand.

The schooner Eagle, from San Francisco for Monterey, encountered a severe gale from southeast in about latitude 37° N., and was compelled to heave to—split the foresail, &c. The wind then shifted to northwest, when she bore up, and reached San Francisco on the 1st of January, 1855. It will be seen that this vessel was on the center-path of the cyclone, as is shown by the direction and change of the wind.

The ship Dalmatia, from Cape Ommany for San Francisco, on the 14th of December, 1854, in latitude 55° N., longitude 139° W., encountered a violent hurricane, which commenced at east, veered to south, and lasted forty-eight hours, carrying away main topgallant mast, yards, and sails; lost boat, cut-water, chain-bolts, round house, rail, bulwarks, and sustained other damage. The variation here being between 20° and 30° E., the first severe wind of the gale was about E.S.E., true meridian, indicating a position near the center-path of the cyclone. But her course being south, the ship would soon pass into the right-hand quadrants of the gale, and thus be headed off by the wind as it veered to the southward.

On the first day of January, 1855, off Cape Mendocino, latitude 40° 30′ N., the Dalmatia experienced another gale from southeast to northwest, attended with a heavy cross sea.

In reference to one of these cyclones, the master of the Dalmatia states that he has never, during an experience of thirty years, encountered so severe a gale.

The schooner Page, from Japan for San Francisco, on the 18th of January, 1850, in latitude 45° 12′ N., longitude 180° meridian, encountered a heavy gale from the southwest. On the morning of the 19th the wind changed, and blew a hurricane from the west-southwest. At 6 P. M. scudding under bare poles. On the 20th, at 2 A. M., the Page was boarded by a tremendous sea, which struck square aft and swept the decks, carrying with it the cabin gangway and binnacle, galley, and store-room, the pump-brakes, boats, and bulwarks.

Barque Rebekah, at San Francisco, April 1, from Batavia, experienced heavy weather during the passage. March 15, (1856,) in latitude 37° N., longitude 160°, experienced a severe gale from the southwest, and shipped a sea which washed away quarter-boat, stove longboat, head knees, and bulwarks. During the last nine days of March had strong southeast gales—split sails, &c.

These imperfect notices of the cyclones which prevail in the North Pacific ocean are respectfully submitted for the consideration of the officers both of the naval service and mercantile marine. If they shall contribute in any degree to the safety and success of our ships and commerce, it will be a grateful reward for the attention and labor which this important subject has at any time required.

I have the honor to be, very respectfully, your obedient servant,

WM. C. REDFIELD.

Commodore M. C. PERRY,

Commander-in-chief of the late U. S. Expedition to Japan.

REPORT MADE TO COMMODORE M. C. PERRY

UPON THE

KURO-SIWO, OR GULF STREAM OF THE NORTH PACIFIC OCEAN;

BY

LIEUT. SILAS BENT.

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JAPAN EXPEDITION OFFICE,
New York, January 10, 1857.

SIR: In obedience to your orders, I have made a careful examination of the monthly meteorological tables and reports of the masters of the several vessels of the late Expedition to Japan, and extracted from them such data and information as I deemed of interest to science, or of importance to navigation, and have succeeded in tabulating and arranging the first in such form as will, I trust, prove satisfactory in elucidating the process by which the general results were obtained.

Scattered over the ocean and seas, extending from the south coast of China to the northeast extremity of Japan, during a period of eighteen months of stirring activity, the squadron traversed that whole region, in every direction; and these reports, written with intelligence, and their accompanying tables, compiled with care, furnish a full and valuable collection of consecutive observations, which show conclusively that there is a "river in the ocean," flowing to the northward and eastward along the coast of Asia, corresponding, in every essential point, with the Gulf stream of the Atlantic.

All the observations contained in these tables I at first plotted on a skeleton chart, but found that no satisfactory conclusion could be adduced from them in such a form, owing to the confusion produced by the unavoidable discrepancies arising from careless steerage, or local deviation of the compasses, irregular atmospheric pressure, and influences of shifting winds and neighboring land; and that, so far as the defining of the limits and general direction of great oceanic currents were concerned, the thermometers were the only sure and safe guides. I therefore made the accompanying series of diagrams of the various passages of the ships between the coasts of China and Japan, the Lew Chew, Bonin, and Sandwich Islands, in order to exhibit the tracks, daily winds, currents, mean diurnal atmospheric pressure, and temperatures of the air and water, and to convey to the mind, by a simple inspection, if possible, the most satisfactory information and results in regard to the important stream in that region of the Pacific ocean.

These diagrams are confined mostly to the sailing vessels, as the wheel-currents of the steamers, when the patent log is not used, invariably embarrasses the reckoning, unless in the most favorable weather.

By a reference to the diagrams, it will be perceived that the first horizontal column at the top of the plate, marked "daily winds," gives the average direction of the wind by initial letters, corresponding to the vertical lines extending downward from that column, which lines repre-

sent the days of the month. Next below the "daily winds" is a barometric scale, divided off into equal parts, for days by the vertical lines, and into tenths by the horizontal lines, the last of which are marked at the side of the diagram.

This scale is traversed by a broken line, which indicates, at its intersection of the vertical lines, the mean diurnal atmospheric pressure.

The next is a thermometric scale, divided off in the same manner as the barometric scale, but graduated at the side for *degrees*, instead of tenths, and traversed by a red line, to indicate, at its intersection of the vertical lines, the mean daily temperature of the air; and by a blue line, to indicate, in the same manner, the mean daily temperature of the [illegible] r

These daily means, of both the barometer and thermometer, were obtained from observations taken at the hours of 3 A. M., 9 A. M.; noon, 3 P. M., 9 P. M., and midnight.

In the narrow space intervening between the barometric and thermometric scales are the days of the month, embraced in the passage of the ship from port to port, and corresponding to the vertical lines by which those scales are intersected.

On the lower part of all the plates (except Nos. VIII and X) is a sectional chart, with the latitudes marked at the side, and the longitudes at the bottom

On this chart is traced the track of the ship, with her position every day at noon; the direction of the daily current, as obtained from the reckoning, denoted by small arrows, and its amount per day in nautic miles, expressed by numerals at the points of those arrows.

I have not multiplied the diagrams further than what I considered absolutely necessary to convey a general, yet accurate, idea of the direction, velocity, and limits of this remarkable stream. You will find it traced upon the accompanying chart, being represented by the shaded space lying along the western shores of the North Pacific.

The existence of a northeast current on the coast of Japan, was noticed by Cook, Kruzenstern, and other explorers, and has, of course, not escaped the attention of more recent intelligent navigators,* but I believe no systematic series of observations upon it have hitherto been made.

The Japanese are well aware of its existence, and have given it the name of "Kuro-Siwo," or Black stream, which is undoubtedly derived from the deep-blue color of its water, when compared with that of the adjacent ocean.

The fountain from which this stream springs is the great equatorial current of the Pacific, which, in magnitude, is in proportion to the vast extent of that ocean when compared with the Atlantic.

Extending from the Tropic of Cancer, on the north, to Capricorn—in all probability—on the south; it has a width of near three thousand miles, and with a velocity of from twenty to sixty miles per day, it sweeps to the westward in uninterrupted grandeur, around three-eighths of the circumference of the globe, until diverted by the continent of Asia, and split into innumerable streams by the Polynesian Islands; it spreads the genial influence of its warmth over regions of the earth, some of which—now teaming in prolific abundance—would otherwise be but barren wastes.

* M. Biot, in his description of the general system of currents in the Pacific, says: "A third, [branch of the equatorial current,] reflected by the eastern coast of China, turns to the northward. But this soon meets, directly in its course, with the Japanese archipelago, the Peninsula of Kamtschatka, and the eastern prolongation of Siberia. Besides this it is driven towards the equator by the Polar current, which issues from Behring's Straits. Under the combined influence of these causes, its course bends to the eastward, and following the direction, now quite open to its progress, it proceeds to the western shores of North America, above the Oregon Territory," &c.

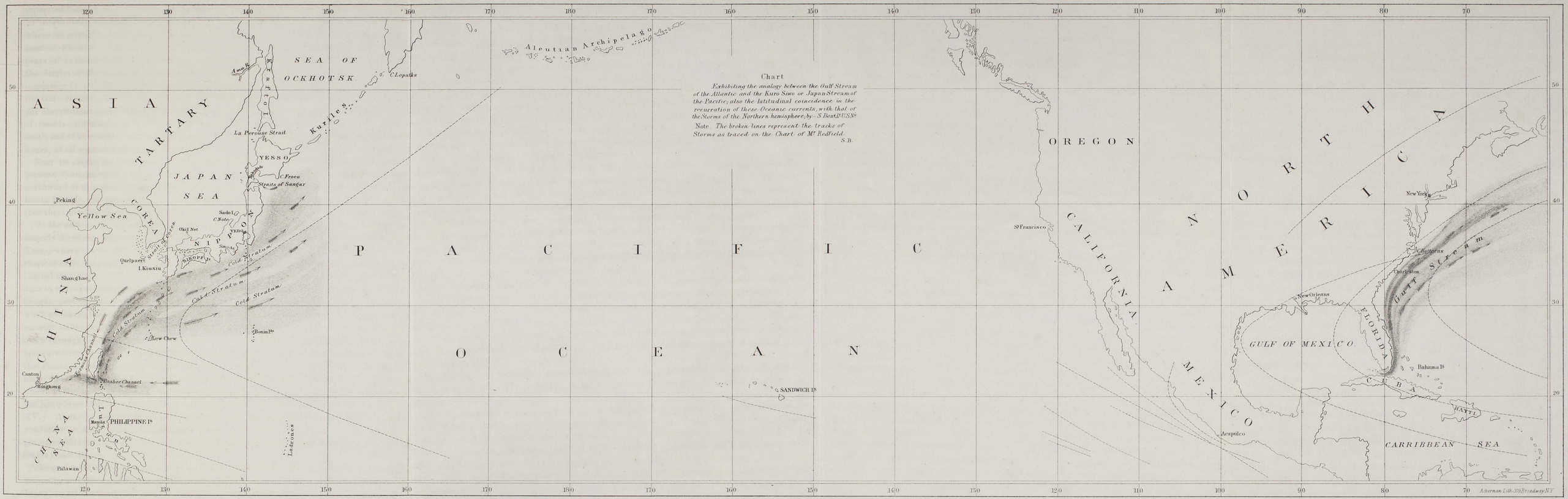


Chart
Exhibiting the analogy between the Gulf Stream of the Atlantic and the Kuro Siwo or Japan Stream of the Pacific; also the latitudinal coincidence in the recurvation of these Oceanic currents, with that of the Storms of the Northern hemisphere; by S. Beal, U.S.N.
Note. The broken lines represent the tracks of Storms as traced on the Chart of Mr. Redfield.
S.B.
ASIA
TARTARY
SEA OF OCKHOTSK
Aleutian Archipelago
C. Lopatka
Amoor R.
Kurriles
La Perouse Strait
YESSO
JAPAN SEA
C. Froeu
Straits of Sangar
Peking
COREA
Yellow Sea
Sado I.
C. Noto
Okai Not
NIPPON
YEDO
Quelpaert
I. Kiusiu
SIKOKF Is.
Simoda
Cold Stratum
Shanghae
Bonin Is.
Chew Chew
Canton
Hongkong
Bashee Channel
PHILIPPINE Is.
Manila
Palawan
Ladrones
CHINA SEA
PACIFIC OCEAN
SANDWICH Is.
OREGON
CALIFORNIA
MEXICO
St. Francisco
Acapulco
NORTH AMERICA
New York
Hatteras
Charleston
New Orleans
GULF Stream
GULF OF MEXICO
FLORIDA
Bahama Is.
CUBA
HAYTI
CARRIBBEAN SEA
120 130 140 150 160 170 180 170 160 150 140 130 120 110 100 90 80 70
50 40 30 20
Ackerman Lith. 376 Broadway N.Y.

causes, its course bends to the eastward, and following the direction, now quite open to its progress, it proceeds to the western shores of North America, above the Oregon Territory," &c.

One of the most remarkable of these off-shoots is this Kuro-Siwo, or Japan stream, which, separated from the parent current by the Bashee islands, and south end of Formosa, in latitude 22° north, longitude 122° east, is deflected to the northward along the east cost of Formosa, where its strength and character are as decidedly marked as those of the Gulf stream, on the coast of Florida. This northwardly course continues to the parallel of 26° north, when it bears off to the northward and eastward, washing the whole southeast coast of Japan, as far as the Straits of Sangar—(see thermometric diagrams, Plates IV, V, VI, VII, and XI)—and increasing in strength as it advances, until reaching the chain of islands to the southward of the Gulf of Yedo, about the meridian of 140° East, where its maximum velocity, as shown by our observations on one occasion, was 72, 74, and 80 miles, respectively, per day.—(See tracks of vessels on Plates I, IV, V, VI, VII, XII, XV, and XVI.) Its average strength from the south end of Formosa to the Straits of Sangar is found to be from 35 to 40 miles per twenty-four hours, at all seasons that we traversed it.

Near its origin the Kuro-Siwo, like the Gulf stream, is contracted and is usually confined between Formosa and the Majico Sima Islands, with a width of one hundred miles. But to the northward of this group it rapidly expands on its southern limits and reaches the Lew Chew and Bonin Islands, giving it a width to the northward of the latter of about five hundred miles.—(See thermometric diagrams and tracks of vessels on Plates I, II, V, IX, XII, XV, and XVI.)

To the eastward of the meridian of 143° east, in latitude 40° north, the stream takes a more easterly direction, allowing a cold current to intervene between it and the southern coast of Yesso, where the thermal change in the water on leaving the stream is from 16° to 20°.—(See thermometric diagrams, Plate XI.) But from the harassing prevalence of fogs during the limited stay of the squadron in that vicinity, the reports and tables do not furnish sufficient data to prove *conclusively* the predominant direction of the cold current through the Straits of Sangar, particularly as the tide ebbs and flows through them with great rapidity. Yet from what we have, I am inclined to believe that it is a current from the Arctic ocean, running counter to the Kuro-Siwo, and which passes to the westward through the Straits of Sangar, down through the Japan Sea, between Corea and the Japanese Islands, and forms the hyperborean current on the east coast of China, which is known to flow to the southward, through the Formasa channel into the China sea. For to the westward of a line, connecting the north end of Formosa and the southwestern extremity of Japan, there is no flow of tropical waters to the northward, but, on the contrary, a cold counter current filling the space between the Kuro-Siwo and the coast of China.—(See thermometric diagrams, Plates III, VI, VII, and XV.) As far as this cold water extends off the coast, the soundings are regular, and increase gradually in depth; but simultaneous with the increase of temperature in the water, the plummet falls into a trough similar to the bed of the Gulf stream, as ascertained by the United States Coast Survey.

The surface of this counter current is, no doubt, influenced in some measure by the southwest monsoon, and during the season of that wind a portion of it is forced out between Formosa and Japan, to mingle its waters with the Kuro-Siwo. But so well is its existence known to vessels trading on the coast of China, that they very rarely, if ever, attempt to *beat* to the northward through the Formosa channel, but almost invariably make the passage to the eastward of Formosa during the prevalence of adverse winds, though those winds may be stronger there than in the Formosa channel.

Of the power of these two currents I can speak from personal experience, in addition to the

facts disclosed by the observations now under consideration, for in the winter of 1848, when attached to the United States ship Preble, commander James Glynn, and bound from Hong Kong to Japan, we struggled for three days, after leaving the port, against this southwest current, setting down through the Formosa channel, without making a single mile on our course to the eastward, and were compelled to resort to the expedient of working along in-shore and anchoring whenever the tide was combined with the current against us. A number of days were thus toilsomely spent before reaching Breaker Point, on the coast of China. We then stretched across the channel, in the middle of which we felt the full strength of the southwest or counter current. But on doubling the south end of Formosa we immediately fell into the Kuro-Siwo, and were borne by it ninety-two miles, dead to windward, in less that three days, whilst lying-to, under storm sails, in a stiff gale from the northward and eastward.

The diagrams, you will perceive, show an increased temperature of both the air and the water the moment this stream is entered, but a predominant thermal change in the water, which almost invariably continues superior in temperature to that of the air until leaving the stream again. On the northwestern edge of the stream the transitions are sudden and extreme, varying, according to the latitude, from 10° to 20°. On the southeastern side the change is less abrupt, and, from the gradual approximation of the thermal ranges of the air and water, its outline is rendered less distinct and definite.

Along the borders of the stream where it chafes against the torpid waters of the ocean and counter currents, as also in its midst where whirls and eddies are produced by islands and the inequalities in its bed, strong tide-rips are constantly encountered which often resemble heavy breakers on shoals and reefs, and become finger-boards, as it were, to warn the seaman of the otherwise unseen influence which may be bearing his ship far from her intended track, and, perchance, upon some of the many fearful dangers that sprinkle that region of the sea.

The Gulf stream, as delineated in the Coast Survey Report of Professor A. D. Bache for 1854, I have copied upon the chart, in order to exhibit to the eye the striking resemblance between it and the Kuro-Siwo. The former is the result of the observations made upon that stream by the coast survey under the direction of Professor Bache. The latter is delineated entirely from the reports and observations made by the Japan Expedition; and, as these latter were obtained during the necessary transits of the vessels from port to port in the discharge of their duties connected with the expedition, they cannot, of course, in any manner pretend to the same comprehensive accuracy and conclusiveness as those upon the Gulf stream; yet they are sufficient, as I have before stated, to prove the remarkable analogy, in almost every particular, between these two important currents of the Atlantic and Pacific oceans.

The strata of cold water lying in the longitudinal direction of the streams, as represented on the chart, were traced upon the Kuro-Siwo from the diagrams of Plates V, VII, XIII, XV, and XVI. I am not precisely aware of what the thermal change is in passing into or from these cold strata in the Gulf stream; but those in the Kuro-Siwo were indicated by a depression of only a few degrees in the water thermometer, and should more properly, perhaps, be termed *cool* strata, as compared with the rest of the stream; for in all instances these strata maintain a superior temperature to the atmosphere above them; and if the hyperborean current is, as I have supposed, entirely separated from the Kuro-Siwo by its passage through the Straits of Sangar to the westward of Japan, I am inclined to think that there is no counter current *underlying* the Kuro-Siwo, as is the case with the Gulf stream. This, however, can be determined only by experiments with the deep-sea thermometer, and the usual apparatus for determining

sub-surface currents, none of which were made by the expedition, as its special object was of primary importance, and all other subjects within the field of our observations were necessarily of subordinate consideration, and were obliged to be made as opportunity and the ordinary facilities of our situation would permit.

Lieutenant M. F. Maury says that "the maximum temperature of the Gulf stream is 86°, or about 9° above the ocean temperature due to the latitude." This maximum temperature coincides pretty nearly with that of the Kuro-Siwo, as shown by the daily means of our observations; but the difference between the temperature of the Kuro-Siwo and the "ocean temperature due to the latitude" is, by the same observations, shown to be greater than that of the Gulf stream, amounting on an average to about 12°.—(*See Thermometric Diagrams, Plates II, VI, VII, XI, XIII, XV, and XVI.*

There is a floating sea-weed found in the Kuro-Siwo similar in appearance to the *fucus natans* of the Gulf stream; but the specimens collected by the expedition were unfortunately lost before being submitted to botanists for examination, and it is therefore yet undetermined whether they are identical or not.

It may not be uninteresting to state that Lieutenant Wm. L. Maury found sprigs of coral while surveying off the harbor of Simoda, in latitude 35° north.

I would further call your attention to the chart upon which they are traced, to show the striking coincidence in the *recurvation* not only of these oceanic streams, but also to the general coincidence in *their* recurvation with that of the storms of the northern hemisphere. Mr. Redfield is of the opinion that the recurvation of storms between the parallels of 20° and 30° north and south latitude, in all parts of the world, as shown by observations, is but partially dependent upon the influence of land, and is "to be ascribed mainly to the mechanical gravitation of the atmospheric strata as connected with the rotative and orbital movements of the different parts of the earth's surface.—(*Naval Mag.*, 1836, p. 318.)

These atmospheric meteors, originating generally about the tenth parallels of latitude, north and south, are impelled by this influence directly towards the poles, but are at the same time borne to the westward by the trade winds. This compound force gives them an oblique direction to the northwest and southwest, until arriving at the outer limits of these winds, about the parallels of 25° or 30°, where the storms become released from their influence, and, continuing their course to the north and south towards portions of the earth's surface having less rotative velocity than that from whence they came, they gradually *recurve*, and soon assume a path to the northeast and southeast, which they pursue until dissipated by expansion, or have fulfilled their mission by a restoration of the atmospheric equilibrium, a disturbance of which had probably given rise to them. The converse of this rotary influence of the earth is thus described by Dr. Hadley and Dr. Franklin: "The air under the equator and between the tropics, being constantly heated and rarified by the sun, rises; its place is supplied by air from the higher and polar latitudes, which, coming from parts of the earth that had less motion and not suddenly acquiring the quicker motion of the equatorial earth, becomes an east wind blowing westward, the earth moving from west to east and *slipping under* the air." This general law of nature operates in the same manner upon the waters of the ocean as upon the atmosphere, when, by any disturbing cause, portions of the former are set in motion from about the equator, modified, of course, by such local obstructions of continents, islands, &c., as may be encountered in their path.

In the American Coast Pilot, edition of 1837, pp. 666, 667, Mr. Redfield furthermore says:

"The Gulf Stream from Florida to Newfoundland is for the most part imbedded or stratified upon a current which is setting in the opposite direction in its progress from the polar regions. By this action the great stream of drift ice from the polar basin is brought within the desolving influence of the Gulf Stream; and the Grand Bank itself, perhaps, owes its origin to the deposits which have resulted from this process during a long course of ages. The icebergs being carried southward by the deeper polar current, their rapid destruction is here effected by the tepid water of the Gulf Stream. These two streams of current, like other currents, both atmospheric and aqueous, pursue each its determinate course, the Gulf Stream being thrown eastward by the greater rotative velocity which it acquired in latitudes nearest the equator, and the polar current being thrown westward along the shores and soundings of the American continent and its contiguous ocean depths by the tardy rotation which it derived in higher latitudes. Were the influence of winds wholly unfelt upon the ocean, it is probable that the same system would still be maintained in all its essential features by the mechanical influence of the earth's rotation, combined with an unstable state of equilibrium."

And Lieutenant M. F. Maury, in a paper on the Gulf Stream and currents of the sea, read before the National Institute April, 1844, says: "A geodetic examination as to the course of the Gulf Stream does not render it by any means certain that it is turned aside by the Grand Banks of Newfoundland at all, but that in its route from the coasts of Georgia as far towards the shores of Europe as its path has been distinctly ascertained it describes the arc of a great circle as nearly as may be. Following the line of direction given to it after clearing the straits of Florida, its course would be nearly on a great circle, passing through the poles of the earth. That it should be turned from this, and forced along one inclining more to the east, requires after it leaves these straits the presence of a new force to give it this eastward tendency. And have we not precisely such a force in the rate at which different parallels perform their daily rounds about their axis? In consequence of this the stream, when it first enters the Atlantic from the Gulf, is carried with the earth around its axis at a rate of two miles and a lalf a minute faster towards the east than it is when it sweeps by the Grand Banks of Newfoundland.

"That this explanation as to its eastward tendency should hold good, a current setting from the north towards the south should have a westward tendency, accordingly, and in obedience to the propelling power derived from the rate at which different parallels are whirled around in diurnal motion, we find the current from the north which meets the Gulf Stream on the Grand Banks taking a southwesterly direction, as already described. It runs down to the tropics by the side of the Gulf Stream, and stretches as far to the west as our shores will allow."

That this theory of rotative influence may or may not be correct it is not my province to discuss, but I was forcibly struck with these coincidences of recurvation when the tracks of the Gulf Stream and Kuro-Siwo, together with the paths of the hurricanes, were traced upon the same chart; and I have made these quotations to show what hypotheses are entertained by some of the eminent men who have given much attention and study to the subject, and from a conviction that they are in some measure, at least, sustained by the results of our observations upon the Kuro-Siwo; for, notwithstanding the configuration of the eastern shores of the continent of America and Asia are undoubtedly the original cause of the deflection to the northward of the whole of the equatorial current of the Atlantic by the Gulf Stream, and of a portion of that of the Pacific by the Kuro-Siwo, or Japan stream, yet were no influences, such as Mr. Redfield and Lieutenant Maury refer to, operating upon these streams, would not their natural inclination from the inertia of their westward flow be to hug the coast, and wash their whole length

to the Arctic sea, or until that inertia was overcome by their friction against the continents? Yet this is not the case in either instance, for it has been well established by Mr. Bache that a counter current, flowing to the southward and westward, intervenes between the Gulf Stream and the coast of the United States as far as the peninsula of Florida; and, as I have before stated, as far as our observations extend, they prove conclusively that there is a very important counter current intervening between the Kuro-Siwo and the main coast of Asia.

The influence of the Kuro-Siwo upon the climates of Japan and the west coast of North America is, as might be expected, as striking as that of the Gulf Stream on the coasts bordering the north Atlantic. From the insular position of Japan, with the intervening sea between it and the continent of Asia, it has a more equable climate than we enjoy in the United States; and since the counter current of the Kuro-Siwo does not make its appearance on the eastern shores of the islands south of the straits of Sangar, and as these islands, in their geographical position, have a more eastwardly direction than our coast, the Kuro-Siwo, unlike the Gulf Stream, sweeps close along this shore, giving a milder climate to that portion of the empire than is enjoyed in corresponding latitudes in the United States.

The softening influence of the Kuro-Siwo is felt on the coasts of Oregon and California, but in a less degree, perhaps, than that of the Gulf Stream on the coasts of Europe, owing to the greater width of the Pacific ocean over the Atlantic.

Still the winters are so mild in Puget's Sound, in latitude 48 degrees north, that snow rarely falls there, and the inhabitants are never enabled to fill their ice-houses for the summer; and vessels trading to Petropaulowski and the coast of Kamtschatka, when becoming unwieldly from accumulation of ice on their hulls and rigging, run over to a higher latitude on the American coast and thaw out, in the same manner that vessels frozen up on our own coast retreat again into the Gulf Stream until favored by an easterly wind.

And in a late address before the American Geographical Society by Dr. Hawks, when speaking of the routes for a railroad to connect the Atlantic States with the Pacific coast, cites the remarks of Mr. Johnson and other eminent surveyors, to show that the precipitation of moisture to the westward of the Rocky mountains, in Oregon Territory, is, with rare exceptions, in the form of rain throughout the year, and seldom as snow; and as the prevailing winds on that coast are from the westward, they are unquestionably ameliorated by the warm waters of the Kuro-Siwo, which, impinging upon the Aleutian islands, are thence thrown against the shores of Oregon and California, and form the southerly current on those coasts, to again fall into the great equatorial current of the Pacific.

The whole of the Kuro-Siwo is not, however, obstructed by the Aleutian islands, for experience shows that there is a current flowing to the northward through Behring's Straits, which is no doubt derived from this stream. This is, perhaps, underlaid by an arctic current flowing to the southward, which, rising to the surface after passing the narrow defile of the straits, supplies the counter current to the Kuro-Siwo before spoken of.

In studying this subject, in connexion with others having a bearing upon it, the hypothesis has forced itself upon my mind, that that portion of the Kuro-Siwo which finds an outlet into the Arctic ocean through Behring's Straits, continues its course to the northward and eastward, after clearing Icy Cape, and is the cause of that open sea, with its high temperature, seen to the northward of Greenland by Dr. Kane; and from the *unity* of its flow in a given path, it leaves the vast fields of ice lying to the southward and eastward, between that path and the north

coast of America and west coast of Melville island, in a great measure unaffected by its dissolving influence; for it is in that direction that our enterprising whalemen who resort to those seas find their most open cruising ground, and I have heard of no instance in which that open water has been explored to its limits in a northeast direction from Behring's Straits. The same physical laws operating upon the Gulf Stream produce similar results upon it after passing Spitzbergen, and the mass of water from these two streams thus accumulated about the pole (after parting with their warmth) find no outlets except those to the southward, between Spitzbergen and the east coast of Greenland, and through the passages among the islands leading into Baffin's Bay, and thus form the streams known as the Greenland and Labrador currents; these uniting in the north Atlantic, become the counter-current to the Gulf Stream after passing Newfoundland.

The same atmospheric meteors of revolving storms, or cyclones, prevail on the coasts of China and Japan as those that have been rendered so painfully familiar to us by their devastations among the West India islands, and along our Atlantic coast. This subject, however, is being fully and ably discussed by Mr. Redfield, and I mention it here merely as an additional illustration of the resemblance in the physical phenomena which characterize the western shores of the two great oceans.

In the passage of the United States steam frigate Mississippi from Simoda, Japan, to the Sandwich Islands, in October, 1854, the thermometer manifested a cold aqueous space between the meridians of 155 degrees east and 170 degrees west, and the parallels of 30 and 35 degrees north, which bears a general correspondence in the Pacific ocean to the position of the Sargassa sea in the Atlantic.—(See *Thermometric Diagrams, Plate XIV.*) Plates VIII and X show the prevailing winds, the oscillations of the barometer, and the temperature of the air and water for each day during our last visit to the bay of Yedo and first visit to Simoda. They are interesting as an indication of the fluctuating atmospheric pressure, and the equable temperature of the air.

The great changes in the temperature of the water at Simoda coincide with the changes in the pirection of the wind, (see *Diagrams, Plate X,*) yet is not attributable entirely to the thermal influence of the wind upon the water, as would seem to be the case from a simple inspection of the Diagram, but is owing chiefly, no doubt, to the peculiar position of the harbor in regard to the Kuro-Siwo, which sweeps directly past its mouth, and from which a superficial layer of warm water is driven into the harbor by every southerly wind of any force. The specific gravity of this layer being less than that of the torpid water of the harbor, it remains on the surface until expelled by a northerly wind, or until the thermal equilibrium is restored between it and the sub-surface water, when the normal temperature of the harbor again manifests itself. The bay of Yedo being more remote from the Kuro-Siwo, the water thermometer shows no such extreme fluctuations as at Simoda.—(See *Diagram, Plate VIII.*)

Very respectfully, your obedient servant,

SILAS BENT, *Lieutenant.*

Commodore M. C. PERRY.
United States Navy.

Plate I

DIAGRAM

of the

Track, Winds daily current, Barometer & Thermometer

of the U. S Despatch Bark

CAPRICE,

from

Shanghai to Lew-Chew,

June 1853.

Ackerman Lith. 379 Broadway NY.

Explanation
- Track
- Barometer
- Air
- Water
- Force and direction of current.

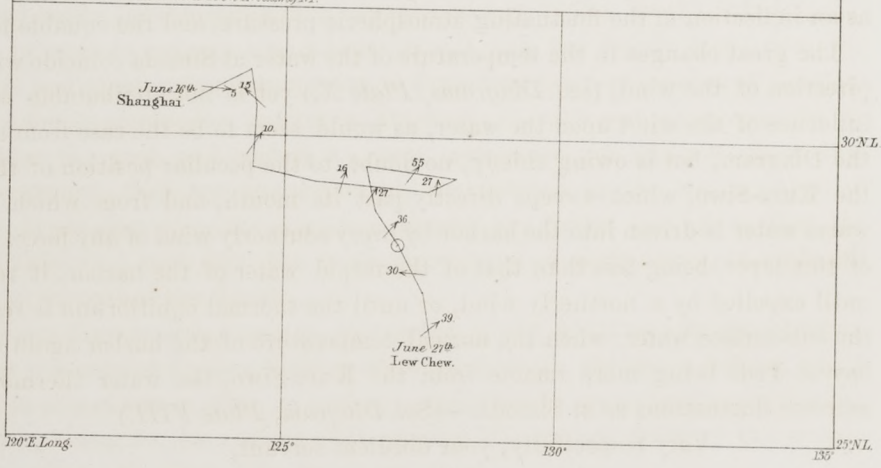
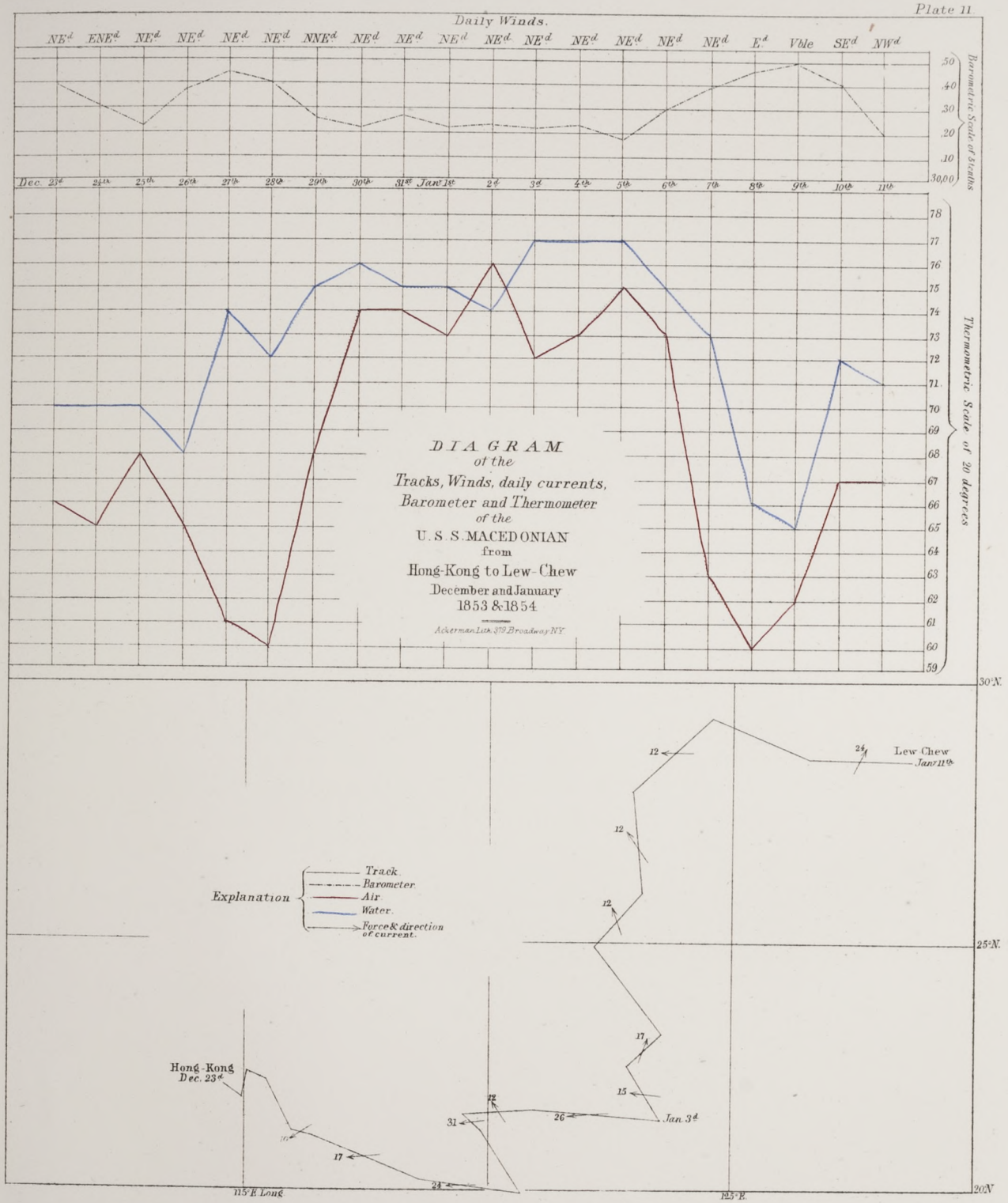
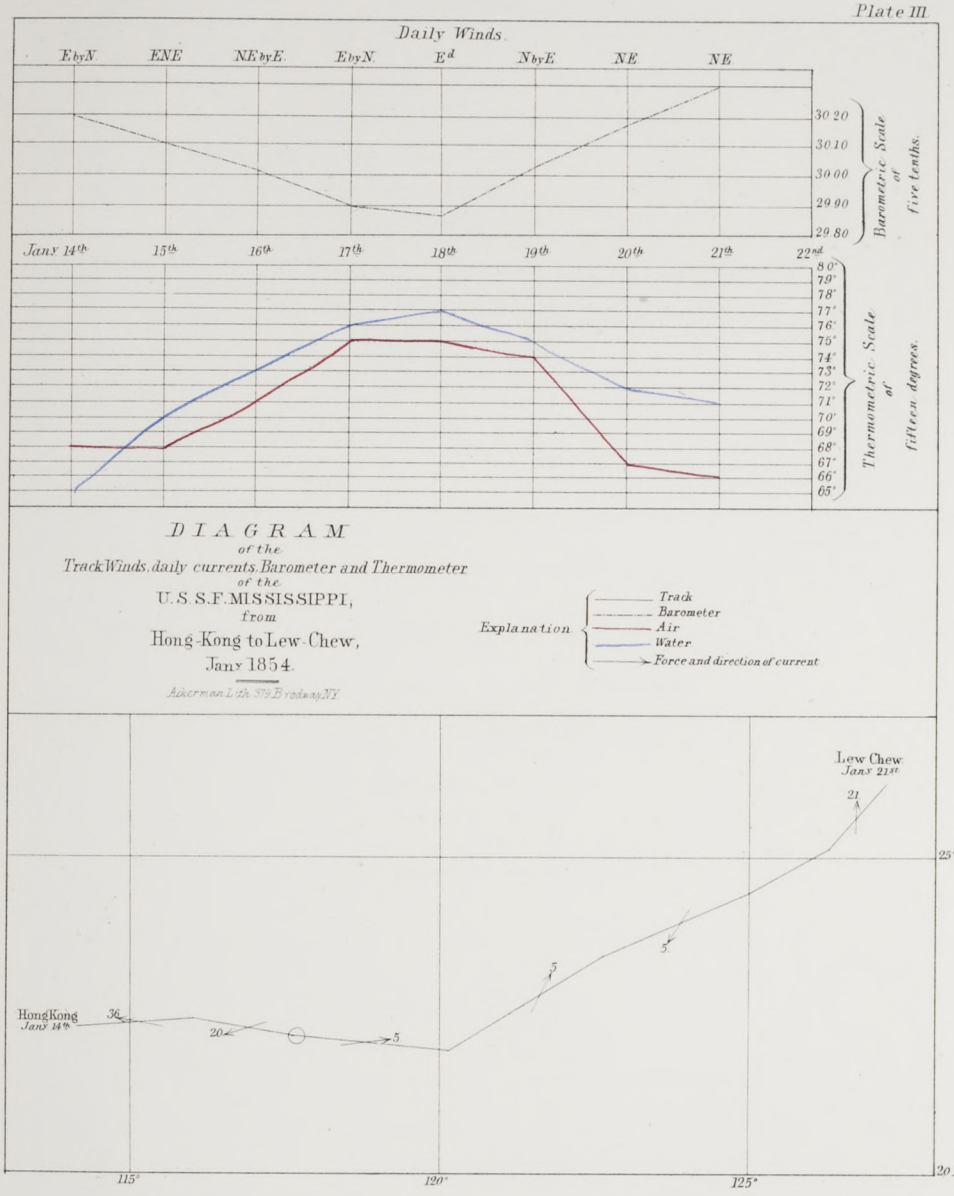


Plate 11



Daily Winds.
NE^d ENE^d NE^d NE^d NE^d NE^d NNE^d NE^d NE^d NE^d NE^d NE^d NE^d NE^d NE^d NE^d E^d Vble SE^d NW^d
Barometric Scale of 5 tenths
.50 .40 .30 .20 .10 30,00
Dec. 23^d 24th 25th 26th 27th 28th 29th 30th 31st Jany 1st 2^d 3^d 4th 5th 6th 7th 8th 9th 10th 11th
Thermometric Scale of 20 degrees
78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59
DIAGRAM
of the
Tracks, Winds, daily currents,
Barometer and Thermometer
of the
U. S. S. MACEDONIAN
from
Hong-Kong to Lew-Chew
December and January
1853 & 1854
Ackerman Lith. 379 Broadway N.Y.
30°N.
25°N.
20°N
Lew Chew
Jany 11th
Explanation
Track.
Barometer.
Air.
Water.
Force & direction of current.
Hong-Kong
Dec. 23^d
Jan. 3^d
115°E Long
125°E.

Plate III



DIAGRAM

of the

Track Winds, daily currents, Barometer and Thermometer

of the

U.S.S.F. MISSISSIPPI,

from

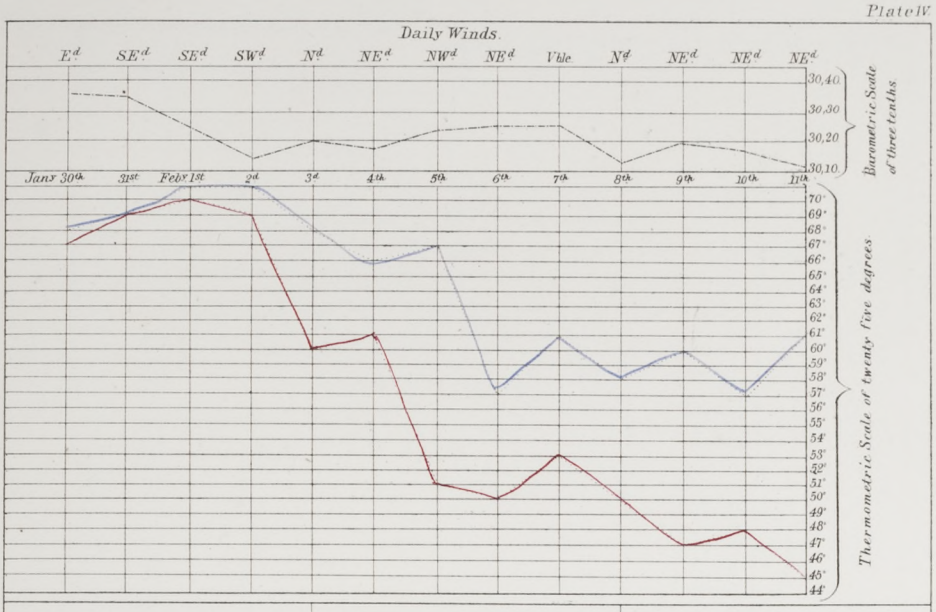
Hong-Kong to Lew-Chew,

Janʸ 1854.

Ackerman Lith. 379 Broadway NY.

Explanation

- Track
- Barometer
- Air
- Water
- Force and direction of current



DIAGRAM

of the

Track, Winds, daily currents, Barometer and Thermometer

of the

U. S. S. MACEDONIAN,

from

Lew Chew to Yedo Bay,

January and February

1854.

Ackerman Lith. 379 Broadway NY

Plate V.

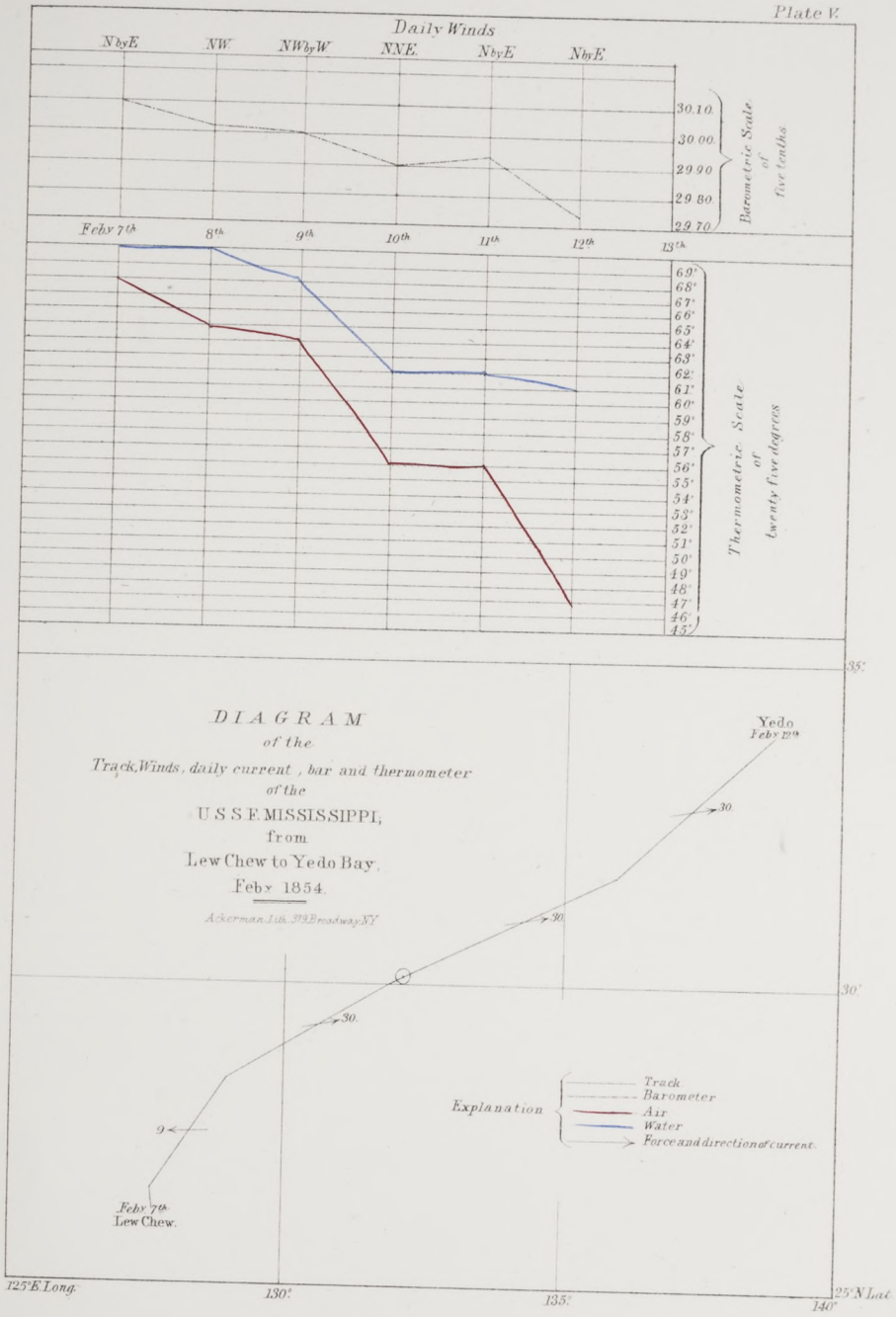
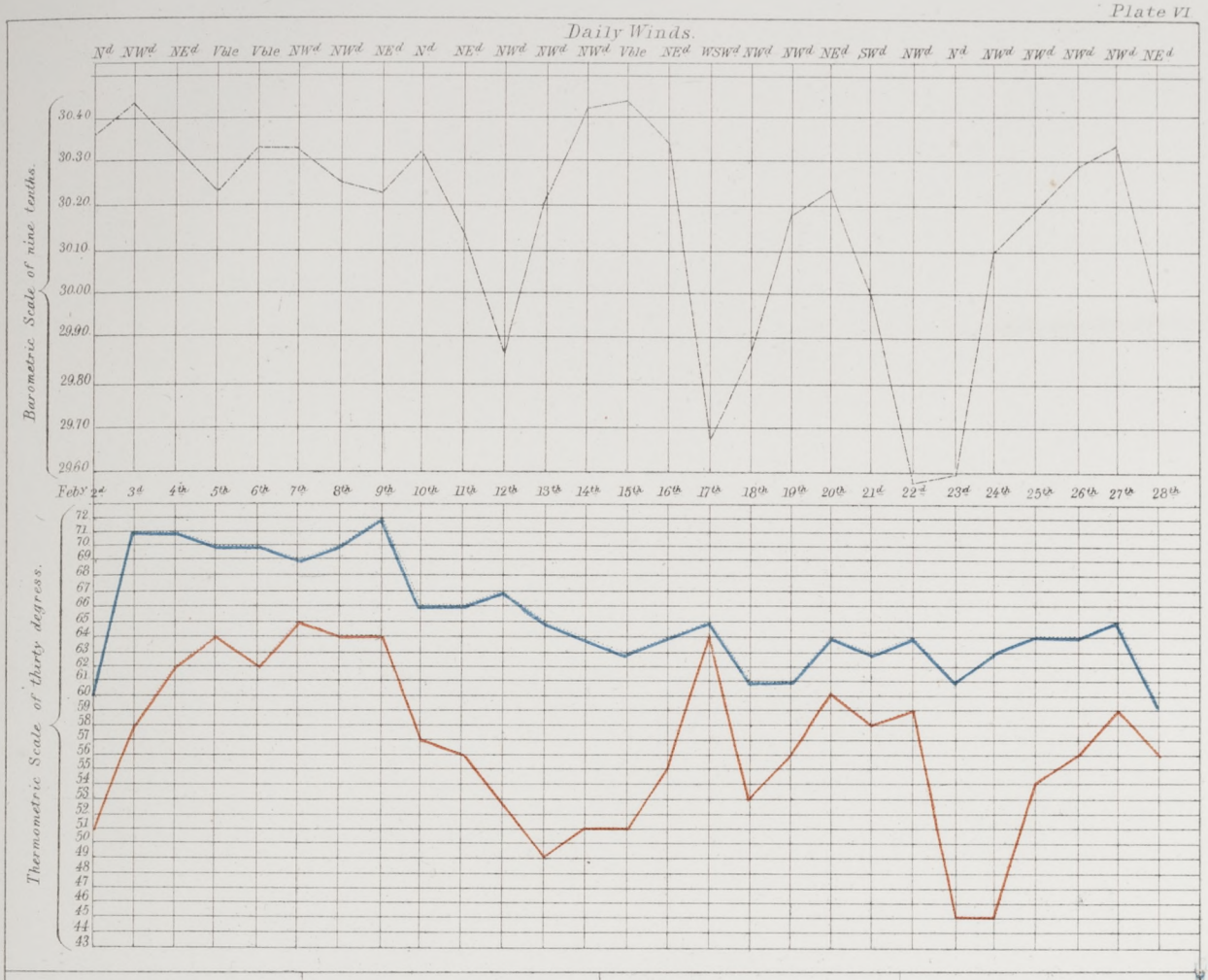

Daily Winds
NbyE
NW
NWbyW
NNE
NbyE
NbyE
30.10
30.00
29.90
29.80
29.70
Barometric Scale of five tenths
Febr 7th
8th
9th
10th
11th
12th
13th
69°
68°
67°
66°
65°
64°
63°
62°
61°
60°
59°
58°
57°
56°
55°
54°
53°
52°
51°
50°
49°
48°
47°
46°
45°
Thermometric Scale of twenty five degrees
DIAGRAM
of the
Track, Winds, daily current, bar and thermometer
of the
U S S F. MISSISSIPPI,
from
Lew Chew to Yedo Bay.
Febr 1854.
Ackerman, Lith. 379 Broadway, NY
Yedo
Febr 12th
30
30
30
9
Febr 7th
Lew Chew.
Explanation
Track
Barometer
Air
Water
Force and direction of current.
35°
30°
25° N Lat
125° E Long.
130°
135°
140°

Plate VI


Daily Winds.
N^d NW^d NE^d Vble Vble NW^d NW^d NE^d N^d NE^d NW^d NW^d NW^d Vble NE^d WSW^d NW^d NW^d NE^d SW^d NW^d N^d NW^d NW^d NW^d NW^d NE^d
Barometric Scale of nine tenths.
30.40
30.30
30.20
30.10
30.00
29.90
29.80
29.70
29.60
Feby 2^d 3^d 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21^d 22^d 23^d 24th 25th 26th 27th 28th
Thermometric Scale of thirty degrees.
72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43

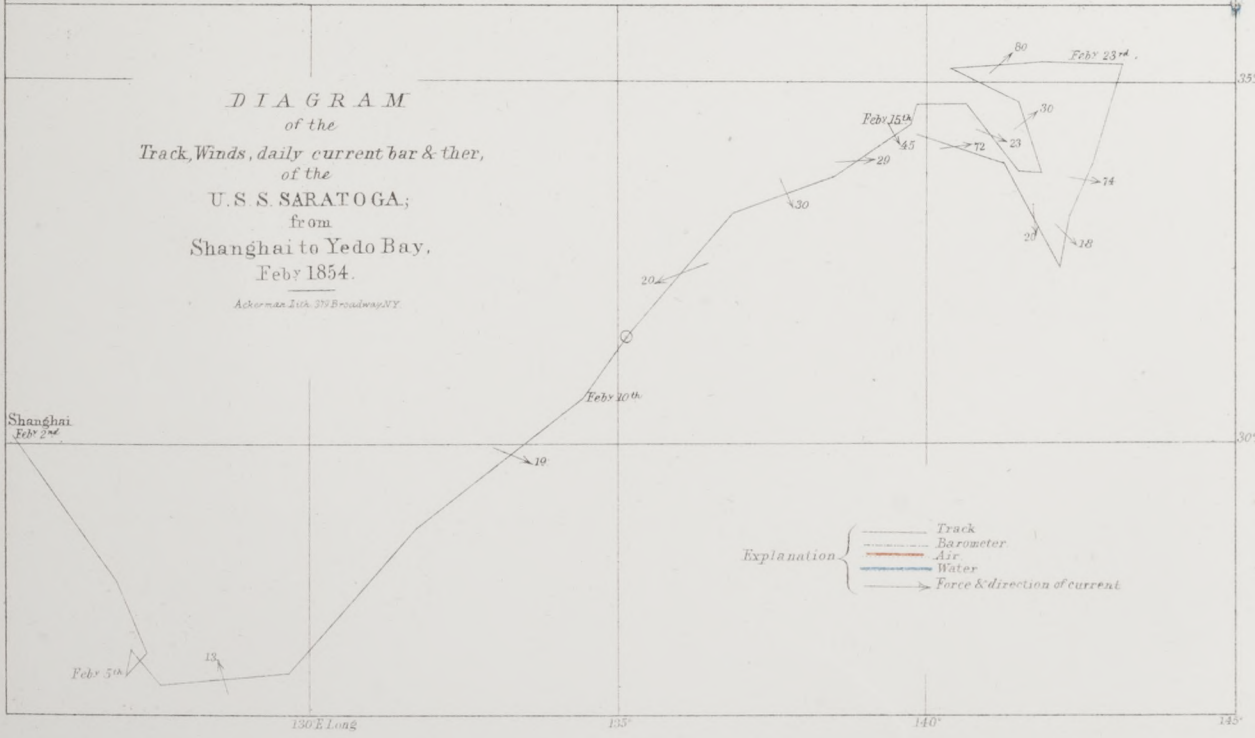


DIAGRAM
of the
Track, Winds, daily current bar & ther,
of the
U.S.S. SARATOGA;
from
Shanghai to Yedo Bay,
Feby 1854.
Ackerman Lith. 379 Broadway N.Y.
Shanghai
Feby 2nd
Feby 5th
13
19
Feby 10th
20
30
Feby 15th
45
29
72
23
80
Feby 23rd
30
74
28
18
35°N.
30°N.L.
130°E Long.
135°
140°
145°
Explanation
Track
Barometer
Air
Water
Force & direction of current

Plate VII

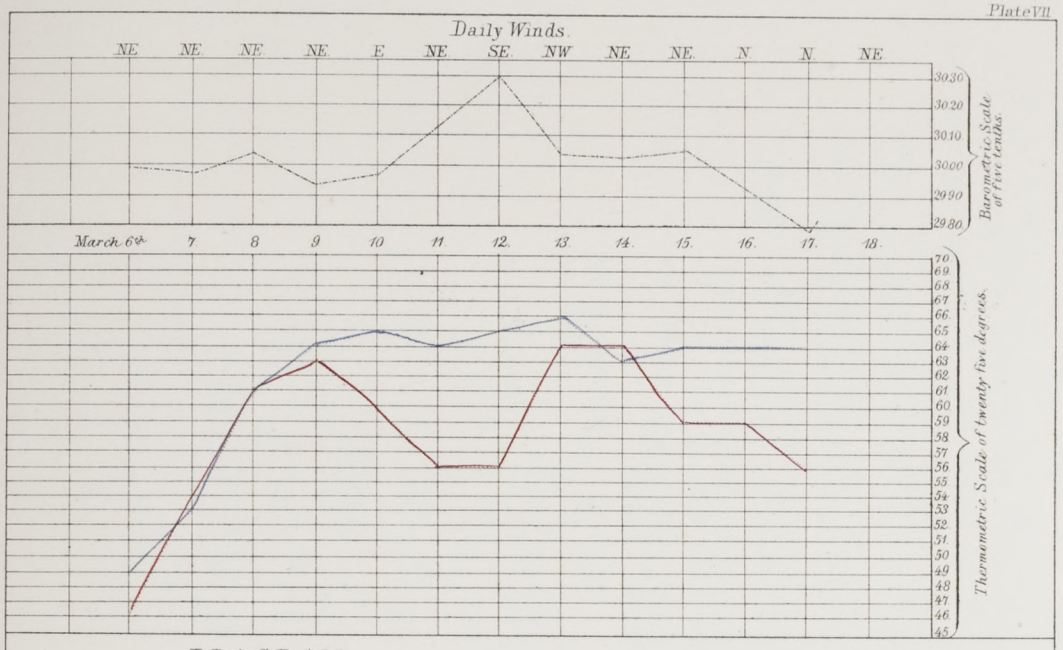


DIAGRAM
of the
Track, Winds, daily Currents, Barometer & Thermometer
of the
U. S. S. SUPPLY.
from
Shanghae to Yedo Bay,
March 1854.

Ackerman Lith. 379 Broadway NY.

Explanation
- Barometer
- Air
- Water
- Track
- Force and direction of current

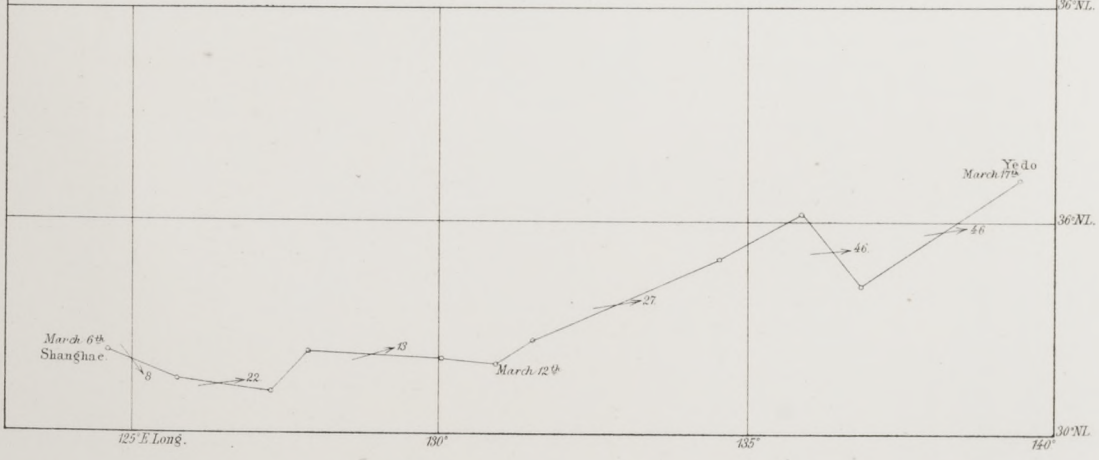


Plate VIII.

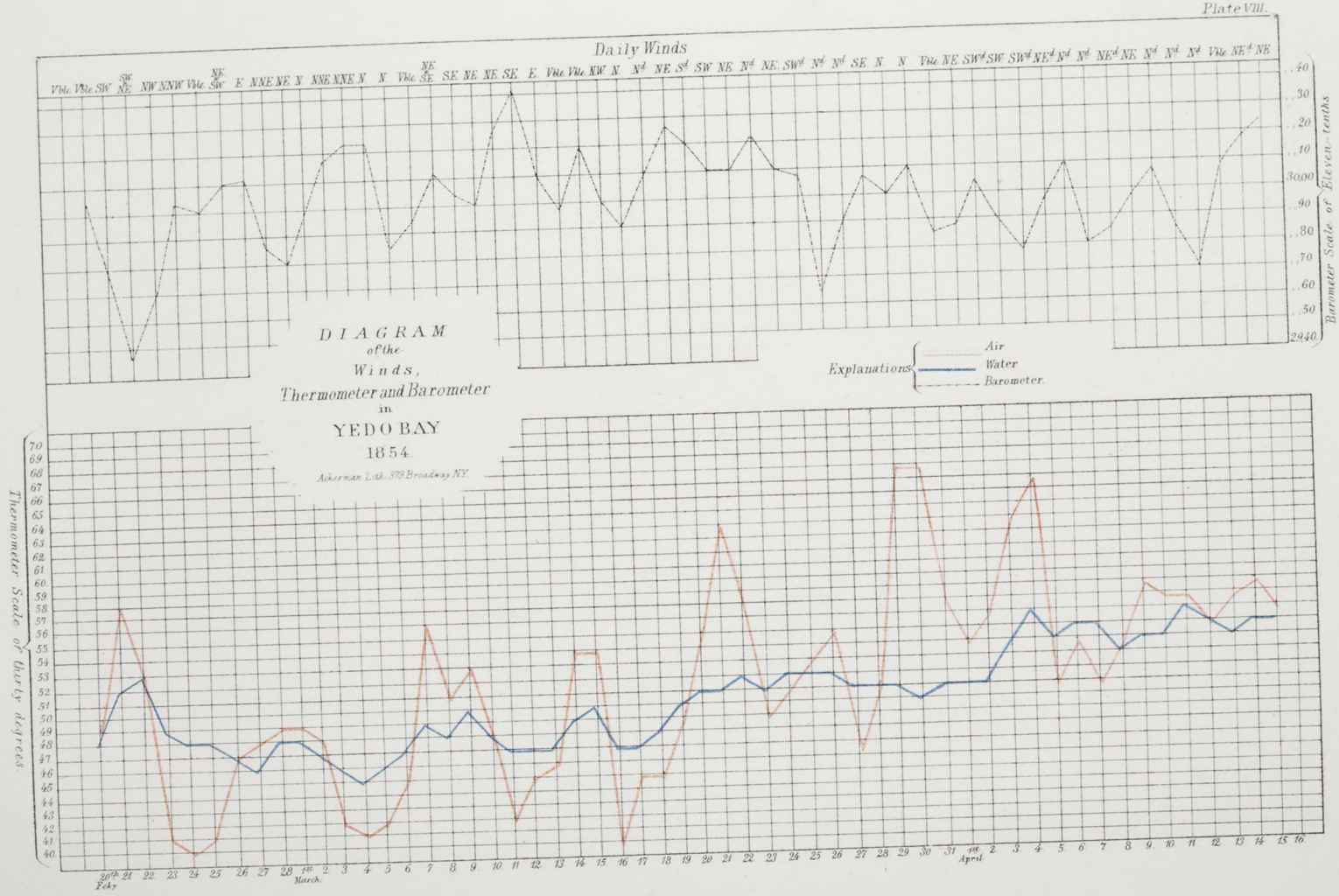

Daily Winds
Barometer Scale of Eleven-tenths
Thermometer Scale of thirty degrees
DIAGRAM
of the
Winds,
Thermometer and Barometer
in
YEDO BAY
1854
Ackerman Lith. 379 Broadway NY.
Explanations
Air
Water
Barometer
20th Feby
March.
April

Plate IX

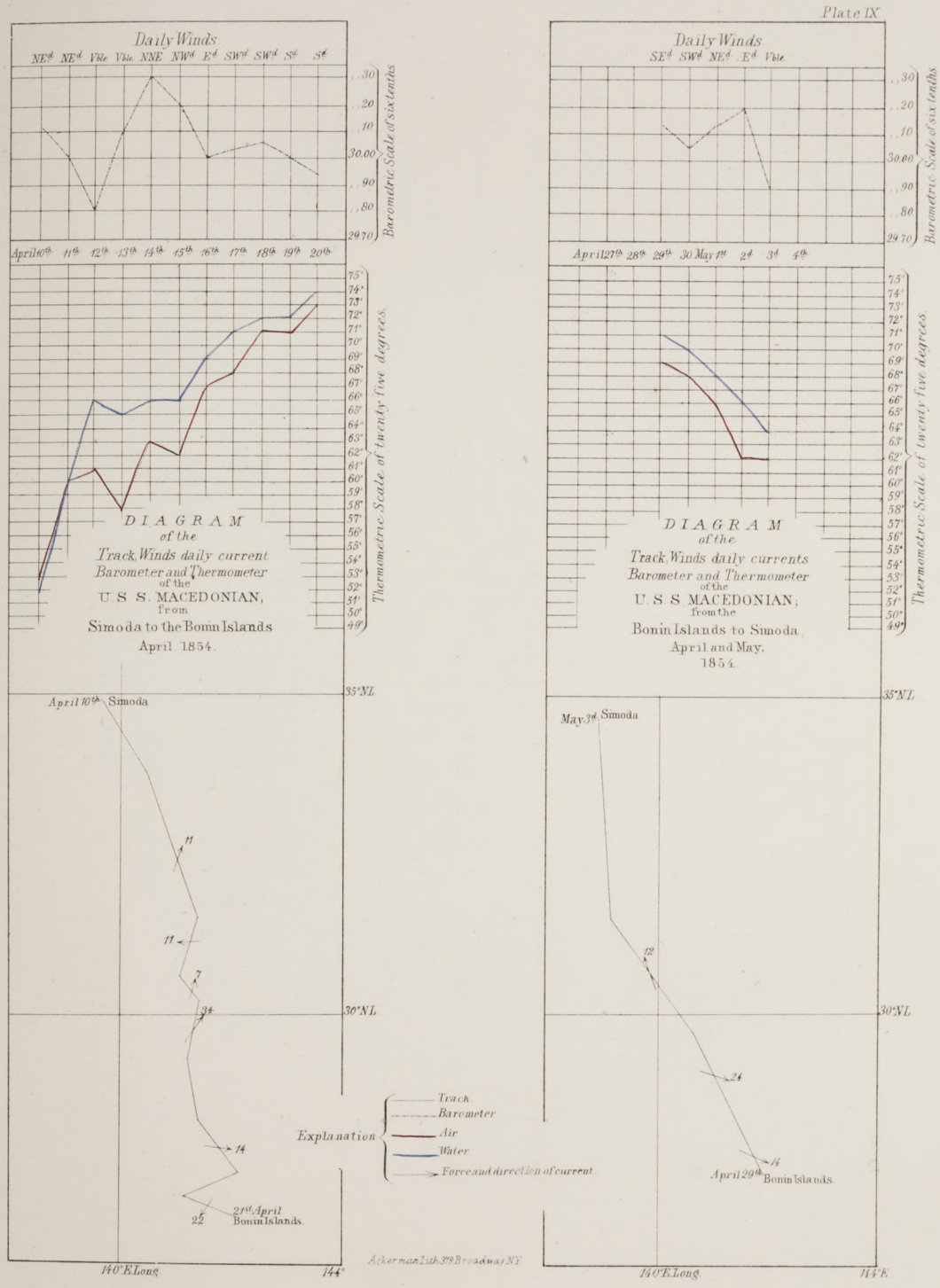
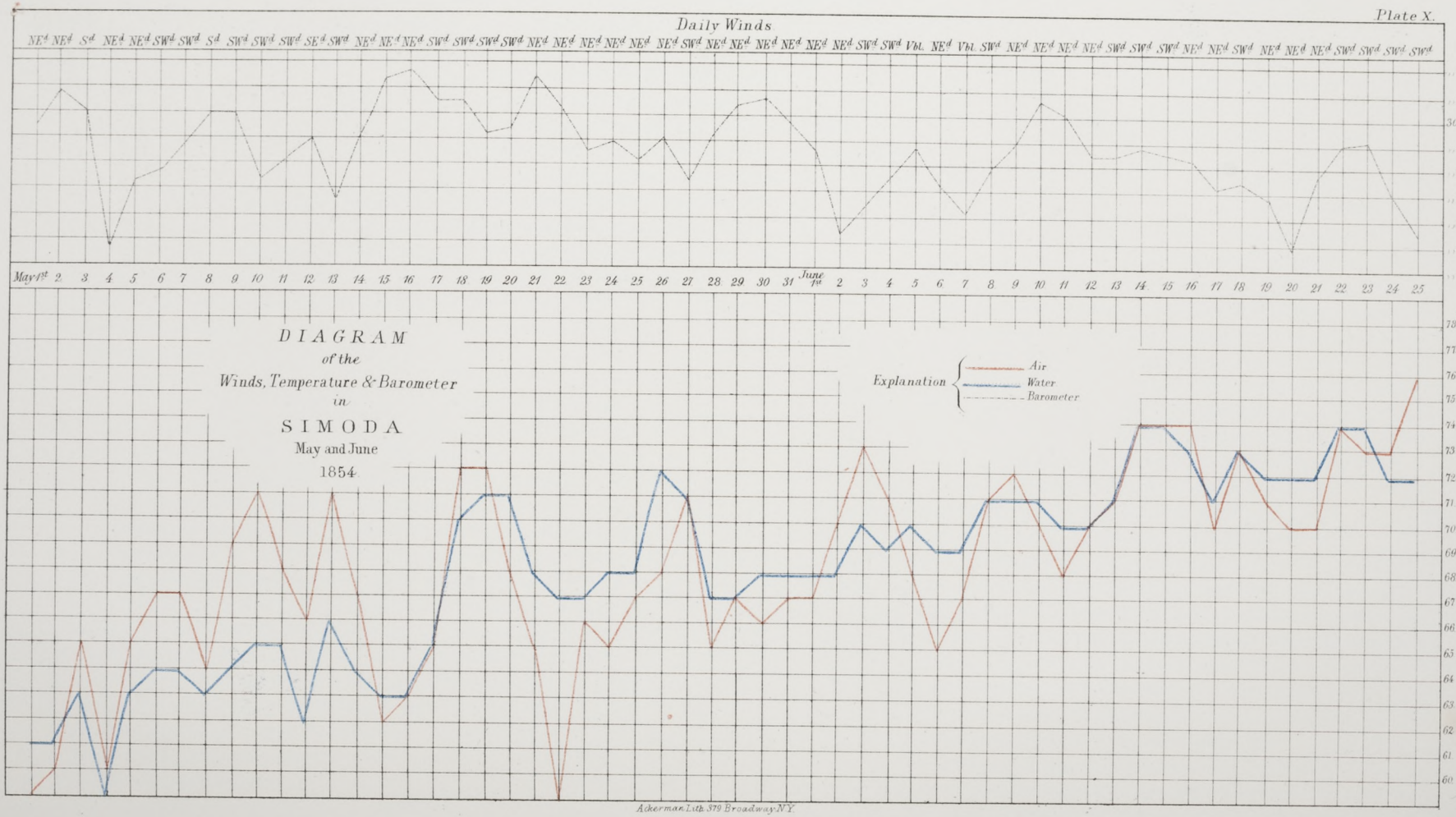

Daily Winds
NE'd NE'd Vble Vble NNE NW'd E'd SW'd SW'd S'd S'd
Barometric Scale of six tenths
April 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th
Thermometric Scale of twenty five degrees
DIAGRAM
of the
Track, Winds daily current
Barometer and Thermometer
of the
U. S. S. MACEDONIAN,
from
Simoda to the Bonin Islands
April 1854.
35°NL
April 10th Simoda
11
11
7
34
30°NL
14
21st April
Bonin Islands.
22
140°E Long.
144°
Explanation
Track
Barometer
Air
Water
Force and direction of current
Ackerman 11th 379 Broadway NY
Daily Winds
SE'd SW'd NE'd E'd Vble
Barometric Scale of six tenths
April 27th 28th 29th 30 May 1st 2d 3d 4th
Thermometric Scale of twenty five degrees
DIAGRAM
of the
Track, Winds daily currents
Barometer and Thermometer
of the
U. S. S. MACEDONIAN;
from the
Bonin Islands to Simoda
April and May,
1854.
35°NL
May 3d Simoda
12
30°NL
24
14
April 29th Bonin Islands.
140°E Long.
144°E

Plate X.



Ackerman Lith. 379 Broadway N.Y.

Plate XI

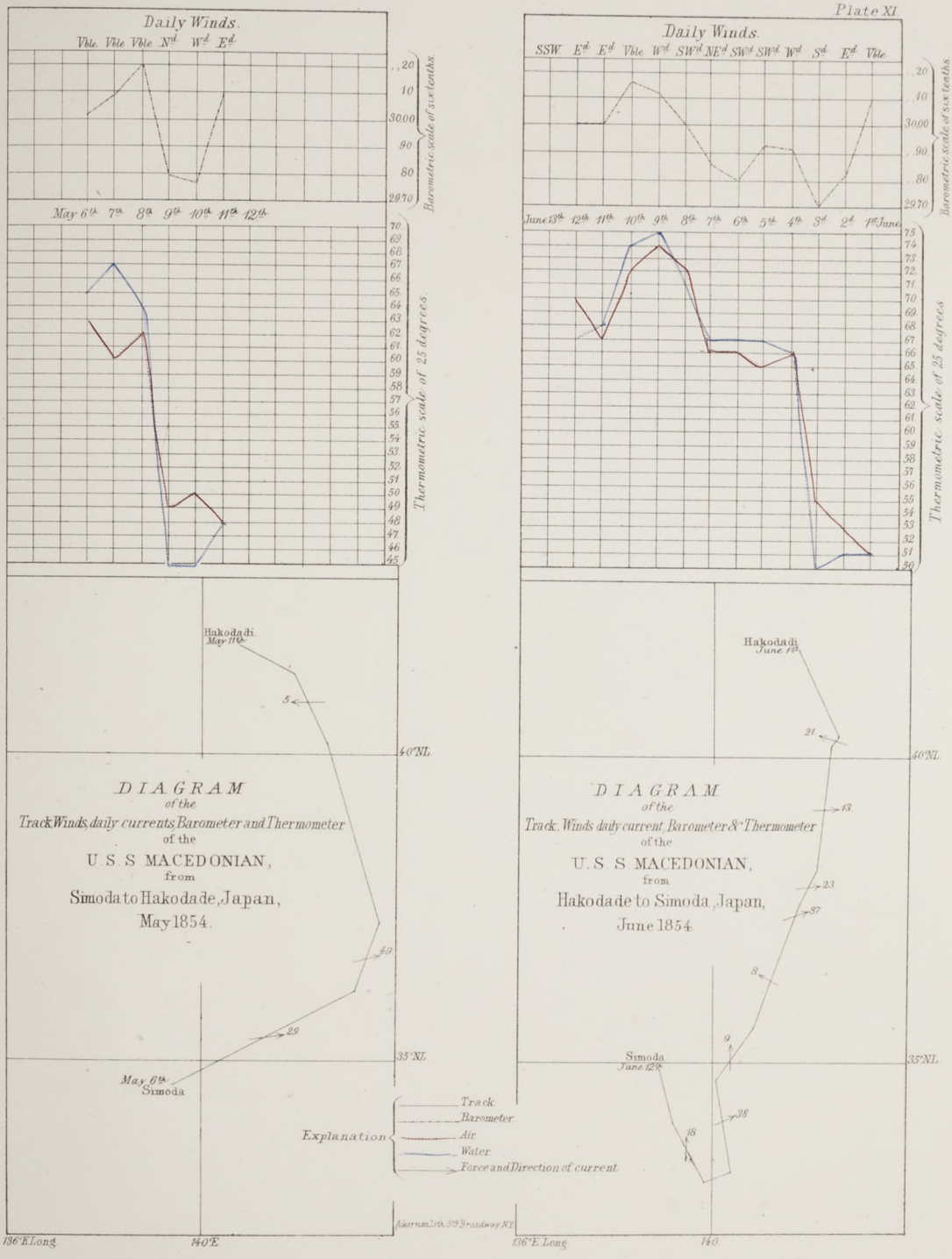

Daily Winds.
Vble. Vble. Vble. N.d. W.d. E.d.
Barometric scale of six tenths.
May 6th 7th 8th 9th 10th 11th 12th
Thermometric scale of 25 degrees
Hakodadi May 11th
40°NL.
DIAGRAM
of the
Track Winds, daily currents, Barometer and Thermometer
of the
U. S. S. MACEDONIAN,
from
Simoda to Hakodade, Japan,
May 1854.
May 6th Simoda
35°NL.
Explanation
Track.
Barometer.
Air.
Water.
Force and Direction of current.
Ackerman Lith. 379 Broadway N.Y.
136°E Long.
140°E.
Daily Winds.
SSW. E.d. E.d. Vble. W.d. SW.d. NE.d. SW.d. SW.d. W.d. S.d. E.d. Vble.
Barometric scale of six tenths.
June 13th 12th 11th 10th 9th 8th 7th 6th 5th 4th 3d 2d 1st June
Thermometric scale of 25 degrees
Hakodadi June 1st
40°NL.
DIAGRAM
of the
Track, Winds daily current, Barometer & Thermometer
of the
U. S. S. MACEDONIAN,
from
Hakodade to Simoda, Japan,
June 1854.
Simoda June 12th
35°NL.
136°E Long.
140.

Plate XII.

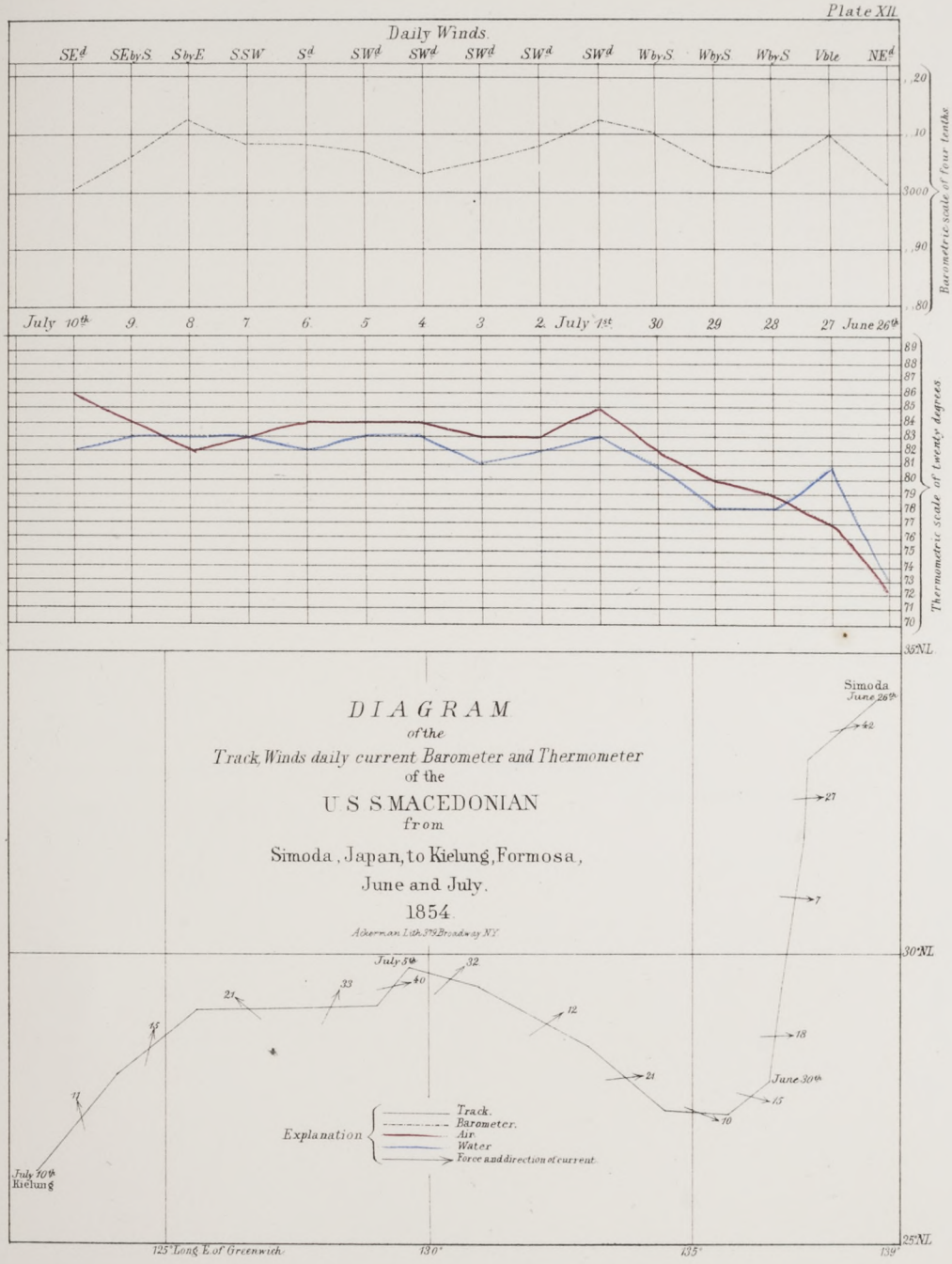


DIAGRAM
of the
Track, Winds daily current Barometer and Thermometer
of the
U S S MACEDONIAN
from
Simoda, Japan, to Kielung, Formosa,
June and July.
1854.
Ackerman Lith. 379 Broadway N.Y.

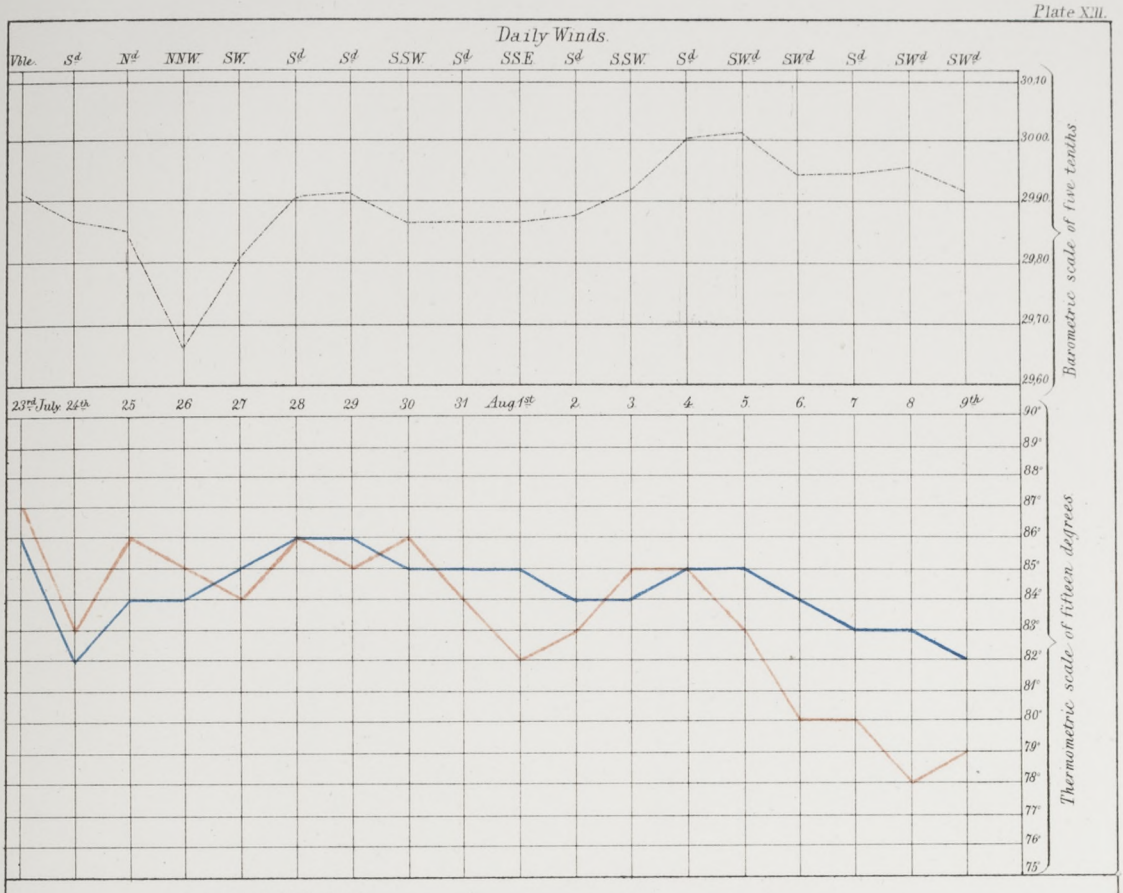
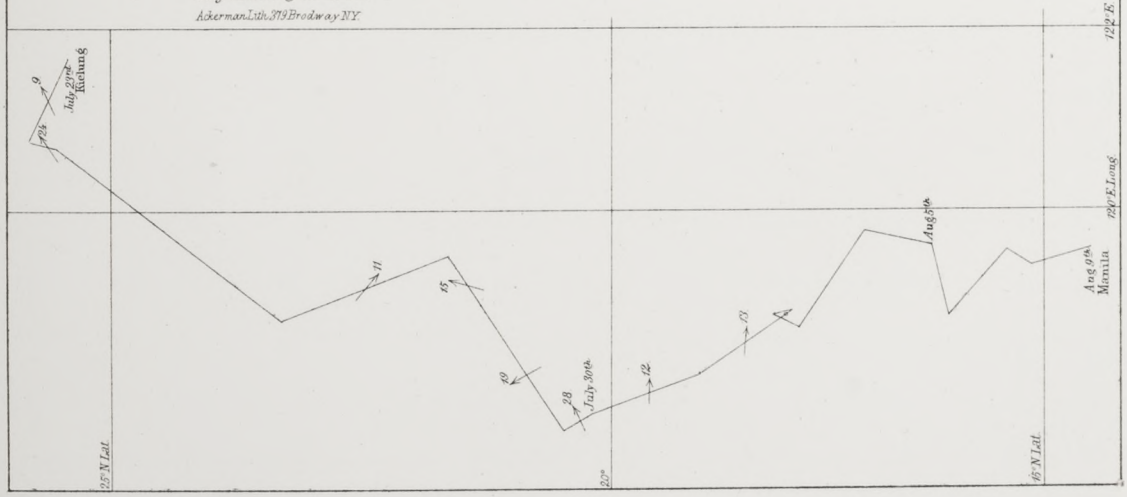
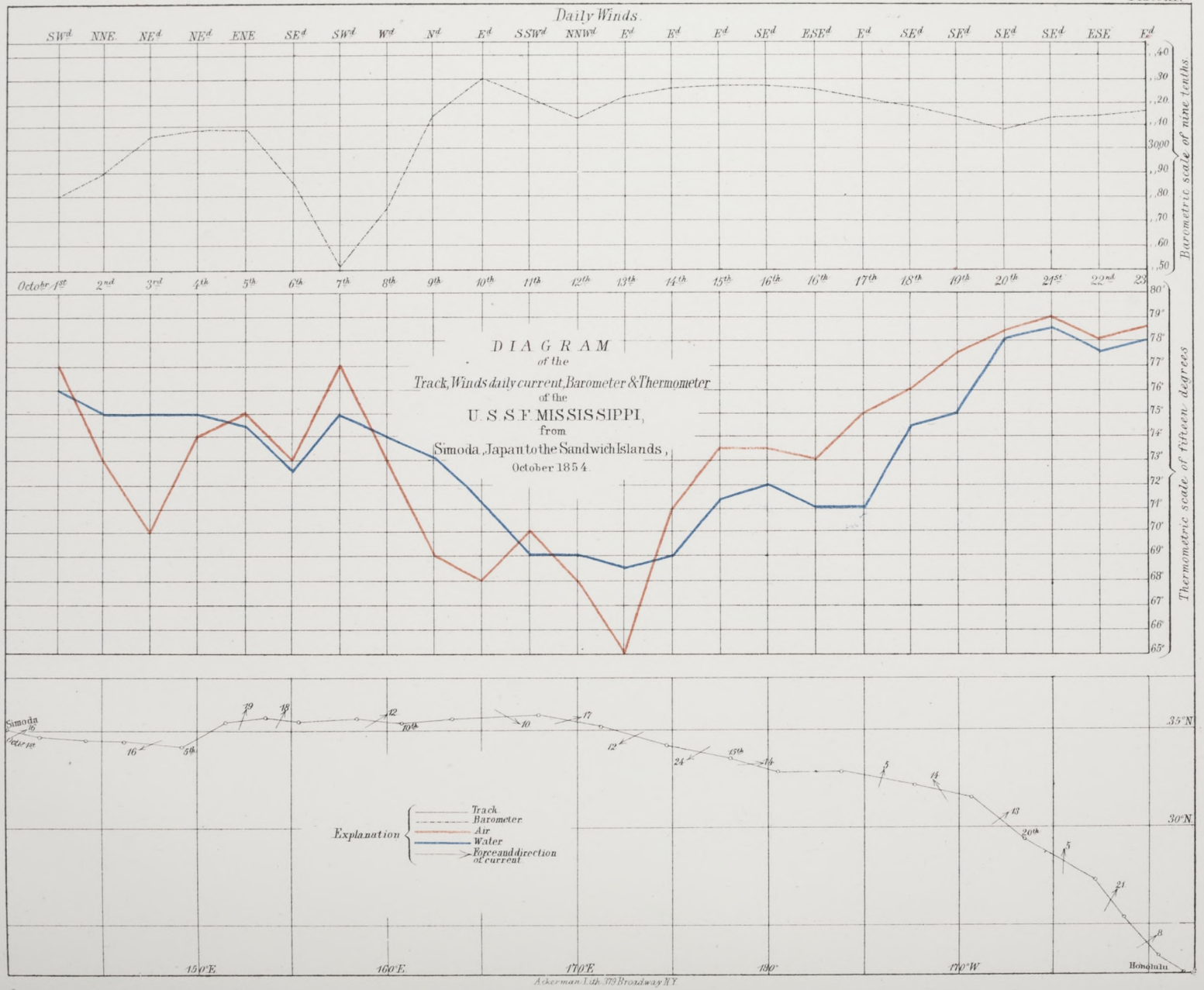


DIAGRAM
of the
Track, Winds daily current Barometer & Thermometer,
of the
U. S. S. MACEDONIAN;
from
Kielung, Formosa, to Manila
July and August 1854.

Ackerman Lith. 379 Broadway NY.

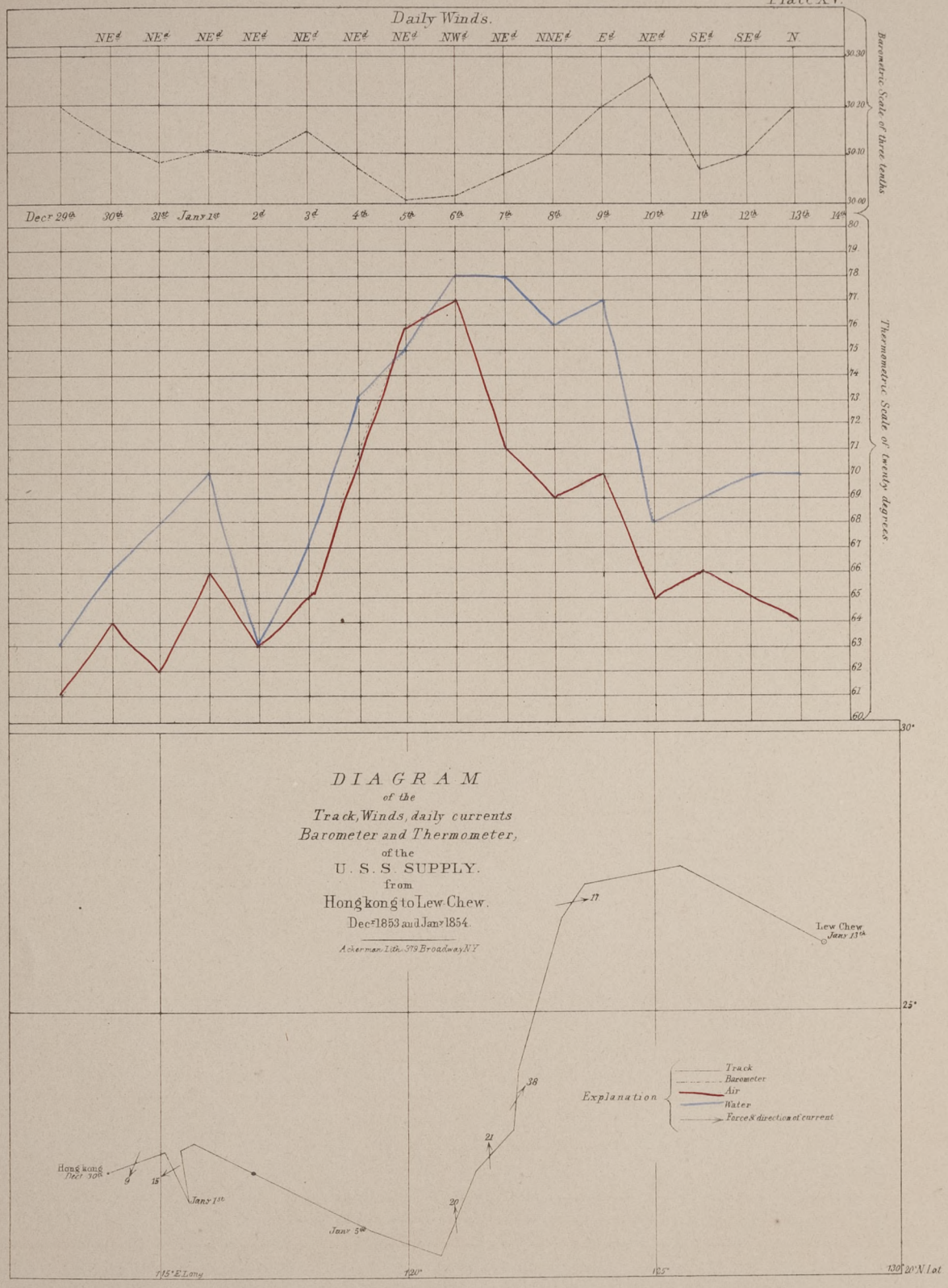
Explanations
- Track.
- Barometer.
- Air.
- Water
- Force and direction of current

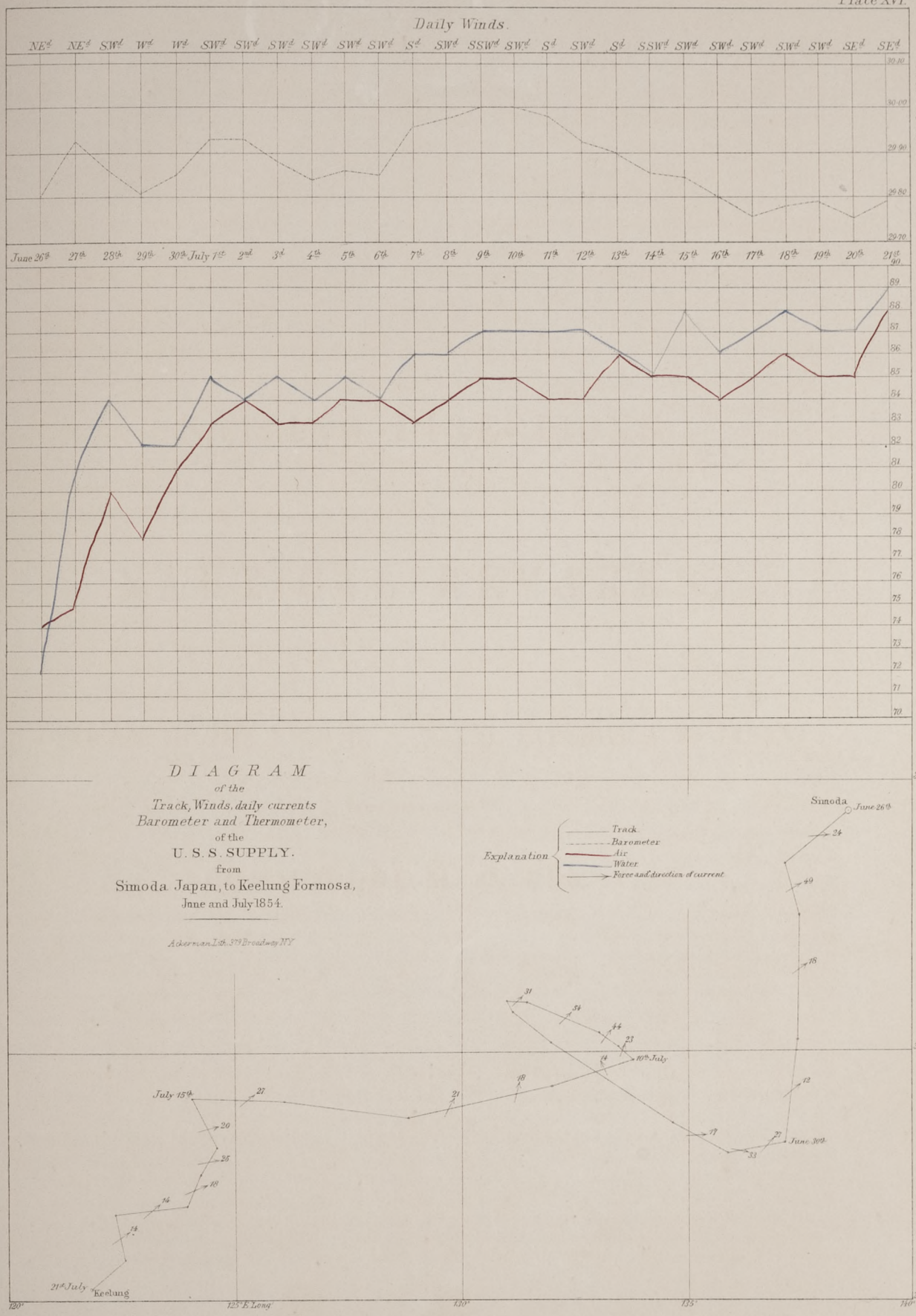




Ackerman Lith. 379 Broadway NY

Plate XV.


Daily Winds.
NE NE NE NE NE NE NE NW NE NNE E NE SE SE N
Barometric Scale of three tenths
30.30
30.20
30.10
30.00
Decr 29th 30th 31st Janry 1st 2d 3d 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th
Thermometric Scale of twenty degrees.
80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60
DIAGRAM
of the
Track, Winds, daily currents
Barometer and Thermometer,
of the
U. S. S. SUPPLY.
from
Hong kong to Lew Chew.
Decr 1853 and Janry 1854.
Ackerman Lith. 379 Broadway N.Y.
30°
25°
Lew Chew
Janry 13th
17
38
21
20
Hong kong
Decr 30th
9
15
Janry 1st
Janry 5th
Explanation
Track
Barometer
Air
Water
Force & direction of current
115° E Long
120°
125°
130°
20° N lat


Daily Winds.
NE'd NE'd SW'd W'd W'd SW'd SW'd SW'd SW'd SW'd SW'd S'd SW'd SSW'd SW'd S'd SW'd S'd SSW'd SW'd SW'd SW'd SW'd SW'd SE'd SE'd
30.10
30.00
29.90
29.80
29.70
Barometric Scale of four tenths.
June 26th 27th 28th 29th 30th July 1st 2nd 3d 4th 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21st
90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70
Thermometric Scale of twenty degrees.
DIAGRAM
of the
Track, Winds, daily currents
Barometer and Thermometer,
of the
U. S. S. SUPPLY.
from
Simoda Japan, to Keelung Formosa,
June and July 1854.
Ackerman Lith. 379 Broadway NY
Explanation
Track.
Barometer
Air
Water
Force and direction of current
Simoda
June 26th
24
49
18
31
54
44
23
14
10th July
18
July 15th
27
21
26
25
18
14
14
21st July
Keelung
12
17
27
33
June 30th
35°
30°N
25°N Lat.
120°
125° E Long.
130°
135°
140°

SAILING DIRECTIONS

AND

NAUTICAL REMARKS:

BY

OFFICERS OF THE LATE U. S. NAVAL EXPEDITION TO JAPAN,

UNDER THE COMMAND OF

COMMODORE M. C. PERRY.

SAILING DIRECTIONS AND NAUTICAL REMARKS,

BY

OFFICERS OF THE LATE UNITED STATES NAVAL EXPEDITION TO JAPAN.

JAPAN EXPEDITION OFFICE,
New York, May 22, 1857.

SIR: I have the honor herewith to send the sailing directions and nautical remarks, compiled from the various reports and observations, made by the officers of the late Japan Expedition.

It is due to Lieutenant Bent to state, that the general remarks and directions were mainly written by him before his detachment from the office.

I am, respectfully, your obedient servant,

WM. L. MAURY,
Lieutenant United States Navy.

Commodore M. C. PERRY,
United States Navy, New York.

Horsburg and the China Pilot No. 1, afford good sailing directions for the south and east coasts of China. If bound to Lew Chew, from Hong Kong, pass through the Formosa channel during the southwest monsoon, giving Agincourt, Crag, and Pinnacle islands, off the north end of Formosa, a safe berth, as there are said to be reefs among them not laid down on the charts, and the currents are strong and variable in the vicinity. Thence, shape a course so as to pass to the northward of Hoa-pin-san,* Tia-usu, and Raleigh Rock, after which haul to the eastward, sight Koomisang, and pass either to the northward or southward of it, Karuma, and the small islet near the latter, but *not* between them, as reefs are said to have been seen there. If to the northward, give Tusima,† a small rocky islet, a good berth; pass the southward of Agenhu, which may be readily recognized by its bold south point and wedge-shaped appearance. The Amakirrima group will be seen to the south-southeastward, Lew Chew visible on the eastern horizon, and in a short time the reef islets will heave in sight to the southward and eastward. These latter are low and sandy, slightly covered with vegetation, and surrounded by coral reefs.

During the northeast monsoon, double the south end of Formosa, and, with the strong current

* The position of Hoa-pin-san as given by Horsburgh, latitude 25° 47′ N., longitude 123° 26′ E., is correct, but it is erroneously laid down on the French chart of 1847: "Carte des Isles Mariannes, &c.," as also upon the "Admiralty chart of 1840, corrected to 1849."

† Lieutenant Commanding H. K. Stevens, of the late North Pacific Surveying Expedition, says: "Tusima is a rocky islet, one quarter of a mile in extent, with a reef projecting 1½ mile towards the northward, and one-fourth that distance in other directions. It is about 80 feet high, much broken, and lies 13¼ miles N. 15° E. from the northernmost peak of Koomisang, and N 86° W. from the centre of Agenhu.

of the Kuro-siwo, beat along its eastern shore to the northward and eastward*, and pass to the northward of the Majico-Sima islands, but to the southward of Hoa-pin-san; sighting Koomisang, pass either to the northward or to the southward of it.† If to the southward, you may hug the northern shores of the Amakirrima islands, as it is believed there are no hidden dangers near them.

During the typhoon season, however, it is advisable to pass to the southward of Formosa and Majico-Sima islands, in order to have plenty of sea-room in the event of encountering one of these storms.‡ The passage to the southward of the Amakirrima is clear, with the exception of Hall's Reef, which bears from the south point of Lew Chew west by north half north, distant about 7 miles, and which is slightly above water.§

Arriving off the harbor, be governed by the following sailing directions for Napha, Island of Lew Chew:

This is the principal seaport of the island, and perhaps the only one possessing the privileges of a port of entry.

The inner, or junk harbor, has a depth of water of from two to three fathoms, and though small, is sufficiently large to accommodate, with ease, the fifteen or twenty moderate sized junks which are usually found moored in it. These are mostly Japanese, with a few Chinese, and some small coasting craft, which seem to carry on a sluggish trade with the neighboring islands.

The outer harbor is protected to the eastward and southward by the main land, whilst in other directions it is surrounded merely by a chain of coral reefs, which answer as a tolerable breakwater against a swell from the northward or westward, but afford, of course, no shelter from the wind. The holding-ground is so good, however, that a well-found ship can ride out here almost any gale in safety.

The clearest approach to Napha from the westward is, by passing to the northward of the Amakirrima islands, and sighting Agenhu island,‖ (which will be recognized by its wedge-shaped appearance;) from thence steer a southeast course for the harbor, passing on either side of Reef islands, being careful, however, not to approach them too near on the western and southern sides, as the reefs below water in these directions are more extensive than is shown by old charts. After clearing Reef islands bring Wood Hill to bear S.S.E., when stand down for it, until getting upon the line of bearing for south channel. This will carry you well clear of Blossom reef, yet not so far off but that the White Tomb and clump of trees or bushes to the southward of Tumai Head, (see view No. 1,) can be easily distinguished.¶ An E.N.E. $\frac{1}{4}$ E.

* Extract from report of Lieutenant Commanding J. J. Boyle: "On the 29th of October, 1853, near the island of Formosa, I discovered a volcano, distant from the land about ten miles, in a violent state of eruption, throwing out columns of vapor to a great height, resembling in appearance a similar phenomenon to which I was witness some years ago on the coast of Sicily; this, however, was of greater magnitude and force than that, although no lava was visible by reason of the dense bank of vapor which hung around it. The depth of water here is much greater than on the Sicilian coast, and hence my conclusion as to the cause of not seeing lava. When last seen, at 3 P. M., it was in a lively state of activity, and bore N.N.W., distant about ten miles. It was in latitude about 24° N., and longitude 121° 50′ E.; there was no sail in sight."

† A diligent, but unsuccessful, search was made for Harp island, placed in latitude 23° 45′ N., and longitude 122° 04′ East. Several vessels of the squadron also passed near the position (latitude 22° 05′ N., longitude 121° 18′ East,) assigned to Alceste shoal, without seeing any signs of it.

‡ The island Ykima, placed on some of the charts to the southward of Ty-pin-san, does not exist; but the two small islands between Ty-pin-san and Patchung, positions marked "doubtful," were seen by some of the squadron, and are believed to be correctly placed on our chart.

§ The ship Heber reports, January, 1852, the discovery of a rock about six feet above water, bearing from the south point of Lew Chew W. by S. $\frac{1}{4}$ S., seven miles distant.

‖ Giving Tusima a safe berth.

¶ In running down for the bearing for south channel, care must be taken to avoid Lexington Reef, laid down on the chart to the southward and westward of Blossom Reef, distant three quarters of a mile, having but $2\frac{1}{2}$ fathoms upon it at low water.

course will now take you in, clear all dangers, and give you a good anchorage on, or near, the seven-fathom bank, about half a mile to the northward and westward of False Capstan Head.

OAR CHANNEL.

To enter this channel, bring the centre of the island in Junk harbor (known by the deep verdure of its vegetation) to fill the gap between the forts at the entrance of Junk harbor, (see view No. 2,) and steer a S.E. ½ E. course until Capstan Head bears east, when haul up E.N.E., and anchor as before directed.

NORTH CHANNEL.

This channel is very much contracted by a range of detatched rocks making out from the reef on the west side, and should not, under ordinary circumstances, be attempted by a stranger, as at high water the reefs are almost entirely covered, and it is difficult to judge of your exact position unless familiar with the various localities and landmarks. To enter by this (North) channel, bring a remarkable notch in the southern range of hills in line with a small hillock just to the eastward of False Capstan Head, (see view No. 3,) and stand in on this range S. by E. ½ E. until Tumai Head bears E. ½ N., when open a little to the southward, so as to give the reef to the eastward a berth, and select your anchorage.

There is a *black spar-buoy* anchored on Blossom reef, half way between its eastern and western extremities; a *red spar-buoy* on the point of reef to the W.N.W. of Abbey point; and a *white spar-buoy* on the southeast extremity of Oar reef. Flags of corresponding colors were attached to all these buoys, and they afford good guides for the South and Oar channels. There are two large stakes on the reefs to the eastward and westward of North channel, planted there by the natives, this being the channel mostly used by the junks trading to the northward.

An abundance of water can always be obtained at the fountains in Junk harbor, where there is excellent landing for boats. There is a good spring near the Tombs, in Tumai bluff; but unless the water is perfectly smooth the landing is impracticable, and, under any circumstances, it is inconvenient from the want of sufficient depth, except at high tide.

Lieutenant Wm. B. Whiting, of the United States ship Vandalia, in his official report to the commander-in-chief upon his surveying operations at Lew Chew, says:

"I herewith submit three sectional charts and one general chart of Lew Chew, comprising my surveys on that island. The sectional charts are the harbors of Deep bay, of Suco, and Tubootch, and of Shah bay. The whole of the west coast, with the exception of the extreme north and south points of the island, were triangulated; determining with accuracy the positions of all the prominent hills, as also the sinuosities of the shore line, the latitudes and longitudes being determined by upwards of two hundred observations. In constructing the general chart, I was much pleased to find some observations (bearings, ranges, and angles) of the French survey fall in exact coincidence with our own determinations, thus affording most satisfactory corroboration of the accuracy of our work."

DEEP BAY.

Lieutenant Whiting says: "The anchorage at the head of Deep bay is good. Although open to the west and southwest, winds from those quarters rarely blow home; or if they do,

NOTE.—The spar-buoys, above described, were securely moored at the time they were placed in their respective positions; but may be displaced, or entirely removed, by the heave of the sea, and should therefore not be implicitly relied upon.

SILAS BENT, *Lieut. U. S. N.*

never raise a sea, as the latter is broken by the long stretch of coast from Gama Satchi, and by the great depth of the bay.

"The country around the head of the bay is very fertile and populous, Motubu and Naguh being the largest towns. At Oon-sah we found a very good ship and timber yard, where several junks were being built. Here we also found the natives more affable and sociable than on any other part of the coast, the women coming around us to examine our uniforms and surveying instruments. This part of the island (extending to beyond Nacosi) appears to be in a high state of cultivation—rice and sweet potatoes are the principal productions; but on the northern side of the peninsula, north of Deep bay, we saw the most extensive fields of wheat that I have seen in Lew Chew, extending uninterruptedly for several miles. Cotton was observed, also, in many places; but the growth was small, and the yield poor. Peas, beans, radishes, turnips, and sugar-cane we saw growing in considerable quantities, also mustard and ginger. On the Natchijen mountains cinnamon was found growing wild. On these mountains is a fine growth of timber, which furnishes most of the spars for the native junks; Nakazuni cove, on the north side of the peninsula, being the principal depot, whence they are transported to other parts of the island.

"To the east and northeast of Suco island there is excellent anchorage, protected from any wind that can blow, affording free egress to the northward and southward, and where wood, water, and fresh provisions can be easily procured. Although on the harbor chart of Suco the anchorage to the east of that island appears to be open to the south, yet it is well sheltered in that direction by the reef making out from the south point of Suco, and by the south shore of Deep bay, which stretches quite across the southern opening, though at a considerable distance."

OONTING, OR PORT MELVILLE, ISLAND OF GREAT LEW CHEW.

This beautiful harbor is on the N.W. side of Lew Chew, and distant about thirty-five miles from Napha.

Sugar Loaf island, an excellent landmark, lies about twelve miles to the W.N.Westward of the entrance. The island is low and flat, with the exception of a sharp conical peak near its extremity, which rises to a height of several hundred feet.

Passing to the north of Sugar Loaf island, an E.S.Easterly course will bring you to the mouth of the harbor, and to the northward and westward of Kooi island. It is advisable to heave to here, or anchor in twenty or twenty-five fathoms water, until boats or buoys can be placed along the edges of the reefs bordering the channel, for without some such guides it is difficult for a vessel of large draught to find her way in between the reefs, which contract in places to within a cable's length of each other, and are at all times covered with water.

The ranges and courses for the channel are, first, Hele rock, in range with Double-topped mountain, bearing south 37 degrees east. Steer this course, keeping the range on, until Chimney rock bears S.$\frac{1}{4}$E.; then for Chimney rock, until Point Conde bears south 49 degrees east; then for Point Conde, until entering the basin of Oonting, when anchor, giving your ship room to swing clear of the reef making out to the northward of Point Conde, and you will be as snug as if lying in dock with good holding ground, completely land-locked, and sheltered almost entirely from every wind.

Good water is to be had at the village of Oonting.

By order of Commodore M. C. PERRY.

SILAS BENT,

Lieutenant United States Navy.

SHAH BAY.

Lieutenant Whiting says: "Is a beautiful land-locked sheet of water, but the reef in front of its entrance prevents its being accessible to vessels of larger size than the junks which frequent it. When once within the entrance, however, the water deepens to twelve and eight fathoms, the bottom soft mud, and very even.

"When we first put into Shah bay it was evening, and the weather presented a threatening appearance. The next morning it was blowing a gale from the northward and westward, which continued for several days, rendering it impossible for a boat to go outside of Ofookah. In the meantime, we completed the survey of the harbor within, and it was not until the last day of our sojourn there that I was able to examine the entrance, when we discovered, to my great chagrin, that a reef across the mouth effectually prevented all ingress for ships or vessels of large draught.

"On the shore of Shah bay (where marked on the chart) was found iron ore, mineral coal, and sulphur. The coal which I saw here was of very poor quality, and mixed with earth and gravel; good coal, however, might perhaps be found by digging."

The following extracts are from the report of Lieutenant George B. Balch to Commander John Kelly, of the United States ship Plymouth:

"In obedience to your order of August 9, I have to report that I proceeded on the 15th, with the launch and first cutter, to execute the duty assigned me.

"On the evening of the 15th we encamped on the Island of Kudaka, the southeastern island of the chain extending along the east coast of Great Lew Chew.

"The following day we discovered the existence of a bay not previously known; but from the exploration we found that it was of no practical utility, being filled with coral reefs. In fact, a reef commencing five miles from the south point of Great Lew Chew extends, in an unbroken chain, outside all of the small islands as far as the northeast point of Ichey island, with the exception of a narrow channel between the islet off the N.E. end of Kudaka and the Island of Tsking. This reef is of coral formation, the approach to which is bold.

"We continued our survey until the 22d, when we reached the Island of Ichey, which forms the southeastern point of Barrow bay. This bay we then proceeded to survey, and the results prove that it is also useless for all purposes of navigation, being exposed to the east winds and swell from the ocean. Our survey of this bay led to the discovery, however, of a port of refuge on the west side of Ichey, or Hanadi, under either of which a secure anchorage may be found. I have marked with anchors on the chart the most desirable positions. This is the only harbor of refuge on the east coast of Lew Chew.

"Having finished the survey of the east coast and adjacent islands and reefs, we passed round the northeast extremity of Great Lew Chew on the 26th, on our return to the ship, where we arrived on the 29th, after an absence of two weeks, during which we circumnavigated the island."

SAILING DIRECTIONS FOR THE HARBOR OF KEELUNG, ISLAND OF FORMOSA.

BY LIEUT. GEORGE H. PREBLE, OF THE U. S. SHIP MACEDONIAN.

Keelung harbor, or Keelung-taw, head (or promontory) is situated near the northeastern point of the island of Formosa. The entrance may be readily known by the high island of

Keelung, situated three and a half miles to the northeast, and by the high, craggy land to the westward, outlines of which are given on the chart. Image Point, forming the western side of the entrance, is called so from the action of the sea, having worn the soft sandstone of which it is composed, leaving boulders of darker stone on elevated pedestals resembling images. The eastern side is formed by a low, flat, and rocky island, (not easily separated from the high land behind it,) having a few small trees and shrubs on its southern edge.

Making and keeping Keelung island well to the eastward, the entrance may be approached without fear, as the soundings are deep, and free from hidden dangers. When well up with the entrance, a remarkable hill will be seen in the harbor, called on the chart Crag peak; bring it to bear south by west, which course will take you down the center of the channel clear of the coral reefs on both sides. The best anchorage for large vessels is on the eastern side of the entrance, to the southward of some dangerous coral shoals, with the outer points of "junk and boat passage," just open. The holding ground (a stiff mud and sand) is excellent. Anchorage for a single vessel may be had in Merope bay, to the southward of Image Point. Vessels of less than 15 feet draught may find a snug anchorage half a mile nearer the town, to the southward of a coral shoal, which makes out to the eastward of Crag peak. Near this anchorage there is a small but remarkable rock, resembling a gothic ruin, and, therefore, called Ruin rock. The town of Keelung is situated at the head of the harbor, about a mile from this last anchorage, and surrounded by extensive mud flats, bare at low water, and can only be approached by small boats at high tides.

There are several coal mines about a mile east-southeast from the town, situated on the southern banks of the small, shallow stream which branches off in that direction.

A limited supply of fresh water can be obtained near each of the little settlements around the shores of the harbor, but generally of poor quality. Pigs, poultry, and vegetables can be obtained in any quantity required. There is a covered market or bazaar at Sowan Point, near the junk anchorage, and another in tho town of Keelung. There is a good landing place for boats at Sowan Point, and from thence is a good road and causeway to the town.

COAL HARBOR NEAR KEELUNG.

It is so called from its proximity to the coal mines opened by the Chinese on the hill-sides of the southern shore of Quar-see-kow bay. It offers anchorage and shelter for one or two ships only. Should the mines ever be worked by Europeans, the coal (which is of good quality) could be conveyed to Harbor rock by means of a railroad along the west shore of Quar-see-kow bay, at the base of the hills. A short pier from the north side of Harbor rock would enable a ship to lie alongside in three or four fathoms water, and receive or discharge her cargo.

Keelung harbor, latitude 25° 09′ north, longitude 121° 48′ east; variation, 0° 00′. High water full, and change $10^h\ 30^m$. Rise and fall, 3 feet. The soundings are in fathoms.

FROM LEW CHEW TO THE BONIN ISLANDS.

Sailing from Napha during the northeast monsoon, it is better to double round the south end of the island, in order to avoid beating through the Montgomery group, of which there is no reliable survey; but with a southerly wind and pleasant weather a vessel will find it to her advantage to pass round the northern end, where she will feel the influence of the Kuro-Siwo, which she may carry well to the eastward on her course to the Bonins.

ISLANDS OF BORODINO.

These are represented in the old charts as one island, but there are two lying in a N.N.E. and S.S.W. direction from each other, distant about four miles, the southernmost being the largest, and about three miles in extent from east to west. It is low, of coral formation, and covered with vegetation. A reef extends along its southern shore, affording no visible harbor.

Latitude 25° 48′ 30″ N.; longitude 131° 15′ 30″ E.

ROSARIO OR DISAPPOINTMENT ISLAND

Lies about seventy miles W. by N. from Port Lloyd, in latitude 27° 14′ 30″ N., longitude 140° 56′ 45″ E. It is about one mile in length, from east to west, is low, rugged, and apparently unsusceptible of cultivation.

PORT LLOYD.

Officers of the squadron made examination of this harbor sufficient to verify the accuracy of the survey of Captain Beechey, R. N., who gives the following sailing directions:

"*Directions for entering.*—Having ascertained the situation of the port, steer boldly in for the *southern head*, taking care not to bring it to the *northward* of N. 47° E., *true*, or to shut it in with two paps on the N.E. side of the harbor, which will be seen nearly in one with it on this bearing. *In this position they are a safe leading mark.* To the southward of this line there is broken ground.

"If the wind be from the southward, which is generally the case in the summer time, round the south bluff, at the distance of 200 yards, *close to a sunken rock*, which may be distinctly seen in clear weather. Keep fresh way upon the ship, in order that she may shoot on end through the eddy winds, which baffle under the lee of the head;* and to prevent her coming around against the helm, which would be dangerous. The winds will at first break the ship off, but she will presently come up again; *if she does not*, be ready to go about, as you will be close upon the reefs to the northward, and put the helm down *before the south end of the island, off the port to the westward, comes on with the high square rock at the north of the entrance.*

"If she comes up, steer for a high *Castle rock* at the east end of the harbor until a pointed rock on the sandy neck to the eastward of the south headland comes in one, with a high sugar-loaf-shaped grassy hill to the southward of it. After which you may bear away for the anchorage, taking care not to open the sugar-loaf again to the westward of the pointed rock.† The best anchorage, Ten-fathom Hole excepted, which it is necessary to warp into, is at the northern part of the harbor, where the anchor is marked on the admiralty plan.

"In bringing up, take care of *a spit which extends off the south end of the small island*, near Ten-fathom Hole, and not to shoot so far over to the *western* reef as to bring a rock at the *outer foot* of the *South Bluff* in *one* with *some black rocks*, which will be seen near you to the southwestward. The depth of water will be from 18 to 20 fathoms, clay and sand. If the wind be from the northward, beat between the line of the before-mentioned *Sugar-loaf* and *Pointed rock* westward, and a north and south line from the *Castle* rock to the eastward. This rock, on the western side, as well as the bluff to the northward of it, may be *shaved*, if necessary. The hand leads are of very little use in beating in here, as the general depth is 20 or 24 fathoms.

* Keep the top-gallant clew-lines in hand.

† This rock is white on the top with birds' dung, and looks like an island.

"The best watering place is in Ten-fathom Hole. It is necessary to be cautious of the sharks, which are very numerous in this harbor. It is high water, full and change, at 6^h 8^m; springs rise 3 feet. The station on the north side of Ten-fathom Hole is in latitude 27° 5′ 35″ N., longitude 142° 11′ 31″, variation 1° 8′ E."

To which Acting Masters Madigan and Bennett, of the United States ships Saratoga and Susquehanna, append the following remarks, viz:

"The entrance to the harbor of Port Lloyd, on the western side of Peel island, one of the Bonin group, is well defined, so that it can scarcely be mistaken.

"A ship bound in would do well to place a boat on the shoal that makes off south from the eastern point of Square Rock, as it is called on Beechy's harbor chart. This shoal can be easily seen from aloft, however, even when there is no swell on. It extends full two cables length from Square Rock to the southward, and is steep. The centre of the shoal is awash with a smooth sea. The tide rises about three feet, and there is a coral rock about one cable's length north from the northern point of Southern Head, on which were found *eight feet water*. But a ship entering the harbor would not be likely to approach Southern Head so near as to be upon it. This island, as well as those surrounding it, is visited chiefly by whale ships, and its products, therefore, are such as to suit their wants.

"Potatoes, yams, and other vegetables, fruits of various kinds, together with wild hogs and goats, can be procured from the few whites and Sandwich Islanders—thirty-five in all—settled there. Wood is good and plentiful, and water can be had, though in limited quantities, and slightly tainted by the coral rocks from which it springs.

"The anchorage is fair, though open to the south and west. The reconnoissance made by order of the commander-in-chief proved the accuracy of Captain Beechy's chart."

Mr. Bennett, acting master of the Susquehanna, says in his report: "Assuming the position of Napha, in Great Lew Chew island, as established by Beechy, to be correct, I find by the mean of my chronometers that he has placed Ten-fathom Hole, in Port Lloyd, five miles too far to the westward, and consequently the whole group is placed that much to the westward of its true position."

BAILEY, OR COFFIN ISLANDS, BEING THE SOUTHERN PORTION OF THE BONIN GROUP.

A reconnoissance of these islands was made under the direction of Lieutenant Balch, by the officers of the Plymouth.

Lieutenant Balch, in his report, says: With the exception of Newport, on the west side of Hillsborough, (formerly known as Fisher's island,) and a small cove just to the northward of it, there is no place on the shores of any of the islands suitable for a coal depot, nor can Newport or the cove be recommended as places suitable for such a purpose. They are both open from southwest to northwest, and the holding ground is not good, being sand and rocks. Vessels could, however, always get to sea on the approach of a gale, as there are two safe passages, and which are very plain.

Hillsborough (the largest of the group) is seven and a half miles in length, by about one and a quarter in width, the greater part of which is hilly and rocky. Some wild hogs are found upon it; fish abundant; turtles plenty, in season. Also, wood and water can be obtained. From May 1 to December, easterly winds prevail; after that, the westerly winds blow till May with the regularity of a monsoon.

The islands Yourou, Oukin, and Kakaronma, are high, well wooded, and appear to be inhabited. These, as well as all other of the islands laid down on the French "*Carte de L Archipel Lou Tchou, et de la partie sud du Japon*" *of* 1848, that were seen by our squadron, are correctly placed. We believe the chart can be fully relied upon.

Ou-sima is the largest of the chain of islands lying between Lew Chew and Japan. It is about thirty miles long, lying in a northeast and southwest direction, and is high, well cultivated, and from the number of villages seen along the coast, must contain a large population.

Two boats from the Mississippi landed near a village in a bay on the western shore, where there is good anchorage, but which is entirely exposed to the eastward. A few fowls and vegetables were procured from the natives, though the visitors were decidedly unwelcome. Off this bay, about two miles distant from the shore, there are two rocks above water.

The vessels sounded as they ran along the western shore, four or five miles distant, in from 45 to 52 fathoms. The north end of the island is high, and, as it is connected with the main by a narrow, low isthmus, it has the appearance, from some bearings, of being a separate island, and, as such, it is placed upon some of the charts. There are several smaller islands lying immediately off the south end. Latitude, north point, 28° 31′ north; longitude, north point, 129° 41′ east.

This is probably the "Harbor island" of the old charts.

There is a rock, fifteen or twenty feet high, three or four miles to the northward of the North point.*

Kikai-sima,† probably Bungalow island of the old charts, lies to the southward and eastward of the north end of Ou-sima, distant about twelve miles. This is a moderately high island, about seven miles in length, and inhabited. Latitude, center of the island, 28° 20′ north; longitude, center of the island, 129° 57′ 30″ east.

SANDON ROCK.

This is a small rock, about twenty feet in height, resembling a haycock, and lying twelve miles north by east-half-east from the north point of Ou-sima.

Bungalow and Harbor islands, as laid down on some of the charts to the eastward of the north end of Ou-sima and Kikai-sima, we are satisfied do not exist.

ISLAND OF KIKAI,

As laid down on some charts in latitude 29° 36′ north, longitude 130° 25′ east, has no existence in that position. The strong currents which prevail in this vicinity are no doubt the cause of the numerous discrepancies in the positions of islands, &c., given by the different charts.

REDFIELD ROCKS.

This is a dangerous cluster of small, sharp pointed rocks, varying from five to twenty feet in height, and lying about twenty miles southwest from Kozu-sima, in latitude 33° 56′ 13″ north, longitude 138° 48′ 31″ east; and latitude 33° 57′ 31″ north, longitude 138° 49′ 13″ east.

* The ship William Badger reports (1856) the discovery of two rocks, about 8 feet above water, bearing northeast by north from Ou-sima, distant 30 miles.

† Commander Rodgers, in his recent surveying expedition to the North Pacific, reports a dangerous shoal about two miles south by west from the southwest point of this island. The charts of his valuable surveys are now in process of publication.

Kozu-sima, in latitude 34° 13′ 15″ north, longitude 139° 08′ east, (centre,) is the most southwestern of the chain of islands lying off the Gulf of Yedo. It is three and a half miles in length from northeast to southwest, and may be recognized by a remarkable white cliff on its western side, and a white patch on its summit, to the northward of the cliff. It has an elevation of 2,000 feet.

About two miles to the westward of the southwest point of Kozu-sima are the "Brood rocks," which should be given a safe berth, as their jagged appearance would lead to the belief that there may be hidden dangers in their immediate neighborhood.

Sikini-sima is a low island, with a small islet off its north point. It is one and a half miles in length, and lies five miles N.N.E. of Kozu-sima. One of the vessels of the squadron passed between these islands and could discover no dangers. It is, therefore, thought to be safe.

Nee-sima is about one and a half miles to the northward and eastward of Sikini, and, from its broken outline, appears from a distance as several islands. It is five miles in extent from north to south, with an altitude at its highest point of 1,468 feet.*

Utoma is a small island about two and a half miles N. ½ E. of Nee-sima; is cone-shaped, and has detached rocks lying near its shores. Its elevation is 660 feet.

To-sima is a couple of miles N. ½ W. from Utoma. It is one mile in diameter; pyrimidal-shaped, with an elevation at its apex of 1,730 feet.

Oho-sima is ten miles N.N.Eastward of To-sima. Its southeastern point is in latitude 34° 39′ 30″ N., longitude 139° 28′ E. North point, latitude 34° 47′ 30″ N., longitude 139° 24′ E. This is the largest and most northern island of the chain. It has an active volcano near its summit, which rises to an altitude of 2,530 feet. The sloping sides of the mountain are extensively cultivated, and dotted with towns and villages. The vapor which sometimes ascends from the volcano, or hangs in a dense mass over the mountain, makes the island a capital landmark for vessels approaching this part of the coast of Japan. The passage between this island and To-sima was repeatedly used by the squadron, and is believed to be entirely free from hidden dangers.

The current sets strongly to the northward and eastward through these various passages, and is, of course, disturbed in its regularity by the obstruction of the islands. This, therefore, should be always borne in mind, particularly in bad weather.

None of the passages between the above named islands were traversed by the squadron, except those two particularly mentioned, and we cannot, therefore, venture to offer any comments upon them.

Meac-sima and *Mecoura* are two islands lying to the southward and eastward of the above chain, affording a safe passage of some fifteen miles in width between them and Kozu-sima, through which the squadron passed in returning from the first visit to the bay of Yedo. Both of the islands are high and bold. Meac-sima is in latitude 34° 06′ N., longitude 139° 29′ E., and Mecoura is in latitude 33° 54′ N., longitude 139° 35′ E. There is a cluster of rocks about two and a half miles to the southward and westward of Meac-sima. Broughton says, "there are, in addition, some black rocks two or three miles from the eastern point of the island;" but the squadron was not at any time in a position to observe them.

BROUGHTON ROCK

Lies about seventeen miles to the southward and westward from Macoura, in latitude 33° 42′ N.,

* There is also a small low island a short distance to the southward and eastward of Nee-sima.

longitude 139° 17′ E. It is an isolated rock, about fifty feet in height, flat topped, and with vertical sides, except from one view, which presents a broken outline or step.

Todos los Santos.—The Lexington passed over the position of this island as laid down on Blunt's chart of 1851, in latitude 30° 51′, longitude 139° 15′, and saw no indications of land.

The Macedonian made an ineffectual search for an island placed on the charts in latitude 30° N., longitude 141° 30′ E., and we feel assured it has no existence near that position.

Ponafidin or St. Peter's island was seen by one of the vessels of the squadron, and is believed to be correctly placed on our chart, in latitude 30° 33′ N., longitude 140° 15′ E.

Lot's Wife, in latitude 29° 47′ N., longitude 140° 22′ 30″ E., is a tall pinnacled rock, rising to an elevation of about 250 feet above the sea, and it may be seen at a distance of twenty-five miles, and bears a remarkable resemblance to a ship under full sail. A cast of the lead within eight miles of this rock gave no soundings with 160 fathoms of line.

In the vicinity of all these islands, as well as in the open sea, and in fact throughout the path of the Kuro-Siwo, from the south end of Formosa to Behring's Straits, constant heavy tide rips will be encountered, which, in light weather, frequently renders a vessel for a time unmanageable.

SAILING DIRECTIONS FOR THE HARBOR OF SIMODA.

BY LIEUT. WILLIAM L. MAURY, U. S. N.

Vessels bound to the harbor of Simoda from the southward and westward should make Cape Idzu,* from which Rock island bears E.S.E. ¼ E., distant about five miles; and if the weather is at all clear, the chain of islands off the Gulf of Yedo will at the same time be plainly visible.

Between Rock island and the main land there are a number of rocks awash, and above water, among which the Japanese junks freely pass; but a ship should not attempt a passage inside of Rock island, unless in case of urgent necessity, particularly as the northeasterly current, which sweeps along this coast, seems to be at this point capricious, both in direction and velocity.

Giving Rock island a berth of a mile, the harbor of Simoda will be in full view, bearing N. ½ W., distant five miles.

Vandalia bluff, on the east side of the entrance, may be recognized by a grove of pine trees on the summit of the bluff, and the village of Susaki, which lies about one-third of the way between it and Cape Diamond. Cape Diamond is a rocky islet lying immediately off the point making out to the eastward of the entrance of the harbor.

Standing in from Rock island you will probably pass through a number of tide rips, but not get soundings with the hand lead until near the entrance of the harbor, when you will be in from 14 to 27 fathoms.

Should the wind be from the northward, and fresh, a vessel should anchor at the mouth of the harbor until it lulls or shifts, or until she can conveniently warp in, as it is usually flawey, and always baffling.

Approaching from the northward, a vessel can pass on either side of Oho-sima, from the centre of which Cape Diamond bears W. by S., distant about seventeen miles.

Between Oho-sima and Simoda no dangers are known to exist; but the northeasterly current must be borne constantly in mind, particularly at night and in thick weather. Its general

*Cape Idzu may be recognized by a conspicuous white cliff a short distance to the northward and westward of it, and the conical rocky peak a few miles further to the northward and westward, forming the southwestern extreme of the peninsula. To the F.S.Eastward of the cape, distant half a mile, there is a rock about 20 feet above water, and off Point Nacane lies a similar rock one-third of a mile distant.

strength is from two to three miles per hour; but as this, as well as its direction, is much influenced by the local winds, headlands, islands, &c., neither can be relied upon.

Should Oho-sima be obscured by thick weather before reaching Cape Diamond, endeavor to sight Rock island, for there are no very conspicuous objects on the main land by which a stranger can recognize the harbor at a distance, and the shore appears as one unbroken line.

To the westward of the harbor there are several sand beaches, and three or four sand banks. These can be plainly discerned when within six or eight miles, and are very good land-marks.

A vessel from the southward and eastward should pass to the westward of the island of Kozu-sima,* which may be known by a remarkable snow-white cliff on its western side. There is also a white patch on its summit to the northward of the cliff. From this island the harbor bears N. by W. $\frac{3}{4}$ W., distant about 26 miles.

Approaching from the eastward, the harbor will not open until you get well inside of Cape Diamond.

To the northward of Cape Diamond is the bay of Sirahama, which is quite deep, and, as it has several sand beaches, it may be mistaken for Simoda; but as you approach this bay, Cape Diamond will shut in the Ukona rocks and Rock island to the southward, while in the Simoda roads they are visible from all points.

There are but two hidden dangers in the harbor; the first is the

SOUTHAMPTON ROCK,

Which lies in mid-channel, bearing N. $\frac{1}{2}$ W. from Vandalia bluff, about three-fourths of the way between it and Centre island. This rock is about 25 feet in diameter, and has two fathoms water upon it. It is marked by a white spar-buoy.

The second is the

SUPPLY ROCK,

Bearing S. by W., a short distance from Buisako islet; and is a sharp rock, with 11 feet water upon it. Its position is designated by a red spar-buoy.

Both of these buoys are securely moored; and the authorities of Simoda have promised to replace them should they, by any cause, be removed.

Centre island, which receives its name from being the point from which the treaty limits are measured, is high, conical, and covered with trees. A cave passes entirely through it.

In the outer roads, or mouth of the harbor, a disagreeable smell is sometimes experienced. But inside of the Southampton rock and Centre island vessels are well sheltered, and the water comparatively smooth. Moor with an open hawse to the southward and westward.

There are good landings for boats in Simoda creek, and at the village of Kakisaki.

A harbor-master and three pilots have been appointed. Wood, water, fish, fowls, and eggs, also sweet potatoes and other vegetables, may be procured from the authorities. It is necessary to supply them with casks to bring the water off.

Latitude of Centre island	34° 39′ 49″ N.
Longitude "	138° 57′ 30″ E.
Variation †	2° 55′ westerly.
High water F and C	V. hr.
Extreme rise of tide	5 feet 7 inches.
Mean "	3 feet.

* This is the most southwestern island of the chain of islands lying off the Gulf of Yedo.

† The variation given on the chart of Simoda is incorrect.

To make the foregoing directions more easily comprehended, they have been rendered as concise as possible; but to furnish further information to navigators bound to or passing the port, the additional remarks are appended.

The harbor of Simoda is near the southeastern extremity of the peninsula of Idzu, which terminates at the cape of that name. To the northward of the harbor a high ridge intersects the peninsula; and south of this, all the way to the cape, it is broken by innumerable peaks of less elevation.

The harbor bears S.W. by W. from Cape Sagami, at the entrance of Yedo bay, distant about forty-five miles.

Rock island is about 120 feet high and a third of a mile in length, with precipitous shores and uneven outlines. It has a thick matting of grass, weeds, moss, &c., on the top.

From the summit of this island overfalls were seen, bearing N. ½ W., distant a mile or a mile and a half. These may have been caused by a rock or reef. An attempt was made to find it, but the strong current and fresh wind prevented a satisfactory examination. The Japanese fishermen, however, deny the existence of any such danger.

N. by W. from Rock island, distant two miles, are the Ukona rocks. These are two rocks, though they generally appear as one. The largest is about 70 feet high. Between these and rock island the current was found setting E. N. easterly, fully four miles an hour.

Centre island bears from rock island N. ½ E., distant 5½ miles, and from Ukona rocks, N. by E. ½ E., distant 3½ miles.

Buisako islet lies N.N.E. from Centre island. It is about 40 feet high, and covered with trees and shrubs.

Should the buoy on Southampton rock be removed, the east end of Centre island on with the west end of Buisako, will clear the rock to the westward.

Off the village of Susaki, and distant one-third of a mile from the shore, is a ledge of rocks upon which the surf is always breaking; give them a berth of two cables in passing.

Cape Idzu, latitude, 34° 36′ 00″ N., longitude, 138° 50′ 35″ E. Rock island, latitude, 34° 34′ 20″ N., longitude, 138° 57′ 10″ E.

S. W. from Koza-Sima, distant about 20 miles, and south a little westerly from Cape Idzu, distant about 40 miles, there are two patches of dangerous rocks, 15 or 20 feet high, which have been named Redfield rocks. They are in latitude 33° 56′ 13″ N., longitude 138° 48′ 31″ E., and latitude 33° 57′ 31″ N., longitude 138° 49′ 13″ E.

These positions may not be strictly correct, but it is believed they are not much out of the way.

By order of Commodore M. C. PERRY, *U. S. N.*

SILAS BENT, *Flag Lieutenant.*

REGULATIONS RESPECTING PILOTS, AND THE SUPPLYING AMERICAN VESSELS ENTERING THE PORT OF SIMODA.

A lookout place shall be established at some convenient point, from which vessels appearing in the offing can be seen and reported; and when one is discovered, making apparently for the harbor, a boat shall be sent to her with a pilot.

And, in order to carry this regulation into full effect, boats of suitable size and quality shall

always be kept in readiness by the harbor-master, which, if necessary, shall proceed beyond Rock island to ascertain whether the vessel in sight intends entering the harbor or not. If it may be the desire of the master of said vessel to enter port, the pilot shall conduct her to safe anchorage, and during her stay shall render every assistance in his power in facilitating the procurement of all the supplies she may require.

The rates of pilotage shall be, for vessels drawing over 18 American feet, fifteen dollars; for all vessels drawing over 13 and less than 18 feet, ten dollars; and for all vessels under 13 feet, five dollars.

These rates shall be paid in gold or silver coin, or its equivalent in goods, and the same shall be paid for piloting a vessel out as well as into port.

When vessels anchor in the outer harbor and do not enter the inner port, only half the above rates of compensation shall be paid to the pilot.

The prices for supplying water to American vessels at Simoda shall be fourteen hundred cash per boat load (the casks being furnished by the vessel;) and for wood delivered on board, about seven thousand two hundred cash per cube of five American feet.

KURA-KAWA-KAHEI, *Lieutenant Governor.*
SILAS BENT, *Flag Lieutenant.*

SAILING DIRECTIONS FOR YEDO.

BY LIEUT. WM. L. MAURY, U. S. N.

Vessels from the southward, bound to this bay, should pass up to the westward of the chain of islands lying off the Gulf of Yedo, and are cautioned against mistaking the deep bight of Kawatsu or Wodawara bay for the entrance of Uraga channel, for on the northeast side of this bay there is a ledge of rocks several miles from the shore, bearing from Point Sakoura about N.W. by W., distant five miles, upon which one of the vessels of our squadron grounded. A stranger, without a correct chart, would naturally make this mistake, as the opening of the channel is not seen at a distance from this quarter, the shore appearing as an unbroken line.

The entrance to the channel bears from the centre of Oho-sima, N.E. by N. ½ N., distant about twenty-five miles. Stand in upon this line, and the Saddle-Hill to the northward of Cape Sagami will be readily recognized, as well as the round black knob on the eastern side of the channel. On approaching Uraga, the Plymouth rocks will be plainly seen; give these a berth of half a mile to clear the Ingersoll patch, a sunken rock with but one fathom on it, and which is the only known danger in the channel.

Between Plymouth rocks and Cape Kami Saki the ground is clear and the anchorage good, if care be taken to get pretty well in, so as to avoid the strong tides which sweep round the latter with great rapidity. A spit makes out a short distance to the southward of Kama Saki, but to the northward of the cape the shore is bold and the water very deep.

On rounding Cape Kami Saki, if bound to the city of Yedo, steer N.W. ½ N. until Perry island bears south, when Webster island will bear west. This will clear Saratoga spit, which makes well out from the eastern shore. Then haul up N. by E. and run on this course until Treaty Point bears S.W. by W., which keep on this bearing by steering N.E. by E. until the beacon bears N.W., when there will be found good anchorage in 15 fathoms water.

At this point our survey terminated; the boats, however, found a clear channel with plenty of water for the largest vessels several miles further to the northward, and within a few miles of the city.

If bound to the American anchorage: from Cape Kami Saki steer N.W., and anchor in 8 or 10 fathoms water, with Perry island bearing S.S.E., and Webster island S.W. by S.

In Powhatan bay there is also good anchorage in 6 and 7 fathoms. Near this anchorage there are two snug coves, very accessible, in which vessels may conveniently repair and refit.

Susquehanna bay, three miles W.N.W. from Cape Kami Saki, is well sheltered, but it contains a number of reefs and rocks, and is, therefore, not recommended as an anchorage.

Mississippi bay is four miles north of the American anchorage; it is well sheltered from the prevailing winds. Upon anchoring it is necessary to give the shore a good berth, to avoid a shoal which extends out from a half to three-quarters of a mile. The conspicuous headland or yellow bluff on the north side of this bay is called Treaty Point; a shoal surrounds the point from two-thirds of a mile to a mile distant.

Between the American anchorage and Treaty Point, the soundings are irregular, shoaling suddenly from 12 to 5 fathoms on banks of hard sand.

To the northward of Treaty Point and N.N.W. from Cape Kami Saki, distant 14 miles, is Yokuhama bay. To reach this anchorage, bring the wooded bluff, which terminates the high land on the north side of the bay, to bear N. by W. $\frac{1}{2}$ W., and steer for it until Treaty Point bears S.W. by S.; this clears the spit off the point; then haul up about N.W. by N. for the bluff over the town of Kanagawa, and anchor in $5\frac{1}{2}$ or 6 fathoms, with the Haycock just open to the eastward of Mandarin Bluff. Mandarin is the steep bluff a mile to the northward of Treaty Point.

A flat extends out from the northern shore of this bay, between Kanagawa and Beacon Point, from one to two miles; off Mandarin Bluff there is also a shoal, extending a mile to the northward.

The Bay of Yedo is about 12 miles wide, and 30 deep, with excellent holding ground, and capable of sheltering the fleets of the world.

Our survey embraced the western shore only, from Cape Kami Saki to Beacon Point. We had no opportunity of examining the eastern side. The soundings from Treaty Point, across in an E.S.E. direction, are regular, and 3 fathoms were found about a mile and a half from the opposite shore.

Of Uraga channel, a reconnoissance was made of the western shore only.

During our stay in the bay, from the 17th of February to the 18th of April, the weather was generally fine, being occasionally interrupted by strong winds and heavy rain. The gales came up suddenly from the southward and westward, with a low barometer, and continued for a short time, when the wind hauled round to the northward and westward, and moderated. We had no easterly blows; in fact the wind was rarely from that quarter, except when hauling round from the northward, (as it invariably did,) by east to the southward and westward.

The tide is quite strong out in the bay; and off the tail of Saratoga spit, Perry island, and Cape Kami Saki its velocity is much increased, but at the anchorage in the Bay of Yokuhama it is scarcely felt. At Yokuhama the Japanese authorities supplied us with wood and water, and a few vegetables, fowls, eggs, oysters, and clams.

Latitude of Cape Sagami, 35° 06′ 30″ N., longitude, 139° 42′ 45″ E. Latitude of Webster island, 35° 18′ 30″ N., longitude, 139° 40′ 34″ E. Latitude of Treaty Building, north end of

Yokuhama, 35° 27′ 15″ N., longitude, 139° 40′ 23″ E. Variation, 2° 44′ westerly.* High-water, F and C, VI. Rise and fall at Yokuhama, 6 feet.

By order of Commodore M. C. PERRY.

SILAS BENT, *Flag Lieutenant.*

FROM THE GULF OF YEDO TO CAPE SIRIJA-SAKI, AT THE EASTERN ENTRANCE OF THE STRAITS OF SANGAR.

A vessel may pass within a few miles of Capes Susaki and Sirofama, after which she will experience the full force of the Kuro-Siwo, setting her on her course to the east-northeastward.

In doubling Cape Blanco, which is a bold, chalky bluff, caution is enjoined, as the squadron passed over the outer edge of a reef in 22 fathoms water S.S.E. from this cape, distant about five miles, and from the heavy overfalls, in which fishing boats were anchored, it is quite certain that there is much less water upon it in the shoalest part, but as it was near nightfall, it was impossible to examine it.

We place this reef in latitude 55° 08′ north, longitude 140° 34′ east; and Cape Blanco in latitude 35° 13′ north, longitude 140° 32′ 30″ east.†

From this point to the Straits of Sangar we encountered no dangers, nor did we approach the coast sufficiently near to test the accuracy of the charts until arriving off Cape Sirija-Saki, the northeast point of Nippon. This point is in latitude 41° 26′ north, longitude 141° 30′ east.

From the northward and eastward, at a distance of six or eight miles, the outline of this cape resembles the back of a sperm whale, with its head to the southward, the Dodo rocks, off the point of the cape, forming the flukes. On nearing the entrance of the Straits of Sangar, the water thermometer suddenly falls fifteen or twenty degrees as you run from the Kuro-Siwo into the cold current setting through the straits. From Cape Sirija-Saki, a northwest by west course (made good) will carry you to the promontory, or Point Ohobana, the southern extremity of the peninsula of Hakodadi.

Cape Esarme, in latitude 41° 50′ 30″ north, longitude 141° 13′ east, is the northern point of the eastern entrance of the straits. It is a bold promontory, with several remarkable dome-shaped mountains in the rear.

The eastern portion of the straits is believed to be clear of hidden dangers, and, in case of necessity, a vessel may, no doubt, find anchorage near the shore.

A strong current was found setting out to the southward and eastward, but what effect the tide may have upon it we had no opportunity of determining.

SAILING DIRECTIONS FOR THE PORT OF HAKODADI.

BY LIEUTENANT WILLIAM L. MAURY.

This spacious and beautiful bay, which for accessibility and safety is one of the finest in the world, lies on the north side of the Straits of Sangar, which separate the Japanese islands of Nippon and Yesso, and about midway between Cape Sirija-Saki‡ (the northeast point of Nippon)

* The variation, as published in the charts of Yedo Bay and the Gulf of Yedo, are incorrect.

† These positions are doubtful, as the unfavorable weather prevented observations near them. They are probably six or eight miles too far to the eastward.

‡ Saki, in the Japanese language, means cape; consequently it should more properly be called Cape Sirija; but to prevent mistakes, it has been thought advisable to adopt the Japanese names.

and the city of Matsmai. It bears from the cape northwest by west, distant about forty miles, and is four miles wide at the entrance, and five miles deep.

The harbor is the southeastern arm of the bay, and is completely sheltered, with regular soundings, and excellent holding ground. It is formed by a bold, peaked promontory, standing well out from the high land of the main, with which it is connected by a low, sandy isthmus, and appearing at a distance as an island may be readily recognized.

The town is situated on the northeast slope of the promontory, facing the harbor, and contains about 6,000 inhabitants.

Approaching from the eastward, after passing Cape Siwo-kubi, named on our chart Cape Blunt, which is a conspicuous headland eleven miles E. S. E ½ E. from the town, the junks at anchor in the harbor will be visible over the low isthmus.

For entering the harbor.—Rounding the promontory of Hakodadi, and giving it a berth of a mile, to avoid the calms under the high land, steer for the sharp peak of Komaga-daki, bearing about north until the east peak of the Saddle, bearing about northeast by north, opens well to the westward of the round knob on the side of the mountain, then haul up to the northward and eastward, keeping them well open, until the centre of the *sand hills* on the isthmus, bears southeast by east ¾ east, (these may be recognized by the dark knolls upon them;) this will clear a spit which makes out from the northwestern point of the town in a north-northwesterly direction two-thirds of a mile; then bring the *sand hills* a point on the port bow, and stand in until the northwestern point of the town bears southwest ½ west, when you will have the best berth, with 5½ or 6 fathoms water. If it is desirable to get nearer in, haul up a little to the eastward of south for the low, rocky peak, which will be just visible over the sloping ridge to the southward and eastward of the town. A vessel of moderate draught may approach within a quarter of a mile of Tsuki point, where there is a building yard for junks. This portion of the harbor, however, is generally crowded with vessels of this description, and unless the want of repairs, or some other cause renders a close berth necessary, it is better to remain outside.

If the Peak or Saddle is obscured by clouds or fog, after doubling the promontory, steer N.N.E. until the *sand hills* are brought upon the bearing above given, when proceed as there directed.

A short distance from the tail of the spit is a detached sand bank with 3½ fathoms on it. The outer edge of this is marked by a white spar buoy. Between this and the spit there is a narrow channel with 4½ fathoms water. Vessels may pass on either side of the buoy, but it is most prudent to go to the northward of it.

Should the wind fail before reaching the harbor, there is good anchorage in the outer roads, in from 25 to 10 fathoms.

Excellent wood and water may be procured from the authorities of the town; or, if preferred, water can be easily obtained from Kamida creek, which enters the harbor to the northward and eastward of the town.

The season, at the time of our visit, was unfavorable for procuring supplies; a few sweet and Irish potatoes, eggs, and fowls, however, were obtained, and these articles, at a more favorable period of the year, will no doubt be furnished in sufficient quantities to supply any vessels that may in future visit the port.

Our seine supplied us with fine salmon and a quantity of other fish, and the shores of the bay abound with excellent shell-fish.

During our stay in this harbor, from the 17th of May to the 3d of June, the weather was

generally pleasant until the 1st of June, when the fog set in. It was usually calm in the morning, but towards the middle of the day a brisk breeze from the S.W. sprung up.

Latitude mouth of Kamida creek, 41° 49′ 00″ N.; longitude mouth of Kamida creek 140° 47′ 45″ E.; variation, 4° 30′ W.; high water, F. and C., 5 hours; extreme rise and fall of tide, 3 feet.

By order of Commodore M. C. PERRY.

SILAS BENT, *Flag Lieutenant.*

The Southampton visited Volcano bay and Endermo harbor, and verified the accuracy of Captain Broughton's survey. She placed Cape Ietomo, at the entrance of the harbor, in latitude 42° 21′ N., longitude 140° 56′ 30″ E. The following sailing directions are quoted from Broughton's voyages, pp. 102, 104.

Volcano bay is to the west of Cape Eroen. It was visited and named by Broughton in September, 1796. He thus speaks of it: "I have seen few lands that bear a finer aspect than the northern side of Volcano bay. It presents an agreeable diversity of rising grounds, and a most pleasing variety of deciduous trees, shedding at this time their summer foliage.

"The entrance into this extensive bay is formed by the land marking the harbor, which the natives call Endermo, and the south point, which they call *Esarmi*. They bear from each other N. 17° W., and S. 17° E., 11 leagues. There are no less than three volcanoes in the bay, which induced me to call it by that name. There are 50 fathoms of water in the centre, and the soundings decrease on the approach to either shore. During our stay at the period of the equinoxes we experienced generally very fine weather, with gentle land and sea winds from the N.E. and S.E., and no swell to prevent a ship riding in safety, even in the bay, and the harbor of Endermo is perfectly sheltered from all bad weather.

"Endermo harbor, as before said, affords good shelter from all winds, bringing the bluff on the extreme part of the isthmus, which forms the starboard point in coming in, to bear N.W. In this situation we found 4 or 5 fathoms, and the larboard entry point on the north shore was on with the bluff. In running for the harbor, the island must be kept open with the starboard entry point till within half a mile of a small islet, (which is only so at half tide,) and then you must steer in to the S.W., when the water will be shoaled, and any berth taken you may prefer. The soundings gradually decrease from 10 to 2 fathoms, soft bottom. A few houses were scattered on the south side of the harbor, and towards the head the shores are low and flat, so much so as to prevent boats landing within one hundred yards. In all other parts wood and water are procured with the utmost convenience. The small island was named *Hans Olason Island*, from one of Broughton's seamen, who was buried there. The harbor is formed by the apparent island, which is an extensive peninsula, of a circular figure. Latitude of the entrance 42° 19′ 29″ N., longitude 141° 07′ 36″ E. High water, full and change, 5^h 30^m; rise and fall, 6 feet."

The Japanese islands are exceedingly broken and mountainous, with numerous peaks rising to a considerable height. Mount Fuzi, or Fuzi-yama, is the highest; it lies in latitude 35° 21′ 30″ N., and longitude 138° 45′ 45″ E., and attains an elevation of about 12,500 feet. In clear weather it can be seen at a great distance, and is an excellent landmark for vessels approaching the Gulf of Yedo.

The positions given above of islands, rocks, &c., are not pretended to be strictly correct, as the surveying operations were secondary and subordinate to the great object of the Expedition, but it is believed they are sufficiently so for all practical purposes.

WINDS AND WEATHER.

The southwest monsoon sweeps over the Lew Chew group, and reaches the southern shores of Japan and the Bonin Islands.

At Napha, Lew Chew, we found it prevailing steadily in May and June, and veering to the southward and eastward in July. In August, the wind was very changeable, and blew at times quite strong, with squally, rainy weather.

The northeast monsoon set in about the 1st of September, and continued until the departure of the squadron, on the 7th of February, being, however, interrupted during the winter months by fresh gales from the northward and westward, which were generally accompanied with heavy rain.

At the Bonin Islands, in April, the wind was variable; in June it was from the southward and westward; and in October, from the northward and eastward. The passage from Lew Chew to these islands, in October, was found to be exceedingly boisterous by the United States ship Plymouth.

On the coast of Japan, northerly winds were most prevalent in February, March, and April, and during this period we had occasionally strong gales, which most frequently commence at southwest, hauling to the northward and westward, and were accompanied with heavy rain. In May and July we had southwesterly winds, and in June they were variable.

During our stay in Japan, from February to June, the weather was generally pleasant. In the Bay of Yedo, the mean temperature for February was 44° Fahrenheit, and the apricot and camelia japonica were in full bloom.

Typhoons.—The whole region from Formosa to the Bonins is within the track of these storms; though we believe they seldom reach the coast of Japan. The season during which they may be expected is from May to November, inclusive; but in the neighborhood of the Bonins they seem to occur more frequently in October. (For further information on this subject, see the able article of the late Wm. C. Redfield, contained in this volume.)

Fogs.—We had but few fogs on the coast of Japan. They commenced at Hakodadi about the 1st of June, but did not extend as far south as Simoda.

CURRENTS.

The general drift of the current from Formosa to Japan, and along the eastern coast of the latter, is to the northward and eastward. From the south point of Formosa to the Straits of Sangar, we found its average strength to be 35 or 40 miles per day; it is, however, very much influenced, both in direction and velocity, by local causes. (See in this volume the article upon the Kuro-siwo, or Japanese stream, by Lieutenant S. Bent, United States Navy.)

WM. L. MAURY, *Lieutenant United States Navy.*
SILAS BENT, *Lieutenant United States Navy.*

APPENDIX.

JOURNAL

OF

THE SECOND VISIT OF COMMODORE PERRY TO JAPAN.

BY A NATIVE OF CHINA.

Among those who embarked in China on board the squadron, when it left for Japan the second time, was a very intelligent and educated Chinaman, who acted as clerk to our interpreter, Mr. Williams. This observant individual, on his return to China, furnished to the "Overland Register," published at Hong Kong, a copy of the journal he had kept on his visit to Japan, in which paper it appeared in an English translation.

As it is a specimen of the intelligence of an educated Chinaman, and as, besides, it presents briefly the views of an Oriental, uninfluenced by the prevalent opinions of our countrymen around him, (for difference of language prevented much interchange of thought,) it has been supposed that it would not be without interest to the American reader, and a place has, therefore, been reserved for it in the appendix to this volume.

From the "Overland Register and Price Current" of Hong Kong, September 11, 1854.

"*Journal of a visit to Japan.*—Under this heading, in the body of the paper, will be found a very interesting paper. It is a literal translation of a journal kept by a Chinese gentleman who was attached to the United States squadron on its second visit to Japan. The letter addressed to the journalist by *Ping-saw-heem-ark-lang* is especially worthy of attention."

"JOURNAL OF A VISIT TO JAPAN.

"Of late years, the intercourse between China and the State of California, in America, has greatly increased in extent and frequency. In consequence, the government of the United States was anxious that steam vessels should run between the two countries, and it became necessary to have an arrangement by which they could purchase coal at the Japanese islands, which lie between America and Asia. To obtain this, several steamers belonging to the United States visited Japan, in the third month of last year, (April or May,) and it was attempted to negotiate a treaty of peace and commerce, but the Japanese could not at once conclude the matter. An agreement was deferred for some time; and on the 10th of January, 1854, according to foreign computation of time, Mr. ———— asked me if I would go to Japan to assist in the preparation of the contemplated treaty. After some deliberation I consented, and on the 13th we spread our sails—got up our steam rather—and began our voyage. Next day, having prayed and sought for help and teaching, as I stood upon the steamer's deck, I looked up, and was struck by the appearance of clouds in the south and northern quarters of the heavens. In

the south they assumed the form of a winged lion, springing up to the zenith, while those in the north were low and broken, like a slaughtered army. A few cloudlets seemed to have floated away from them towards the south, till they were arrested by the lion's breath, whose figure, moreover, continued to dilate, while the clouds in the north gradually disappeared altogether. After looking at these appearances, I said to my friend, 'The heavens prognosticate that our expedition will finally be successful, but difficulties will have to be overcome in the first place.' 'Your words,' said he, 'are strange; let us wait for the event.'

"After three days our vessel steamed right towards the northeast; we passed Formosa, and for some days saw no land. At the same time the wind blew very strong from the north. The steamer was tossed about as if it had been a fan, while all around it there were gulls darting and flying about. In this way we went along for seven days, when we came in sight of land, which was declared to be Lew-k'ew.

"Lew-k'ew, or, as Europeans and Americans call it, Loo Choo, is a small island, about 100 leagues long, and 30 or 40 leagues broad. Its chief town lies in latitude 26° 14′ N., longitude 127° 52′ E.

"From the time of the Ming dynasty, its chief has received investiture from our emperor, having the title of a king. It is a poor territory, yielding only sweet potatoes, some vegetables, a black kind of sugar, vegetable oil, and a few other things. The people bind up their hair in a knot, and wear very large sleeves to their coats. Their shoes are made of grass. The men wear two long pins through their top-knots, and the women one. This is the only distinction between them in their dress, so that when they are young it is not easy to know them from one another, but as they grow up the beard, which is not shaven, sufficiently characterizes the males. One is surprised to see the middle-aged men walking about the streets all with long beards.

"On the first day of our new year, (January 29,) I went on shore for a ramble, and finding a lot of boys on the street, gave them a few cash, which greatly delighted them. The people were very humble. Outside the doors of some of the houses congratulatory sentences were posted up, as in China at the new year, but there was no excitement and no other sign of rejoicing. At Napa I found a temple, and in the garden attached to it the burying place of the families of distinction. The surnames and names of the dead, and the time when they lived, were engraven on tombstones. Every day the priests, I was told, swept them clean, and placed before them flowers and leaves of trees. The tombs of the common people are like those which obtained in China during the time of the Ming dynasty.

"The heights all around were covered with trees. The people I found living in grass huts, put up with enclosures formed of rough stones. Their dwellings had no furniture. For stools and chairs, they use grass mats, on which they *hunker* on their knees and toes, having a pan of fire before them, at which they light their pipes. A few of them can speak and read Chinese. They have no shops, but a market ground, where the business of exchanging commodities is conducted by the women. Thus they do not use money, and care little for the coins of other countries. The common people stand in great awe of their rulers. They are very plain in their diet, and seldom impose on one another. The doors of their houses are merely thin boards, and for windows they use paper, but they pass the nights without fear of thieves; and I have seen, when a man dropped anything on the way, another pick it up and restore it to him. In their public courts there is almost nothing to do—no quarrels to decide, no litigations to settle. Their manners resemble those of the golden age in high antiquity. Whenever we strangers

wanted to buy anything, it was necessary for us to inform the magistrates, who thereupon managed the business.

"On the 3d of February, Commodore Perry and many officers of the Expedition appeared in full dress and display, and proceeded in chairs to the palace of the king, I also accompanying them. The prime-minister, Shang-hwang-heun, presided at an entertainment which was given to us, and we were received by the treasurer, Ma-leang-tsae. A grand feast was set out, the articles being the same as we use in China, and at the conclusion, the various officers made presents to their guests of fans, tobacco-pouches, silk, and other things. They were not of much value, but this being the way in which their king expresses his respect for foreign nations, the American officers gave them presents in return. The king himself we did not see, but were told that he was young, and would be frightened at us. The palace is on the top of a hill named *Sew-le*, about three leagues from the shore. On both sides of the way to it were large trees, and it was adorned with many commemorative arches. The building itself is large and beautiful, with great quantities of the phœnix-tail grass, and many of the *melia asedarach* and other trees growing about it, and affording a pleasant shade. On the hill-sides and in the fields we saw grain growing, and on the shore there were several salt pans. At this time the moon was advancing to the full, and beneath her light I enjoyed the pleasant scenery.

"Two days after we resumed our voyage, and proceeded towards Japan. For four days we were out of sight of land, and on one occasion I saw a whale more than forty feet long spouting out a jet of water from its head and then disappearing. By-and-by we passed some uninhabited islands, and in two days more the steamers and sailing vessels, amounting in all to nine, cast anchor near to Hwang-pin, called by the Japanese themselves Yoku-hama. The season being spring and the air clear, I saw at a distance, as I judged, of a hundred *le.* inland from Yoku-hama a lofty mountain, rising up seven or eight *le.*, its summits covered with snow. From the highest peak lesser though still lofty elevations succeeded to one another, as if in a chain, and reach as far as Keanghoo or Yedo, the capital of the country. When the emperor heard of the arrival of the Expedition, he sent commissioners to negotiate with the visitors, the chief commissioner being of the surname of Lin. I do not give the names of the others, because I really never could distinguish on their cards what was surname and name, what was office and what was place.

"On both sides, this being the commencement of intercourse between their respective countries, there seemed at first to be some suspicions. I observed a fleet of more than a hundred Japanese vessels, all with cloth sails, drawn up some distance off, near the shore, and on the land was a camp full of soldiers and their accoutrements, all in preparation for any hostilities which might arise. Next day two or three government boats came off to see the steamers, carrying at their stern a blue and white flag, with the words 'Imperial Service' on it. The American officers received the parties very courteously, and showed them the guns, trains, and everything on board their vessel. The visitors were greatly delighted. Their dress was wide and loose, with large sleeves. Each man had a couple of swords at his girdle. Their hair was tied up in a knot, a small space over the *pia mater* in front being shaven. They wore shoes made of straw, and their trowsers were of gay and very various colors. Notwithstanding the difference of their language, I could introduce myself to them by means of the pencil, as they understood the Chinese character, and they responded to me in the same way, expressing their admiration of my country, and their pleasure at making my acquaintance. Many of them wrote down for me their names and titles, and a friendship was thus established between us.

Next day a present came off to the steamer, consisting of one boat of turnips, twenty fowls, five hundred eggs, several boxes of oranges, and several piculs of onions. These things were received, and corresponding presents were returned, after which it was proposed to commence the negotiations. On this the commissioners sent for instructions to the capital, and received orders to erect a building on shore, where they should received the visitors. This was soon done, and a fine building it was, hung round with silk, screened off from the public gaze by elegant curtains, the floor being laid with mats and carpets. Lin ——— was the chief commissioner on the Japanese side, and on the American side was Matthew C. Perry, commander-in-chief of the United States naval forces in the East India, China, and Japan seas—with him was Dr. Williams, interpreter for the United States. For every officer present at the interview there was placed an entertainment on a small table, but it consisted merely of fresh fish, oysters, and other shell-fish, fowls' eggs, turnips, and a yellow looking wine. The Japanese, indeed, do not keep sheep, nor oxen, nor pigs, nor do they kill animals to entertain visitors with. I saw that many even of the fowls, which they do breed, obtained a most venerable age. If we look only at the diet of the people, it is immeasurably inferior to that of the Chinese.

The commissioner having received the articles of the treaty as proposed by the Americans, returned a communication after five days, and from that time, every day, there were officers coming to the ships, and supplies were sent of fuel, water, eggs, and fish. Among those who came to our vessel was a gentleman, named Ping-san-heen-urh-lang, of an ingenious nature and great learning, who asked me about the troubles which are at present distracting my native country. I showed him an account of the insurrection which I had drawn up, and a volume of essays on the principles of good government. These he borrowed of me the next day, in a polite manner, and returned them before long with the following letter:

"I trust that since I saw you, you have been well, and pursuing with pleasure your literary avocations. I have read carefully the record concerning the affairs at Nanking, and the volume of essays, with the perusal of which you favored me. I have learned two things from them, for, in the first, place they have made me acquainted with the causes of the present confusion in China, and, in the next, they display your own learning and worth. In times of disorder and difficulty, you have not forgotten the regard for your sovereign and interest in your country, which every good man ought to cherish. As I have shut up your volumes, my feelings have found vent in sighs.

"The common people are oppressed and miserable, and the rulers pay no attention to their feelings. They who should be the pastors of the nation fail to dischage their duties; bribery and venality widely prevail; such it seems is the condition of China, from antiquity to the present time—the common diseases of a decaying empire. The essential evil of such a state may be described in a single phrase—it is the desire of gain. Now, the desire of gain is common to all men, and is the pregnant womb of all evil. Confucius seldom spoke of gain, wishing to check the lust of it in its source. This, also, was the reason why my ancestors cut off all intercourse of foreign nations with Japan, because the desire of gain led astray the ignorant people, and wonderful arts in the investigation of principles deceived the perverse,* so that they got striving together, seeking gain and hurrying after what was wonderful, till filial duty, modesty, and the sense of shame were all forgotten. To a man who has reached this stage of evil, neither his father nor his sovereign is anything.

* The Japanese gentleman writes Chinese with great freedom. Few, if any, Sinologues from the west could compete with him. Yet his composition might be plainer in some parts than it is. It is not easy to make out his meaning here, where he is touching on an interesting topic—the reason which induced the exclusion of foreigners from Japan.

"The ways of Heaven are great. It nourishes all things in the universe. Even among the dark countries who dwell by the icy sea, there is not an individual who is not a child of Heaven and Earth—not one who is not made to love his fellows, and be friendly with them. On this account the sages embraced all men with a common benevolence, without distinction of one from another. The principles for mutual intercourse, all over the globe, are the same—propriety, complaisance, good faith, and righteousness. By the observance of these a noble harmony is diffused, and the heart of Heaven and Earth is abundantly displayed.

"If, on the contrary, commerce is conducted merely with a view to gain, quarrels and litigations will spring from it, and it will prove a curse instead of a blessing. Against such a result my ancestors were profoundly anxious. Looking thus at the subject, the one topic of intercourse, it is the means by which people exchange the commodities which they have abundantly, for those which they have not, and one nation succours the distresses of another; its prosperity is plainly indicated by Providence, and peace, harmony, and good feeling are its true results. Yet if gain—gain—be what is sought for by it, it will only develope the lusts and angry passions of men, and there will be a melancholy termination to what may be begun under good auspices. It is but a hair's breadth which separates those different results; for, give selfishness the reins, and righteousness is instantly merged in the desire of gain.

"From ancient times till now, for hundreds and thousands of years, confusion and disorder the rise and fall of states, recourse to arms and words of peace, all have been determined by this. Whenever nations agree to carry on intercourse together, they should speak clearly on this point of righteousness, and then let them exercise their soldiers and discuss the subject of war, that they may be prepared to inflict any punishment which Heaven demands. No sovereign of any kingdom should be unprovided for this.

"It happens, however, that when peace has long prevailed, these important matters are slighted, and thence comes the decay of States. But, in our country, the due precautions for safety have been well attended to. Our soldiers have been trained; the art of war has been discussed; guns have been cast; ships have been built, day after day, and month after month, for many years, and now our troops are like those of the ancient heroes T'ang and Woo. It is in this way that we have secured the continuance of our peace. If we had not done so, some nefarious ministers or powerful thieves might have arisen to excite confusion, and to begin to plunder, and we should be unable to punish them. All over the globe the strong destroy the weak, and the great swallow the small, as if societies of men were like collections of tigers and wolves. God, by his spiritual pervasion, however, sees, with a parent's heart, how His children impose on and strive with one another. Must he not be grieved? must he not be moved to pity?

"But the world may be compared to a chessboard, and every nation, also. There cannot be wanting worthy princes and heroic lords. Who is he that shall go before his fellows, whip in hand, to execute the laws of Heaven? Now great changes are occurring. It is a time of revolutions, when every prince should set his heart to act in obedience to providence, and labor for the good of his people. You ——— now live in a steamship of the United States, and you wander over the seas. Have you seen such a man as I indicate? If you have not, I pray you, wherever you go, to inculcate the principles I have stated on every sovereign and ruler; so shall the wishes of Confucius and Mencius, so many centuries after their time, be made to shine conspicuously in the whole world.

"Herewith, with these observations, I beg to return to you your documents, and wait upon you with my desires for your happiness."

To this letter I returned the following reply:

"Now it is drawing towards the third month of spring, and the landscape is assuming aspects of beauty. I have received your admirable letter, and my poor mind has been not a little enlarged by it. We have come together like the leaves of plants floating on the water, and on me has fallen the light of your instructions. When you say that all in the world are the children of heaven and earth, and that they should treat each other according to the principles of propriety, complaisance, good faith, and righteousness, your words are great and correct, and are sufficient to show the generous spirit of universal and equal benevolence which belongs to the school of our sages. For every word in your letter I shall ever be grateful. I shall wear it at my girdle, and always keep it in remembrance.

"The present age is very different from the times of antiquity; but who, with a conscience, can altogether disregard it? Notwithstanding my want of talent, for years I gave myself to the business of the world. During the war with the English, I led a body of braves, and put forth all my strength in the service of my country. Yet, afterwards, the officers of the government, bent on nothing but gain, made no account of my devotion and efforts. It was this neglect which set my mind on travelling abroad, and led me to my present position on board this steamer. Revolution is impending. Mere ordinary men, whose objects are power and profit, get into the possession of authority, and men of spirit and generous aim are likely to be pushed by them into calamity and driven to ruin. The maxim of the sage must be observed: 'When the empire is well governed, you may show yourself; when it is ill-governed, live in obscurity.' Yet, I have been unable to banish from my mind all interest in the condition of affairs, and, therefore, drew up the two works which you have read, hoping that some man will arise who, by his deeds and principles, shall promote the good of the people, and establish the prosperity of the country on a permanent basis. This is what I deeply desire; would, for the good of my country, that this end were gained!

"As to making compositions, jingling sentences, and seeking poetic inspiration from the moon and from flowers, this sort of thing I have long given up; yet, to dissipate my melancholy and moodiness, I have made a couple of odes, to which I beg you to apply the axe of your correction, and herewith I wait upon you with my desires for your happiness."

In the first decade of the third month (March or April) the commodore had a conference on shore with the Japanese commissioners, on which occasion rows of *japonicas*, in full flower, were arranged outside the building. Lin, the chief commissioner, had several hundred bags of grain, each weighing more than two hundred catties, set down close by, and, soon after, there appeared eighty or ninety burly fellows, naked, excepting a cummerbund, though the weather was extremely cold, and taking up the bags, one man two or three sacks at a time, they removed them, in a twinkling, to the shore. These men were not of uncommon height, but very stout, and immensely muscular. After they had removed the sacks of grain, they were made to exhibit their strength in wrestling and fighting, in an open space in front of the reception hall—the victor being rewarded with three cups of wine.

At that time I talked with an officer of the district of Poo-ho, by the name of Hop-yuen-tsaon-chwang, and asked how they proceeded in Japan in the appointment of men to official situations. He told me that both in the civil and military departments, officers were appointed after examination, only importance was not attached, as in China, to the making of verses;

that the books which they studied were those of Confucius and Mencius, and the writers of their school, and that after passing the examinations, and being approved as competent for office, parties were privileged to wear two swords.

As the Japanese for two hundred years have had no intercourse with foreigners, and have seen none, excepting the few Chinese and Dutch who carry on the trade at Nanga-saki, I found myself quite an object of interest; and as they set a great value on Chinese characters and compositions, whenever I went to the hall of reception many of them were sure to ask me to write on fans for them. The fans which I inscribed during a month while we were at Yokuhama could not be fewer than five hundred. The applications were, indeed, troublesome, and the writing took up much of my time, but it was difficult to decline acceding to their pressing requests.

On the same day on which the exhibition of athletes took place, the articles of treaty were settled, and it was arranged that the two ports of Seang-Kwan and Hea-teen, called by the Japanese, Hakodadi and Simoda, should be open to vessels from the United States, which should there be supplied with firewood, water, provisions, and coal. The most friendly feeling was displayed by both the contracting parties, and there seemed to be an end of their suspicions. A few days after, Commodore Perry gave an entertainment to Commissioner Lin on board his flag-ship, the *Powhatan*, which was decked out for the occasion. I made the following lines upon it:

Two nations' representatives at Yokuhama met;
To show their human brotherhood, the feast of joy was set.
Here were the chiefs who doff the hat and friendly greetings pay,
And there the heroes with two swords, in proud and bold array.
They raised the sparkling cup to prove their words of peace sincere,
While roll of drums and clash of bells came thundering on the ear.
Love spake from every lip, strained every eye with pleasure,
Ever may the treaty last, a good securing measure!

After the feast there were some theatrical performances; and when it was evening the Japanese returned to the shore. Next day the presents brought from the government of the United States to the Emperor of Japan were exhibited. There was a model of a railway engine and carriage, a life-boat, an electric telegraph apparatus, the instruments for taking daguerreotype pictures, various implements of agriculture, and other things. A circular railroad had been laid down outside the town, on which the engine and carriage swept round and round with great rapidity, to the astonishment of the beholders. The use of the electric telegraph was by means of copper wires to convey intelligence instantaneously from one place to another. By the daguerreotype apparatus pictures were taken by the reflection of the sun's light from the object on plates of metal. There is no need for pencils or drawing, and the pictures last long without fading. The life-boat was fitted with air-boxes, by means of which it was kept from sinking. On occasions of shipwreck, parties may be saved by means of this invention. The implements of agriculture were the most ingenious contrivances for purposes of husbandry used in the United States. The Emperor of Japan received all these things, and gave in return presents of lacquered ware, what might be called fine China ware, if it were not made in Japan, silks, &c. There was one gentleman, a Mr. Hop-yuen-choo, who conversed with me on this occasion, and gave me a case for pencils, along with these lines:

"The rain is gone; the nightingale
Sings loud among the trees;
Its notes to the foreign vessels
Are borne upon the breeze.

Ah! silly bird, thou knowest not
Their sails they soon will turn,
The yellow hats and lace of gold
Go and leave us to mourn."

At the same time, an officer named Ming-tuh showed me an ode which he had made on the first morning of the year. It ran:

"The bear begins his course again;
To me the world seems cold and vain.
Tsing Hok's high aim my soul inspires;
But not in me are Woo-how's fires.
With poet's pencil in my hand,
And wine cup near me on the stand,
I hear the willow rustling at my eaves,
And watch the opening of its eye-like leaves."

Another officer, named Yuk-foo Sank-kew-chung, also brought me some lines on the spring. They were:

"Last night among the flowers I walked and sang,
This morn again my voice in green woods rang.
Beyond men's ken the way of God above!
This greenery of spring well proves his love."

This piece was composed in the hall of reception, and it seemed incumbent on me to produce something of the same kind, so I took my pencil and wrote:

O face of spring, that now revisitest
The earth, my soul is stirred by thee to song.
Though still the winter snow clothes all the hills,
The rural paths are bright with blushing flowers,
And on the mountain sides the firs shine green.
Amid the waves see how the sea gulls play,
And find their home upon the ocean's breast.
Along the shore the smoke curls from the camps;
The hovering mists close shroud the ships of war.
Here in this hall the east and west are met;
There rise the towers of Japan's capitol.
Where shall I go to taste the inspiring cup?
I'll row my boat to yonder clump of trees.

On the same day, Wau-che-choo, of Shan-pun, asked me to inscribe a fan for him, and presented to me the four following lines:

"Say not our meeting here was all of chance;
To you we owe the treaty and our peace.
From far the strangers came, their language strange,
'Twas well we had your pencil and your tongue."

I took the opportunity that day to take a long walk, and not far from the town came upon an old temple dedicated to the dragon spirit. It was built of wood, and in the inside were hung, in frames, a great many pictures. Near by was a brick manufactory. The bricks were different from those we use in China—hard and large, and of an ashy color. Strolling on two or three *le*, there were a good many dwellings of the common people, some covered with tiles, and some thatched with straw. Most of them had pasted on the door Buddhistic charms, written on strips of paper. The women, afraid of a foreigner, kept all out of sight. During all the time we were at Yoku-hama, indeed, I saw only one woman.

After some days, the business of the expedition at this port being concluded, the steamer left Yoku-hama, and in one day reached Simoda, called in Chinese "Hea-teen," which would be in

English "Low-fields." It lies in latitude 34° 39′ north, longitude 138° 57′ east, and takes its name of Low-fields from its lying at the foot of high hills, from which streams come down, making the country around rich and fertile. There is a small, rocky island in the middle of the harbor, which serves the purposes of a break-water. Within it vessels may lie in perfect safety as in an amphitheatre, with lofty hills rising one above another in front and outside the great ocean; but whatever storms rage there, they may ride quietly and undisturbed. The steamers anchored close by the rocky island, the shore of the mainland being steep and precipitous, rocky cliffs, indeed, against which the waves might beat and chafe for ever without making any impression. The heights and hills are well wooded, and abound with pheasants, hawks, crows, and foxes. In the low grounds teal are abundant.

On the day after our arrival, the commodore went on shore, and took up his quarters in the Leaou-seen temple, on Fae-shun hill. There was a priest in charge of the temple called Yis-tsang, and two neophytes with him. Inside was a large hall for the worship of Buddha, and along the sides of it were many tombs—small structures made of stones—which it was the duty of the priests to sweep and keep clean, and where they presented daily offerings of flowers. The parties buried in them had, during their lifetime, made contributions to the temple. Behind the temple was a small pillared dome, built of stone, a small fish-pond, and many flowers and fruits. While we were taking some refreshments, hundreds of the people, men and women, came in to look at the strangers and receive presents. The women came and went without any appearance of bashfulness. They wore their dress long, had an apron behind instead of in front, and their hair was bound up with a strip of red silk. Most of them were good looking, and before marriage their teeth are beautifully white. After they have children, however, they stain the teeth black with gall-nut powder.

On another day I walked through the streets, and looked at the shops and houses. Some of them were built of bricks and covered with tiles, while others were merely huts of straw. They were mostly connected together, so that one could walk a long way, just passing from one house to another. The women moved about in the houses and streets as freely as the men. They came readily on the streets to me when I called them; many of them I saw working with the upper part of their bodies uncovered. Many of the men go about without any covering but the cummer bund, and the women think nothing of looking at obscene pictures. There are bathing houses, to which both the sexes resort without distinction. The women came always in crowds to see a foreigner, but ran off when any of the two-sworded gentry made their appearance.

The streets are all named. There are "Great Work street," "New street," "Shop street," and half a score besides. Passing along the shore and crossing a bridge, after walking a little more than a *le*, you are in the district of Tsze-Ké, and come to the temple of the "Gemmeous spring," shaded by old fir trees, and fronting the rocky island in the harbor, of which I have spoken. Here a piece of ground has been assigned as a burial place for strangers from the United States.

The people are all Buddhists. All about, on the hill sides and by the seashore, are images of Buddha, and on most of their tombstones are engraven some words from the "water lily," classic. At the temple of "Great Repose," I saw people worshipping Buddha, without either incense or lighted candles. When they had finished, they put some money in a box, calling it "Let-go-life money," with reference to the Buddhist doctrine which forbids the killing of animals. There were two priests in the place, who asked me to write some characters for them,

on which, struck by the scenery around, I wrote "encircling peaks, girdling waters." They in return described their position in the following lines:

"Here in our little cells we sit,
Round our inkstones the white clouds meet.
Mere dust to us is gold so rare,
The future gives us not a care.

While I was sitting with them, there came a woman to the temple to worship; the sight of beauty greatly stirred me;—

"Her lips vermillion red, her teeth were white,
Her hair in clouds rose o'er her eyebrows bright.
In glittering head-dress starlike was her sheen,
Or like the moon through plum tree branches seen."

The day being very warm, the priests had tea brought in, and I found it sweetish, like that produced at the hill of Se-tseaou, not far from Canton. About a bow-shot from this temple is a mountain gully, where a stream flows clear over a bed of sand and pebbles—a beautiful place for bathing.

In "Pond" street is a temple, where I found an idol grasping in his hands a bow and arrows. On the walls were hung many paintings of ships, which I supposed to be votive offerings from parties on their safe return from sea. Many people had hung up in the same temple the hair of their head, having vowed in a time of danger to cut it off, and present it, should they be delivered. Such are some of the customs of the Japanese.

The *azalea* is very abundant on the hills about, nor are other flowers rare. My friend made large collections of them, which he afterwards dried and preserved for future study, showing himself worthy to be a disciple of Confucius, who advised his followers to read the book of Odes, that they might become acquainted with the names of birds and animals, plants and trees.

Now every village has that which is good in its order and government. Though Japan is a smaller country than China, yet robbing and oppression are unknown in it. The doors of the houses are for the most part but thin boards, or frames with paper pasted over them, yet a case of theft is hardly ever heard of. Surely these things are sufficient to prove the excellence and ability of its rulers.

One day, wishing to ramble over the hills, I got a priest to guide me, and after walking five or six *le*, came to a village called Seu-Ke, by the sea-shore. There I saw large quantities of the shells of the pickle fish, which is found largely in the neighboring waters. Returning to the town I went into several shops. Among articles for sale in these, laquered-ware occupies the first place. When I made any purchase, I wrote my name on the article and also the price. The shop keeper then carried it to the officer of customs for the port, who, with his assistants, superintended all matters of buying and selling. A dollar was taken as 1,600 cash. The Japanese themselves have a large copper coin, equal to 100 cash. They have also several coins of gold and silver, and one piece of silver gilt. Within a circuit of seven *le* around Simoda, I did not see a single sheep, goat, or pig. Herds, however, were not uncommon, and were used for carrying burdens. Cows and oxen are used by the people for ploughing. The women weave cloth just as they do in China. Blacksmiths and carpenters seemed to go about their work as among ourselves; but I did not see any pieces of women's work in embroidery. Both men and women are fond of carrying fans. While I was at this place I am sure I inscribed more than a thousand fans. The governor and the various officers conducting the intercourse

with the Americans, all requested my services in this matter. They sent me the following complimentary lines:

"In foreign ships abroad you roam,
Escaping from the ills of home.
O'er the wide ocean to the East,
You've come, and us with peace have blessed."

I returned to them this reply:

"Eastward my course, the ship of fire I joined,
On travel bent, new scenes absorb my mind.
What mountains rise to bless my wandering sight!
O'er ocean's fields I gaze with vast delight;
Our wheels! like wings whose power the eagle wields;
Our helm! t' its lightest touch the vessel yields;
We dash along, a car whose steeds are whales;
Like osprey strong, we sport with furious gales;
By moonlight calm I saw Lew Chew's fair isle;
I've marked of Japan's hills the snowy pile.
Deeply my insignificance I feel,
Not vain to friendship, these things I reveal."

On the 16th day of the 4th month (12th May,) the commodore sailed from Simoda, and in five days reached Hakodadi, the second of the ports appointed in the treaty. It lies in latitude 41° 49′ N., longitude 140° 47′ E., and its climate is very much the same as Moukden. It is a retired and small place, surrounded by a barren country, where the trees are few and the grass is scanty. The people consequently are dependent for their food on supplies from other places, and vessels are constantly coming and going to it. From this circumstance it has received the name in Chinese of Seang-kwang, *i. e.*, "Hall of boxes." The harbor is wide, an open bay indeed, the hills on shore standing round it, as if in audience of the sea. When we were there the snow was still to be seen on the tops of the mountains. The houses are superior to those of Simoda, and the dress, ornaments, and vessels of the people are all indicative of more wealth. The women kept in their houses, and did not allow themselves to be seen by foreigners. The morals of the inhabitants appeared to be good. Obscene language was rarely heard.

Near Hakodadi is "Kingdom-protecting" hill, on which there is a temple where the pillars and beams are covered with carvings. All the articles in it are new and beautiful, and many pictures are hung round the walls. On each side of the principal hall are many graves. The commodore had several pictures taken in this building with a daguerreotype apparatus, and distributed among the Japanese officers.

Some difficulty arose in arranging about the distance to which the American citizens might travel round the port of Hakodadi, and a reference upon the subject was made by the Japanese to Yedo. During the time which thus elapsed, there was free intercourse with the people, and one could not but be struck with their quiet and submissive habits. They would kneel down by the way-side when they saw an officer. I did not see a single woman. On our first arrival, indeed, most of the shops and houses were shut, for the people, alarmed by the appearance of the foreign vessels, had fled to distant villages. Gradually, however, they regained their confidence, and came back and resumed their occupations. Hundreds of horses and some asses were to be seen upon the streets, bringing and carrying burdens of food. The windows were mostly of paper, as in other places where we had been, and upon many of the doors were pasted Chinese characters, signifying "Wilderness House," "Tortoise House." In the shops there was abundance of silks, but of a quality inferior to those of China. Their lacquered ware, how-

ever, was admirable, and the shops were soon emptied of it by their visitors. Deer skins, the roach fish, and medicinal sea-weed were to be seen in large quantities. The food of the people was of a better quality than at Simoda.

After some days, a request arrived from Yedo that the expedition would return to Simoda, that the question how far the country around Hakodadi should be considered open territory might be determined in conference with the Commissioner Lin. Besides the usual verses of compliments, an officer, called Yuen-tang, presented me, on our leaving the port, with two pictures in rolls, not to be distinguished from those common in China. Another gave me a good many volumes, I always acknowledging the gifts by the return of strings of fragrant beads. On the 4th of June, the commodore commenced his return to Simoda, the passage back occupying the same time as the passage from it had done. The day after his arrival, he and his officers, all in full dress, were entertained by Lin in the Leaon-seen temple, and in the afternoon the American soldiers marched in order through the streets, there being a general turn out of the population to look at them. Among the attendants of one of the commissioners was a young gentleman named Kwei-ching-min, of much intelligence and liveliness. All the visitors were very fond of him, and he had a great knack of drawing their likenesses. One of the imperial physicians, Wan-tsuen, asked me on this occasion about the manner in which officers were advanced to government employment in China. I endeavored to explain the subject to him, and we afterwards exchanged stanzas.

On the 17th of June, Lin and the other commissioners completed the negotiations connected with the treaty, which was arranged in thirteen articles. It was agreed, also, that American citizens should be free to ramble to the distance of five *le* all round Hakodadi. These are Japanese *le*, and the five may be equal to ten English miles. On the same day the commodore gave a grand entertainment on board the steamer, and exhibited a mimic specimen of a naval fight, for the entertainment of his Japanese guests, but the festivities were sadly interrupted by heavy rains.

Having heard that in Simoda there was one Yun-ts'ung-wo, famous for his skill in writing with his mouth, I went to him and got him to draw and inscribe for me about a dozen pictures.

On the 25th of June, all the business being concluded, the squadron left Japan, many officers escorting it in their own boats. Six days brought us to Lew-Chew, where the native authorities received us courteously, and supplied the ships with provisions. When we sailed from Lew-Chew in February, the commodore had left some sailors who were sick, and circumstances came to light concerning the death of one of them, which required investigation. He and two others had been drinking, and he in particular had provoked the people till they began to stone him. They probably killed him and threw him into the sea; but the authorities concealed the fact of his having been stoned, and merely said that he had disappeared, leaving his companions drunk, and they knew nothing of him till he was reported as found drowned at a certain spot. The fact of his having been stoned coming out, one of the men concerned in the case was brought before the Commodore, who, after inquiry, delivered him to the Lew-Chewan authorities, to be dealt with according to justice. He was banished, I understood, to Kew-chung hill, and the local magistrate was deprived of his pay, but retained in office.

On the 11th July, the prime minister and the treasurer, at an interview with the commodore at Napha, concluded articles of a treaty between the United States and Lew-Chew. This being settled, the steamers separated, and we sailed for different ports of China.*

* Although there are some errors in the descriptions of the Chinese writer, his paper has been faithfully copied.—M. C. P.

No. 2.

GENERAL ORDER No. 1.

UNITED STATES STEAM FRIGATE MISSISSIPPI,
At Sea, December 22, 1852.

In promulgating the subjoined extract from the instructions addressed to me by the honorable Secretary of the Navy, and bearing date the 13th ultimo, I have to enjoin upon all officers and other persons attached to the vessels under my command, or in any way connected with the squadron, a most rigid adherence to all the requirements of said order.

Whatever notes or drawings may be prepared by the officers or other persons before mentioned, whether by special order or their own volition, will be endorsed by the respective parties, and transmitted through the captain of the fleet to the commander-in-chief, who will in due time lodge them at the Navy Department, from whence they may or may not be reclaimed, as it may be deemed expedient by the government.

All curiosities and specimens of natural history are also to become the property of the United States, unless voluntarily relinquished by the commander-in-chief.

M. C. PERRY,
Commander-in-chief United States naval forces
stationed in the East Indies and China seas.

Extract from instructions of the Secretary of the Navy.

"A subject of great importance to the success of the expedition will present itself to your mind in relation to communications to the prints and newspapers touching the movements of your squadron, as well as in relation to all matters connected with the discipline and internal regulations of the vessels composing it. You will, therefore, enjoin upon all under your command to abstain from writing to friends and others upon those subjects. The journals and private notes of the officers and other persons in the expedition must be considered as belonging to the government until permission shall be received from the Navy Department to publish them."

GENERAL ORDER No. 2.

UNITED STATES STEAM FRIGATE MISSISSIPPI,
At Sea, December 23, 1852.

Entertaining the opinion that if the talents and acquirements of the officers of the squadron are properly developed and brought into action, they will be found equal to a plain and practical examination and elucidation of the various objects pertaining to the arts and sciences that may come under their observation during the present cruise, and being aware of the limited accommodations of the vessels under my command, I have invariably objected to the employment of persons drawn from civil life to conduct those departments more immediately connected with science.

Therefore, I have to request and to direct that each officer of the respective ships may employ such portions of his time as may be spared from his regular duties and proper hours of relaxation in contributing to the general mass of information which it is desirable to collect, and, in

order to simplify and methodize these researches, a paper is subjoined particularizing the various departments, in reference to which information is more especially wanted, so that each officer may select that or those departments, which may seem most congenial to his tastes and inclinations.

All captains and commanders are required to render every facility, consistent with the proper duties of their respective vessels, to those officers who may manifest a zealous co-operation in the pursuits herein specified, and it is to be plainly understood that I do not officially require the officers to perform any involuntary duty. I shall only exact that which may come legitimately within the sphere of my authority, leaving to the officers themselves to engage as far as they may see fit in those investigations, which may be considered in an official point of view gratuitous.

And it will always give me the greatest pleasure to identify and bring to proper notice the labors of each and every individual who may contribute to the general work.

M. C. PERRY,
Commanding East India Squadron.

No. 3.

Letter from the second King of Siam to Commodore Perry, recently received.

PALACE OF THE SECOND KING,
Bankok, Siam, July 16, 1856.

DEAR SIR: A long interval has elapsed since I have heard from you, but you are not forgotten.

The beautiful pistol which you had the honor of forwarding to me has afforded me much satisfaction and amusement. I was so much pleased with it, that I have taken special pains to secure as many varieties of the revolver as I could obtain, but none have given the satisfaction of the pistol you sent me.

As there is an opportunity of sending to America, through Mr. Mattoon, the United States consul, I gladly avail myself of it to send you a small but richly wrought spear, manufactured in Siam, which I trust you will do me the kindness to accept.

The American envoy had the honor of making a liberal treaty of commerce and friendship, which I trust will prove mutually advantageous.

With best wishes for yourself, believe me, yours, truly,

S. PHRA PIN KLAU CHAU YU HUA,
Second King of Siam, &c., &c.

Commodore M. C. PERRY, [SEAL.]
United States of America.

No. 4.

Account of the loss of Lieutenant John Matthews and boat's crew, of the United States ship Plymouth.

In consequence of the misplacement of some of the official communications of Captain John Kelly, no particular account of the disastrous loss of Lieutenant John Matthews and the entire

crew of one of the boats of the Plymouth, at the Bonin islands, has been given in the first volume of this report. To remedy this omission as far as practicable, an extract from a duplicate despatch recently received from Captain Kelly is here inserted. And it is due to the memory of Lieutenant Matthews to state, that he was an officer of high and honorable standing, and of great professional merit; his comrades in the boat were also men of excellent character.

Extract. "I have also the unpleasant duty to perform of reporting the loss of the second cutter, with Lieutenant Matthews and fourteen men, thirteen of whom belonged to this ship, the other was a man who had been left sick on the island by an American whale ship. The circumstances attending the melancholy event are as follows:

"On the morning of the 25th of October last, Lieutenant Matthews requested permission to take the second cutter and proceed to North island for the purpose of fishing and shooting wild pigeons, stating that he would return by dinner time; he left about 8 A. M., and stood off under sail about two miles from the island to speak an English schooner then in the offing. The captain of the schooner reported, that while entering the harbor he saw the boat very near North island; so that I imagine she must have been returning to the ship when he encountered the typhoon.

"The gale was terrific, commencing at the N.? and ending at the N.W. You may judge of the strength of the wind when I inform you that this ship, with four anchors down, lower yards and topmast struck, dragged completely across the harbor, with the water as smooth as a mill pond.

"On the 27th I despatched Sailingmaster H. N. T. Arnold in search of the cutter, supposing she had been stove on landing, and that the crew were on one of the islands, and only waiting to be relieved.

"After two days' ineffectual search, he returned. I herewith enclose you his report.

"The whaleship Bowditch, Captain Waldron, was lying in the harbor at the time; his boats went out daily in search of the hump-back whale; he, Captain Waldron, directed his boat's crew to examine closely all the islands; but to no effect; not a vestige of the boat or her crew could be discovered.

"On the 29th I got underway and stood to the northward and westward, in hopes of meeting with some of the oars or masts, but without success. I then stood to the southward, fearing some accident had befallen the surveying party; but, thank God, they were all safe; though Lieutenant Balch reported they were very near being lost."

No. 5.

List of officers belonging to the several ships composing the Naval Expedition which visited Japan in 1853–'4, in command of Commodore M. C. Perry.

Rank.	Names.	Ship.	Remarks.
Commander-in-Chief	Commodore M. C. Perry		
Captain of the Fleet	Commander H. A. Adams, staff		
Flag Lieutenant	John Contee, do		Resigned.
Do	Silas Bent, do		
Chief Interpreter	Dr. S. Wells Williams, do		
Commodore's Secretary	O. H. Perry, do		
Commodore's Clerk	A. L. C. Portman, do		
Captain	Joel Abbot, commanding	Macedonian	
Do	William J. McCluney, do	Powhatan	
Commander	John Kelly, do	Plymouth	
Do	Franklin Buchanan, do	Susquehanna	
Do	William S. Walker, do	Saratoga	
Do	John Pope, do	Vandalia	
Do	S. S. Lee, do	Mississippi	
Lieutenant Commanding	Junius J. Boyle, do	Storeship Southampton	
Do	Arthur Sinclair, do	Storeship Supply	
Do	John J. Glasson, do	Storeship Lexington	
Do	Alfred Taylor, do	Steamer Queen[a]	
Do	William L. Maury, do	Store barque Caprice[a]	1853; subsequently transferred to Mississippi.
Lieutenant	John P. Gillis, attached to	Plymouth	Returned home, 1854.
Do	Oliver S. Glisson, do	Powhatan	
Do	John R. Goldsborough, do	Saratoga	
Do	Thomas R. Rootes, do	Vandalia	
Do	Thomas T. Hunter, do	Susquehanna	
Do	R. B. Pegram, do	Powhatan	
Do	William B. Whiting, do	Vandalia	
Do	Edmund Lanier, do	Mississippi	
Do	Latham B. Avery, do	Macedonian	
Do	Joseph H. Adams, do	Powhatan	Died at Macao, 1853.
Do	Washington Gwathmey, do	Macedonian	
Do	Francis S. Haggerty, do	Powhatan	
Do	John B. Randolph, do	Susquehanna	Returned home sick, 1854.
Do	George H. Preble, do	Macedonian	
Do	William E. Boudinot, do	Powhatan	
Do	J. Hogan Brown, do	Susquehanna	
Do	Edward L. Winder, do	Macedonian	Returned home sick, 1854.
Do	John K. Duer, do	Susquehanna	

[a] Hired vessels.

LIST OF OFFICERS--Continued.

Rank.	Names.	Ship.	Remarks.
Lieutenant	George B. Balch---attached to	Plymouth	
Do	J. M. B. Clitz---do	Mississippi	
Do	George H. Cooper---do	Susquehanna	
Do	Charles M. Morris---do	Mississippi	
Do	J. W. A. Nicholson---do	Vandalia	
Do	John Matthews---do	Plymouth	Lost in a typhoon, 1853.
Do	W. B. Fitzgerald---do	Supply	Returned home sick, 1853.
Do	N. B. Harrison---do	---do	
Do	Alphonse Barbot---do	Vandalia	
Do	Sommerville Nicholson---do	Powhatan	
Do	William A. Webb---do	Mississippi	
Fleet Surgeon	Thomas L. Smith---do	Susquehanna	
Do	Daniel S. Green---do	Mississippi	
Surgeon	Amos G. Gambril---do	Plymouth	Died at Hong Kong, 1853.
Do	Robert Woodworth---do	Macedonian	
Do	Charles D. Maxwell---do	Powhatan	
Do	J. T. Mason---do	Vandalia	
Passed Assistant Surgeon	John S. Messersmith---do	Southampton	
Do	C. H. Wheelwright---do	Powhatan	Returned home in the Plymouth.
Do	William A. Nelson---do	Store ship Lexington	
Do	L. J. Williams---do	Mississippi	
Do	James S. Gilliam---do	Macedonian	
Assistant Surgeon	Thomas B. Steele---do	Saratoga	
Do	Benjamin Vreeland---do	Vandalia	
Do	Arthur M. Lynah---do	Mississippi	
Do	Charles F. Fahs---do	Susquehanna	
Do	Jenks H. Otis---do	Plymouth	
Do	Albert Schriver---do	Powhatan	
Purser	Garret R. Barry---do	Susquehanna	
Do	William Speiden---do	Mississippi	
Do	Edward C. Doran---do	Plymouth	
Do	Joseph C. Eldredge---do	Powhatan	
Do	Richard T. Allison---do	Macedonian	
Do	James K. Harwood---do	Vandalia	
Chaplain	George Jones---do	Mississippi	
Do	E. C. Bittinger---do	Susquehanna	
Passed Midshipman and Acting Master	Henry N. T. Arnold---do	Plymouth	
Do	Reuben Harris---do	Susquehanna	
Do	John Walcutt---do	Macedonian	
Do	John Madigan---do	Saratoga	
Do	Garrit V. Denniston---do	Vandalia	
Do	George A Stevens---do	Southampton	
Do	Francis S. Conover---do	Supply	
Do	John W. Bennett---do	Susquehanna	
Passed Midshipman	Peter Wager---do	Lexington	

LIST OF OFFICERS—Continued.

Rank.	Names.	Ship.	Remarks.
Acting Master	David Ochiltree ——attached to—	Mississippi	
Do	Reigart B. Lowry——do——	Powhatan	
Do	John T. Barrand——do——	Steamer Queen	
Passed Midshipman	John H. Upsher——do——	Supply	
Acting Master	Ed. Y. McCauley——do——	Powhatan	1854-'55.
Do	John Kell——do——	Mississippi	1854.
Do	J. Howard March——do——	Mississippi	1854-'55.
Passed Midshipman	James H. Rochelle——do——	Southampton	
Do	Robert D. Minor——do——	Lexington	
Do	Walter F. Jones——do——	Mississippi	
Do	Joseph Fry——do——	Supply	
Do	Albert Allmand——do——	Saratoga	
Do	Charles Gray——do——	Southampton	
Do	Robert W. Scott——do——	Saratoga	
Do	T. T. Houston——do——	Southampton	
Do	John Watters——do——	Macedonian	
Do	K. Randolph Breese——do——	Mississippi	
Do	Edwin F. Gray——do——	Plymouth	
Do	John G. Sproston——do——	Macedonian	
Midshipman	William McN. Armstrong—do——	Mississippi	Came home in charge of sick, 1853.
Do	Frederick A. Boardman ——do——	Susquehanna	
Do	Lester A. Beardslee——do——	Plymouth	
Do	Charles E. Hawley——do——	Susquehanna	
Do	Simon C. Mish——do——	Mississippi	
Do	George F. Morrison——do——	Plymouth	
Do	Robert L May——do——	Southampton	
Do	James W. Shirk——do——	Mississippi	
Do	Edward C. Stockton——do——	Plymouth	
Do	Oscar F. Stanton——do——	——do——	
Boatswain	Amos Colson——do——	Mississippi	
Do	William Whiting——do——	Powhatan	
Acting Boatswain	John Collins——do——	Susquehanna	
Boatswain	William Smith——do——	Plymouth	
Acting Boatswain	J. C. Hayden——do——	Macedonian	
Boatswain	Charles Smith——do——	Saratoga	
Do	Edward B. Bell——do——	Vandalia	
Gunner	Samuel G. City——do——	Powhatan	
Do	John Caulk——do——	Mississippi	
Do	Charles B. Oliver——do——	Susquehanna	
Do	William H. Hamilton——do——	Saratoga	
Do	Hamilton Bell——do——	Macedonian	
Do	John Wilkins——do——	Vandalia	
Do	William Harcourt——do——	Plymouth	
Carpenter	John Green——do——	Susquehanna	
Do	John O. Butler——do——	Powhatan	
Do	Henry M. Lowry——do——	Mississippi	

LIST OF OFFICERS—Continued.

Rank.	Names.	Ship.	Remarks.
Carpenter	Daniel Jones attached to	Macedonian	
Do	Leonard Moses do	Saratoga	
Do	Charles W. Babbitt do	Plymouth	
Do	Thomas V. Butt do	Vandalia	
Sailmaker	George Parker do	Powhatan	
Do	George T. Blackford do	Plymouth	
Do	Jacob Stevens do	Mississippi	
Do	Charles T. Frost do	Macedonian	
Do	W. S. L. Brayton do	Vandalia	
Do	Henry T. Stocker do	Saratoga	
Major Marine Corps	Jacob Zeilin do	Mississippi	
Captain	William B. Slack do	do	
Do	Robert Tansill do	Powhatan	
First Lieutenant	James H. Jones do	Macedonian	
Do	Jacob Read do	Vandalia	
Chief Engineer	Jesse Gay do	Mississippi	
Do	Samuel Archbold do	Susquehanna	
Do	George Sewell do	Powhatan	
First Assistant Engineer	John P. Whipple do	Steamer Queen	
Do	Robert Danby do	Mississippi	
Do	William Holland do	do	
Do	George F. Hebard do	Susquehanna	
Do	Henry H. Stewart do	do	
Second Assistant Engineer	John Faron do	Powhatan	
Do	George T. W. Logan do	Mississippi	
Do	George Gideon, jr do	Powhatan	
Do	Edward Fithian do	Susquehanna	
Do	Eli Crosby do	do	Died at Lew Chew, 1854.
Do	William Henry King do	Powhatan	
Do	J. C. E. Lawrence do	Susquehanna	
Do	William H. Rutherford do	Mississippi	
Do	George W. Alexander do	do	
Third Assistant Engineer	Thomas A. Shock do	Susquehanna	
Do	William S. Stamm do	Powhatan	
Do	Stephen D. Hibbert do	Susquehanna	
Do	Mortimer Kellogg do	Powhatan	
Do	Henry Fauth do	do	
Do	Edward D. Robie do	Mississippi	
Do	Le Roy Arnold do	Powhatan	
Do	John D. Mercer do	Mississippi	
Captain's Clerk	J. W. Spaulding do	do	
Do	Joseph P. Norris do	Plymouth	
Do	——— Bibby do	Powhatan	
Do	——— Whittlesey do	Vandalia	
Do	——— Abbot do	Macedonian	
Do	N. B. Adams do	To captain of fleet	
Do	J. S. Sewell do	Saratoga	

LIST OF OFFICERS—Continued.

Rank.	Names.	Ship.	Remarks.
Captain's Clerk	——— McClenahan	attached to	Southampton
Do	Arthur Sinclair	do	Supply
Purser's Clerk	William Speiden	do	Mississippi
Rated Acting Master's Mate	William B. Draper	do	do
Do	John Williams	do	Powhatan
Do	John Lewis	do	Vandalia
Do	Lawrence Lewis	do	do
Do	——— Randall	do	do
Do	——— Sloane	do	do
Do	——— Wheeler	do	do
Do	——— Ashbury	do	do
Do	J. H. Bierbower	do	Lexington
Do	William Heine*	do	
Do	E. Brown. jr*	do	
Do	James Morrow†	do	

* Employed as Artist.

† Employed as Agriculturist.

NOTE.

As the Treaty of Kan-a-ga-wa was the first formal instrument of the kind ever negotiated by the Empire of Japan, according to the usages of international law, with any Christian nation, it has been thought advisable to preserve a fac-simile in this Report of the original document.

FAC-SIMILE

OF

THE ORIGINAL TREATY WITH JAPAN.

SEE ENGLISH VERSIONS,

VOLUME I, PAGE 377, AND AT THE END OF THIS DOCUMENT.

右之條日本亞墨利加兩國ゟ
全權調印せしむる者也

嘉永七年三月三日

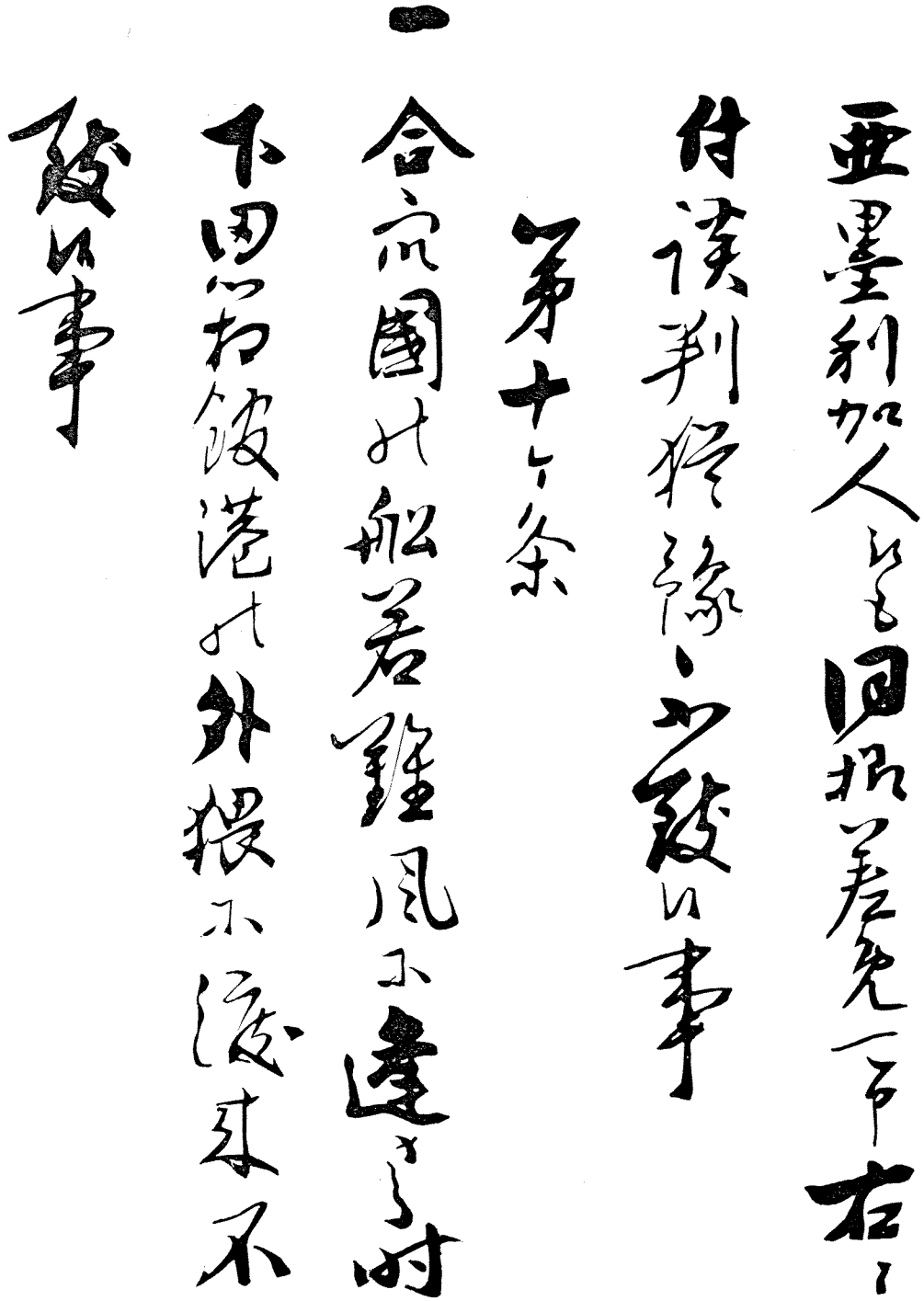
林大學頭 印
井戸對馬守 印
伊澤美作守 印
鵜殿民部少輔 印

第十二ヶ条

一今般ハ約條ヲ定ル上ハ五國ニ於
堅ヲ守ヘ中尤合衆國ニ至ル於テ長公
會大臣ニ評議一定ニ後書ヲ日本
大君ニ致シ此事今より後十八ヶ月
を過君上許容ニ約條ヲ替シ可

第十一ヶ条

一両國政府に於て無據後ゟこれ
模拙ことより合衆國官吏のもれ下
田に差置は後も一つゟこし尤約定調
印より十八ヶ月後に無しは不
及其儀は事



一 薪水食料石炭并欠乏之品求る
時ニ其地ニ役人ヲ以テ取扱ヒ
私ニ行ヒ事ヲ取ラ事

第九ヶ条

一 日本政府外國人ニ當節亜墨
利加人ニ不差免ニ庫ヲ免シ節ヲ

時金銀錢并不相を以て入用之
品相調はを差免しは尤日本政府
の規定に相違すれ且合衆國の
船より差出は不物を日本人に好
して差返は時を更合すれ事

第八ヶ条

港ニ後ハ追て取極免ハ事

第六ヶ条

一 必用ハ不拘其外可有叶事ニ

雙方談判ニ上取極ハ事

第七ヶ条

一 合衆國ハ船右ニ港ニ渡来ニ

第五ヶ条

一合衆國の漂民其他の者とも当分
下田箱館迄何中長崎に於て唐
和蘭人同様閉籠免窮屈の取
扱無し下田港内の小島周り凡
七里の内ハ勝手ニ徘徊いたし箱館

同招之事有不及償以事

第四ヶ条

一 漂着或ハ渡来之人民之扱之後も
他國同招緩優ヲ有之閑ハ龍以後
段ヲ發ル保正直ハ法度ニ之伏
從いあ一以事

金銀錢を以て可お辨ひ事

第三ヶ条

一 合衆國の船日本海濱漂着之時
扶助致し其漂民を下田又ハ箱館ヘ護
送致し本國の者更ニ下ニ不拘の不拘も
同招ニの致ひ尤漂民諸雜費ニ毎國互ニ

人ニ調ひ丈を給ひ為免渡来之儀
差免しい尤下田港を約條書
面調印ニ上即時相開き箱
館を来年三月より置お始り事
一給ひ置き品物直送書し成り日本
役人より右渡可申右代料を

朽れ和親を取結ひ場に人柄れ
若干無し事

第二ヶ条

一

伊豆下田松前地箱館れ安港ハ
日本政府に於て亜墨利加船薪
水食料石炭欠乏の品を日本

日本君主より全權林大學頭
井戸對馬守伊澤美作守鵜殿
民部少輔を差遣し敕諭を信し
て雙方左へ通取極ひ

第一ヶ条

一日本と合衆國とハ其人民永世不

約條

約條

亜墨利加合衆國と帝國日本兩國
ノ人民誠實不朽の親睦を結ヒ
兩國人民の交親を旨とし向後
守條相立ん爲合衆國より全權
アテユカルブレトヘルリ人
名を日本ホ差越し

JAPANESE TREATY.

THE United States of America and the Empire of Japan, desiring to establish firm, lasting, and sincere friendship between the two nations, have resolved to fix, in a manner clear and positive, by means of a treaty or general convention of peace and amity, the rules which shall in future be mutually observed in the intercourse of their respective countries: for which most desirable object the President of the United States has conferred full powers on his commissioner, Matthew Calbraith Perry, special ambassador of the United States to Japan; and the august Sovereign of Japan has given similar full powers to his commissioners, Hayashi-Daigaku-no-kami, Ido, Prince of Tsus-Sima, Izawa, Prince of Mimasaki, and Udono, member of the Board of Revenue.

And the said commissioners, after having exchanged their said full powers, and duly considered the premises, have agreed to the following articles:

ARTICLE I.

There shall be a perfect, permanent, and universal peace, and a sincere and cordial amity, between the United States of America, on the one part, and the Empire of Japan on the other, and between their people, respectively, without exception of persons or places.

ARTICLE II.

The port of Simoda, in the principality of Idzu, and the port of Hakodadi, in the principality of Matsmai, are granted by the Japanese as ports for the reception of American ships, where they can be supplied with wood, water, provisions, and coal, and other articles their necessities may require, as far as the Japanese have them. The time for opening the first named port is immediately on signing this treaty; the last named port is to be opened immediately after the same day in the ensuing Japanese year.

NOTE.—A tariff of prices shall be given by the Japanese officers of the things which they can furnish, payment for which shall be made in gold and silver coin.

ARTICLE III.

Whenever ships of the United States are thrown or wrecked on the coast of Japan, the Japanese vessels will assist them, and carry their crews to Simoda or Hakodadi, and hand them over to their countrymen appointed to receive them. Whatever articles the shipwrecked men may have preserved shall likewise be restored, and the expenses incurred in the rescue and support of Americans and Japanese who may thus be thrown upon the shores of either nation are not to be refunded.

ARTICLE IV.

Those shipwrecked persons and other citizens of the United States shall be free as in other countries, and not subjected to confinement, but shall be amenable to just laws.

ARTICLE V.

Shipwrecked men, and other citizens of the United States, temporarily living at Simoda and Hakodadi, shall not be subject to such restrictions and confinement as the Dutch and Chinese are at Nagasaki; but shall be free at Simoda to go where they please within the limits of seven

Japanese miles (or *ri*) from a small island in the harbor of Simoda, marked on the accompanying chart, hereto appended; and shall in like manner be free to go where they please at Hakodadi, within limits to be defined after the visit of the United States squadron to that place.

ARTICLE VI.

If there be any other sort of goods wanted, or any business which shall require to be arranged, there shall be careful deliberation between the parties in order to settle such matters.

ARTICLE VII.

It is agreed that ships of the United States resorting to the ports open to them shall be permitted to exchange gold and silver coin and articles of goods for other articles of goods, under such regulations as shall be temporarily established by the Japanese government for that purpose. It is stipulated, however, that the ships of the United States shall be permitted to carry away whatever articles they are unwilling to exchange.

ARTICLE VIII.

Wood, water, provisions, coal, and goods required, shall only be procured through the agency of Japanese officers appointed for that purpose, and in no other manner.

ARTICLE IX.

It is agreed, that if, at any future day, the government of Japan shall grant to any other nation or nations privileges and advantages which are not herein granted to the United States and the citizens thereof, that these same privileges and advantages shall be granted likewise to the United States and to the citizens thereof without any consultation or delay.

ARTICLE X.

Ships of the United States shall be permitted to resort to no other ports in Japan but Simoda and Hakodadi, unless in distress or forced by stress of weather.

ARTICLE XI.

There shall be appointed by the government of the United States consuls or agents to reside in Simoda at any time after the expiration of eighteen months from the date of the signing ot this treaty; provided that either of the two governments deem such arrangement necessary.

ARTICLE XII.

The present convention having been concluded and duly signed, shall be obligatory, and faithfully observed by the United States of America and Japan, and by the citizens and subjects of each respective power; and it is to be ratified and approved by the President of the United States, by and with the advice and consent of the Senate thereof, and by the august Sovereign of Japan, and the ratification shall be exchanged within eighteen months from the date of the signature thereof, or sooner if practicable.

In faith whereof, we, the respective plenipotentiaries of the United States of America and the Empire of Japan, aforesaid, have signed and sealed these presents.

Done at Kanagawa, this thirty-first day of March, in the year of our Lord Jesus Christ one thousand eight hundred and fifty-four, and of Kayei the seventh year, third month, and third day.

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by Edw. Sels

Engr. by Selmar Siebert

CHART OF THE COAST
OF
CHINA AND OF THE JAPAN ISLANDS
including the
MARIANES and a part of the PHILIPINES
Compiled by order of
COMMODORE M. C. PERRY, U.S.N.
from the latest authorities, with additions and corrections by the
U. S. JAPAN EXPEDITION
by Lieut.s W. L. Maury and S. Bent, U.S.N.
1855.
The Soundings are in Fathoms.
CHINESE TARTARY
SEA OF JAPAN
YESSO
LEOTONG
PECHILI
SHANTUNG
WHANG-HAI OR YELLOW SEA
KIANG NAN
CHE-KIANG
FO-KIEN
QUANG-TONG
CHINA SEA
PHILIPINE ISLANDS
MARIANA ISLANDS
JAPANESE ISLANDS
KOREA
KOREA CHANNEL
FORMOSA CHANNEL
KUROSIWO OR BLACK STREAM
Bonin Islands
Longitude East from Greenwich

SUGAR LOAF
or
Sill Segooskoo
EE ISLAND
Ee Village

Sugarloaf E.N.E. dist. 5 m.

Reef Island E. by S. ½ S.
Abbey Pt E. S.E.
Table Hill S.E. by E.

Entrance to Napha Hr dist 10 m.

PORT MELVILLE

Pt Hope
Sidmouth I.
KOU I.
Kou Villa
Mina
Urakiaga
Goadji
Nakazumi
Gontin
YAGADJI
BY
LYRAI
Hamazotsu
Tsuruhootch
Hogami
Hama Sachi
Piyadji
NATCHIJIN
MOUNTAINS
Sachi
Metuke
Mina I.
Gonga
Nacosi
Motuiki
Tube
Omsah
Nagui
DEEP BAY
SHAH BAY
Crawford I.
Shoal
Ofoosah
Sidmouth I.
Sericatchi
Ohui Soonduh
MUNA
Gama Satchi
BARROW BAY
Kaidaka
Hanaga
Tanza
Bama
Ancient Fort of Katsin Barki
Taking
MATHEWS BAY
North Channel
Reef Islands
Napha Kiang
Oar Channel
South Channel
Albert
Fountain and Well Water
NAPHA
SHUEY
Table Hill
Turtle I.
Kwaka
Hall's Reef
South Point

ISLAND of LEW CHEW

Surveyed by order of

COMMODORE M.C. PERRY U.S.N.

by

W.B. Whiting, Silas Bent, G.B. Balch, I. Mathews & A. Barbot,

Lieutenants U.S.N.

in

1853-54

SCALE

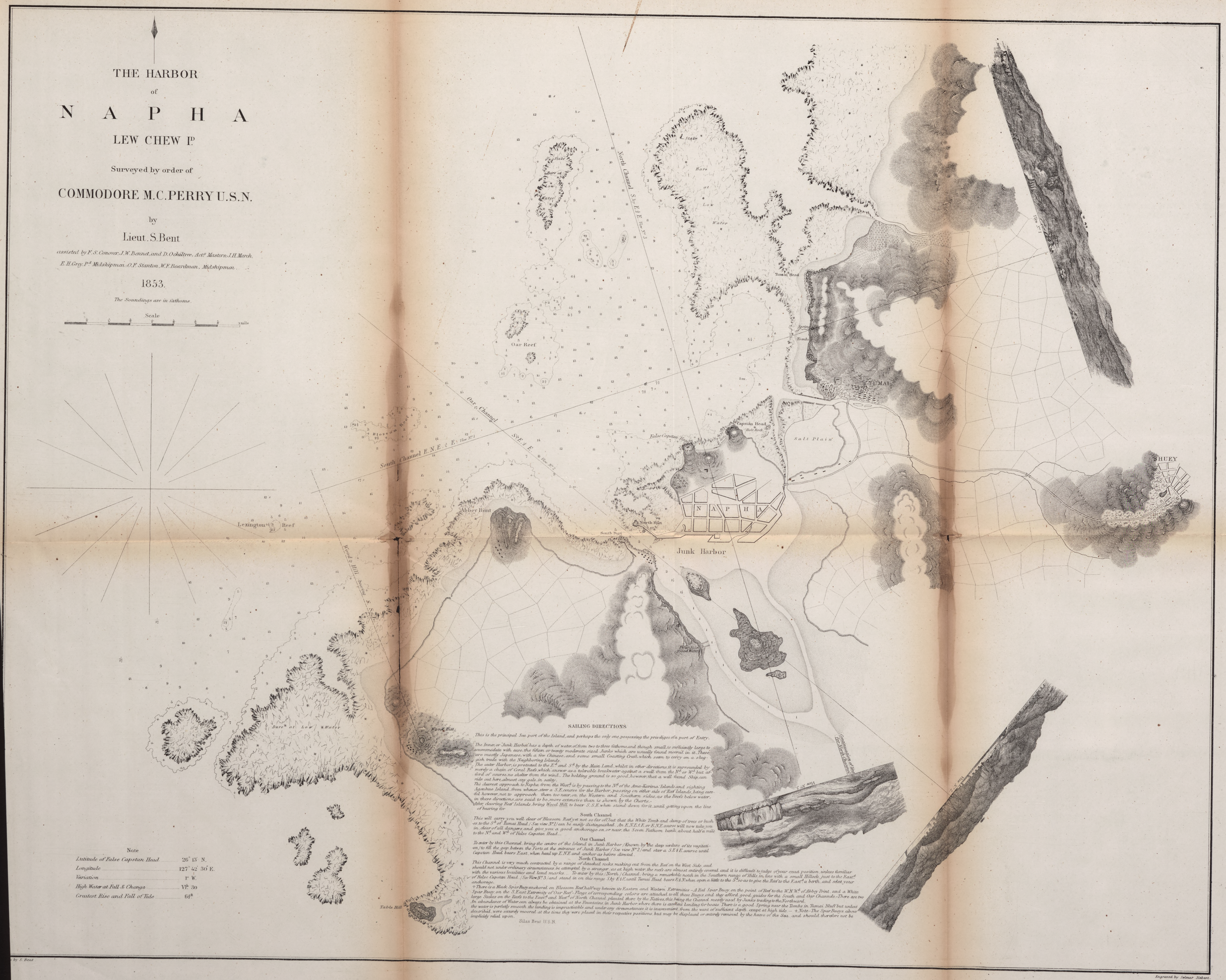
3 inch to 1 mile

The Soundings are in fathoms.

Long. 128 East from Greenwich

Drawing by Edward Sels.

Engraved by Selmar Siebert


THE HARBOR
of
N A P H A
LEW CHEW Id.
Surveyed by order of
COMMODORE M.C.PERRY U.S.N.
by
Lieut. S. Bent
assisted by F.S. Conover, J.W. Bennet, and D. Ochiltree, Actg. Masters; J.H. March, E.H. Grey, Pd. Midshipmen; O.F. Stanton, W.F. Boardman, Midshipmen.
1853.
The Soundings are in fathoms.
Scale
1 mile
Oar Reef
Oar Channel
South Channel E.N.E. & E.
North Channel
Lexington Reef
Abbey Point
Wood Hill
Table Hill
Capstan Head
Hole Rock
False Capstan Head
Salt Plain
Tumai Head
TUMAI
SHUEY
N A P H A
North Fort
South Fort
Junk Harbor
Bare at Low Water
Note
Latitude of False Capstan Head 26° 13' N.
Longitude 127° 42' 30" E.
Variation 1° W.
High Water at Fall & Change Vh. 30
Greatest Rise and Fall of Tide 6½ft.
SAILING DIRECTIONS
This is the principal Sea port of the Island, and perhaps the only one, possessing the privileges of a port of Entry.
The Inner, or Junk Harbor, has a depth of water, of from two to three fathoms, and though small, is sufficiently large to accommodate with ease, the fifteen or twenty moderate sized Junks which are usually found moored in it. These are mostly Japanese, with a few Chinese, and some small Coasting Craft, which seem to carry on a sluggish trade with the Neighboring Islands.
The outer Harbor, is protected to the Ed. and Sd. by the Main Land, whilst in other directions, it is surrounded by merely a chain of Coral Reefs, which answer as a tolerable breakwater against a swell from the Nd. or Wd. but afford of course, no shelter from the wind. The holding ground is so good, however, that a well found Ship, can ride out here, almost any gale, in safety.
The dearest approach to Napha from the Westd. is by passing to the Nd. of the Ama-Karima Islands, and sighting Agenhue Island, from whence, steer a S.E. course for the Harbor, passing on either side of Reef Islands, being careful, however, not to approach them too near, on the Western and Southern sides, as the Reefs below water, in these directions, are said to be, more extensive than is shown by the Charts.
After clearing Reef Islands, bring Wood Hill to bear S.S.E. when stand down for it, until getting upon the line of bearing for
South Channel
This will carry you well clear of Blossom Reef, yet not so far off, but that the White Tomb and clump of trees or bushes to the Sd. of Tumai Head (See view No. 1) can be easily distinguished. An E.N.E. & E. or E.N.E. course will now take you in, clear of all dangers, and give you a good anchorage on, or near, the Seven Fathom bank, about half a mile to the Nd. and Wd. of False Capstan Head.
Oar Channel
To enter by this Channel, bring the centre of the Island in Junk Harbor (Known by the deep verdure of its vegitation) to fill the gap between the Forts at the entrance of Junk Harbor (See view No. 2) and steer a S.E. & E. course until Capstan Head bears East, when haul up E.N.E. and anchor as before directed.
North Channel
This Channel is very much contracted by a range of detached rocks making out from the Reef on the West Side, and should not under ordinary circumstances be attempted by a stranger, as at high water, the reefs are almost entirely covered, and it is difficult to judge of your exact position, unless familiar with the various localities and land marks. To enter by this (North) Channel, bring a remarkable notch in the Southern range of Hills in line with a small Hillock, just to the Eastd. of False Capstan Head. (See View No. 3) and stand in on this range S. by E. & E. until Tumai Head bears E. & N. when open a little to the Sd. so as to give the Reef to the Eastd. a berth, and select your anchorage.
+ There is a Black Spar Buoy anchored on Blossom Reef, half way between its Eastern and Western Extremities – A Red Spar Buoy on the point of Reef to the W.N.Wd. of Abbey Point, and a White Spar Buoy on the S.East Extremity of Oar Reef – Flags of corresponding colors are attached to all these Buoys and they afford good guides for the South and Oar Channels – There are two large Stakes on the Reefs to the Eastd. and Westd. of North Channel, planted there by the Natives, this being the Channel mostly used by Junks trading to the Northward.
An abundance of Water can always be obtained at the Fountains in Junk Harbor where there is excellent landing for boats. There is a good Spring near the Tombs in Tumai Bluff but unless the water is perfectly smooth, the landing is impracticable and under any circumstances it is inconvenient from the want of sufficient depth, except at high tide. – + Note – The Spar Buoys above described, were securely moored at the time they were placed in their respective positions, but may be displaced or entirely removed by the heave of the Sea, and should therefore not be implicitly relied upon.
Silas Bent U.S.N.
by S. Bent
Engraved by Selmar Siebert.

LEW CHEW Ip.

DEEP BAY

Surveyed by order of

COMMODORE M.C.PERRY U.S.N.

by

Lts W.B.Whiting and A.Barbot

U.S.SHIP VANDALIA J.POPE COMMANDER

1853-54

The Soundings are in fathoms.

The Latitude of Naguh Obey is ..... 26° 35′ 35″ N.
The Longitude ..... " ..... 127° 59′ 42″ E.

Scale of 1 Naut.Mile

From the Original Drawing of Lt.W.B.Whiting, copied by Lt. S.Rent.

Engraved by S.Siebert, Lettering by C.A.Knight.

(LEW CHEW)

TUBOOTCH & SUCO HARBORS

Surveyed Jan'y. 1854

by

Lieuts. William B. Whiting and Alphonse Barbot U.S.N.

belonging to U.S. Ship Vandalia

JOHN POPE COMMANDER

by order of

Commodore

Matthew C. Perry

Commanding U.S. Naval Forces in

East Indies, China and Japan Seas

Scale $\frac{1}{20,000}$

Drawn by Lieut. S. Barbot

Engraved by S. Siebert, Lettering by C.A. Knight.

SHAH BAY

LEW CHEW I.

Surveyed by order of

COMMODORE M.C. PERRY U.S.N.

by

Lieut.ᵗ W.B. Whiting and Alph. Barbot

of the

U.S. SHIP VANDALIA J. POPE COMMᵈ

1853

OFOOKAH

Tombs

CRAFORD Iᵈ

Tombs

Salt pans

Coal

SHAH

Tomb

The latitude of Craford Iᵈ N. Point 26°39' 20" N.
" longitude " " " " " 128° 08' 12" E.
The Soundings are in fathoms.

Scale of one Naut. Mile

0 ¼ ½ 1

Engraved by S. Siebert

Drawn by S. Bent

KEELUNG HARBOR

FORMOSA ISLAND

Surveyed by order of

COMMODORE M.C.PERRY U.S.N.

by Lieut.G.H Preble & P^d M^d Walter F.Jones

in the

U.S.SHIP MACEDONIAN

CAPT.J.ABBOT

1854

Scale of 1 Naut Mile

Latitude of Keelung Harbor 25°09' N.
Longitude " " 121°48' E
Variation 0°
H.Water Full & Change 2h30m Rise & Fall 3 ft.
The Soundings are expressed in fathoms

Macedonian Point
Flat or Tong Pousee Island
Coral Patches
PALM ISLAND
Tent Hill
Gillams Pt
Williams Rock
Woodworth Pt
Image Pt
KEELUNG
Entering Place
Coral Patches
MERRIPEE BAY
HARBOR
Good Holding ground and safe Anchorage
Scotchow
Joss House
Ruin in stone
Passage for Junks
Rocks
Sail
Gwathmrys Cove
Perreang Village
Sendong Vill.
Creg Peak
New Fort
Ruin Rock
Coral Shoal
Dry at Low Water
Coral dry at Low Water
Jerry Cove
Gravepoint
Spreestone Rocks
Parallel Rocks
Abbon Point
Coal Peak or Sphinx Head 100 Ft.
E by S 1 mile dist.
Entering Place
JUNK HARBOR
Old Fort
Village
Entering Place
Boundary Pt
Boat Landing
Harbour Pt
Round I. or Bowyer
Mudflats
dry at Low Water
Sowwan
Small Junks at anchor
Temple
Joss House
Stone Causeway leads to the coal mines
KEELUNG TOWN
Ruin Rock
Creg Peak
Image Pt
Western Entrance of Keelung Harbor
Views of Ruin Rock called Santong by the Chinese
20 Ft.
bearing E.
bearing E.S.E.
KEELUNG ISLAND
Keelung Island S.E.by S.
Keelung Harbor S.by E.
Mountain Peninsula bearing S.by W.
Distant Outline of the land about Keelung
COAL HARBOR
Gull Rk
Oxnard Pt
Harbor Rock
Coal Peak or Sphinx Head
Jones Pt
Flatland and Rocks
Peak Rock
QUAR SEE KOW BAY
COAL REGION
300 to 500 high
Breeses Cove

SAILING DIRECTIONS FOR KEELUNG.

Keelung Harbor or Keelung Tow (head or promontory) is situated near the North Eastern points of the Island of Formosa. The Entrance may be readily known by the high Island of Keelung, situated 24 miles to the N.E. and by the high craggy land to the Westward, rolling, of which are given on the Chart. Image Point forming the Western entrance is sailed in from the action of the sea having worn the soft sandstone of which it is composed, leaving boulders of darker stone on elevated pedestals resembling images. The Eastern side is formed by a low flat and rocky island not easily separated from the high land behind it having a few small trees and shrubs on its southern edge.

Making and keeping Keelung Island well to the Northward the entrance may be approached without fear of the soundings are deep and free of hidden danger. When well up with the entrance a remarkable hill will be seen to the harbor called on the chart Creg Peak, bring it to bear S.by W which course will take you down the space of the channel clear of the coral reefs on both sides. The best anchorage for large vessels is on the eastern side of the entrance to the Southward of some dangerous coral shoals, with the outer points of land and boat passage just open. The holding ground is soft mud and sand is excellent. Anchorage for a single vessel may be had in Horque Bay to the Southward of Image Pt. Vessels of less than 15 Ft draft may find a snug anchorage half a mile nearer the town to the Southward of a coral shoal, which makes to the N.E. of Creg Peak. Near this anchorage there is a small but remarkable rock, resembling a turtle rain and hence called Ruin Rock. The town of Keelung is situated at the head of the harbor about a mile down this last anchorage and surrounded by extensive mudflats bare at low water and can only be approached by small boats at high water.

There are several coal mines about a mile E.S.E from the town, situated on the southern banks of the small shallow stream, which branches off in that direction. A limited supply of fresh water can be obtained near each of the little watercourses around the shores of the harbor, but generally if your pushes Pigs, Poultry and Vegetables, can be obtained in any quantity required. There is a covered market or bazaar at Sowwan Point near the Junk anchorage and another in the town of Keelung.

There is a good landing place for boats at Sowwan Point and from thence there is a good Road and causeway to the town.

Coal Harbor is so called from its proximity to the coal mines, opened by the Chinese on the hillsides of the Southern shore of Quar see kow Bay. It offers anchorage and shelter for one or two ships only. Should the mines ever be worked by Europeans, the coal which is of good quality, could be conveyed to Harbor Rock by means of a Rail Road along the West shore of Quar see kow Bay at the base of the hills. A short pier from the North side of Harbor Rock would enable a ship to be alongside in 3 to 4 fathoms, and receive or discharge her cargo.

Drawn by Edwd Sola.

Engr by Selmar Siebert

142°10' East

26°40' N.

Devils Rock

23 So.

HILLS BOROUGH I.P.

Pyramid Rock

Arched Rk.

Painted Rock

Fresh Water

Rocks awash

Plymouth

NEW PORT

PLYMOUTH I.P.

Mid. Channel Rock

Needles

PERRY ISLAND

KELLY ISLAND

H.W.F & C XI^h 32^m
Spring rise 34 f^t

THE COFFIN ISLANDS

Surveyed by order of

COMMODORE M.C.PERRY U.S.N.

by

Lieut^s G.B.Balch, G.H.Cooper & L.A.Beardslee Mid.

of the

U.S.Ship Plymouth

COMMANDER JOHN KELLY U.S.N.

1854

Scale in Naut. miles

1 ½ ¼ ¼ 0 1

The Soundings are in English fathoms.

Engraved by S. Siebert. Lettering by C.A.Knight.

WESTERN SHORE
of the
BAY OF YEDO
Surveyed by order of
COMMODORE M.C. PERRY U.S.N.
by
Lieut.Wm L. Maury
and other officers of the
JAPAN EXPEDITION
1854

SAILING DIRECTIONS

Vessels from the Southward, bound to this bay, should pass up to the Westd of the chain of Islands lying off the Gulf of Yedo and are cautioned against mistaking the deep bight of Kawasu Bay for the entrance of Uraga Channel, for on the N.E. side of this bay, there is a ledge of rocks several miles from the shore, bearing from Cape Sagami about W.S.W. distant ten miles, upon which one of the vessels of our squadron grounded. A stranger without a correct chart would naturally make this mistake, as the opening of the channel is not seen at a distance from this quarter, the shore appearing as an unbroken line. The entrance of the Channel bears from the Centre of Oosima N.E.½N. distant about twenty five miles Stand in upon this line and Saddle Hill, to the Northd of C. Sagami will be readily recognized, as well as the round black topt hill on the Eastern side of the Channel. On approaching Uraga, the Plymouth Rocks will be plainly seen, give these a berth of half a mile to clear the Ingersoll Patch, a sunken rock with but one fathom on it, and which is the only known danger in the channel.

Between Plymouth Rocks and Cape Kami-Saki the ground is clear and the anchorage good, if care be taken to get pretty well in, so as to avoid the strong tides, which sweep round the latter with great rapidity.

A spit makes out a short distance to the Southward of Cape Kami-Saki, but to the Northward of the Cape the shore is bold and the water very deep.

On rounding Cape Kama Saki, if bound to the City of Yedo, steer N.W.½N until Perry Island bears South, when Webster Island will bear West. This will clear Saratoga Spit, which makes well out from the Eastern shore; then haul up N by E and run on this course, until Treaty Pt bears S.W. by W. which keep on this bearing, by steering N.E. by E. until the Beacon bears N.W. where there will be found good anchorage in 15 fathoms water. At this point our survey terminated, the boats however found a clear channel with plenty of water for the largest vessels several miles further to the Northward and within a few miles of the city.

If bound to the American Anchorage from Cape Kami Saki steer N.W. and anchor in 8 or 10 fathoms water with Perry Island bearing S.S.E. and Webster Island S.W. by S.

In Powhatan Bay there is also good anchorage in 6 and 7 fathoms. Near this anchorage there are two small coves, very accessible, in which vessels may conveniently repair and refit. Susquehanna Bay is three miles W.N.W. from Kanpi Saki it is well sheltered, but it contains a number of reefs and rocks, and is therefore not recommended as an anchorage.

Mississippi Bay is four miles N. of American Anchorage, it is well sheltered from the prevailing winds. Upon anchoring, it is necessary to give the shore a good berth, to avoid a shoal, which extends out from a half to three quarters of a mile. The conspicuous headland or long Yellow bluff on the North side of this bay is called Treaty Point, a shoal surrounds the point from two thirds of a mile to a mile distant.

Between the American Anchorage and Treaty Point the soundings are irregular, shoaling suddenly from 12 to 5 fathoms on, banks of hard Sand.

To the Northd of Treaty Point and N.N.W. from Cape Kami Saki distant 14 miles is Tokuhama Bay. To reach this anchorage, bring the Wooded Bluff, which terminates the high land on the North side of the bay to bear N. by W.½W. and steer for it, until Treaty Point bears S.W. by S. this clears the spit off the point, then haul up about N.W. by N. for the bluff over the town of Kanagawa and anchor in 5½ or 6 fathoms with the Haycock just open to the Eastd of Mandarin Bluff. Mandarin is the steep bluff a mile to the Northd of Treaty Point.

A flat extends out from the Northern shore of this Bay between Kanagawa and Beacon Point from one to two miles. Off Mandarin Bluff there is also a shoal extending a mile to the Northd.

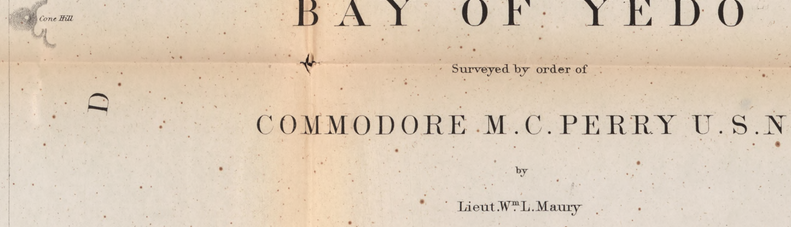
The Bay of Yedo is about 12 miles wide and 30 deep, with excellent holding ground and capable of sheltering the fleets of the World. Our survey embraced the Western shore only from Cape Kami Saki to Beacon Point. We had no opportunity of examining the Eastern side. The soundings from Treaty Point across in an E.S.E. direction are regular, and three fathoms were found about a mile and a half from the opposite shore. Of Uraga channel a reconnaisance was made of the western shore only.

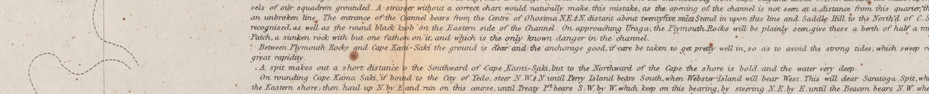
During our Stay in the Bay from the 27th of February to the 18th of April, the weather was generally fine, being occasionally interrupted by strong winds and heavy rains. The gales came up suddenly from the South'd and West'd with a low barometer and continued for a short time, when the wind hauled round to the Northd and Westd and moderated. We had no Easterly blows, in fact the wind was rarely from this quarter, except when hauling round from the Northd.

The tide is quite strong out in the Bay, and off the tail of Saratoga Spit, Perry Island, and Cape Kami Saki, its velocity is much increased, but at the anchorage in the Bay of Tokuhama it was scarcely felt. At Tokuhama the Japanese Authorities supplied us with wood and water and a few vegetables, fowls, eggs, oysters and clams.

Latitude of Cape Sagami	35° 06′ 30″ N.
Longitude " " from Greenwich	139° 42′ 45″ E.
Latitude of Webster Island	35° 18′ 30″ N.
Longitude " "	139° 40′ 34″ E.
Latitude of Treaty Building (North end of Tokuhama)	35° 27′ 15″ N.
Longitude " "	139° 40′ 23″ E.
Variation	0° 25′ W.

High Water F. & C. V.
then and Full at Tokuhama 6h
The Soundings are in fathoms





Drawn by Edward Sels

Engraved by Selmar Siebert

GULF

AND

BAY OF YEDO

Surveyed by order of

COMMODORE M.C.PERRY U.S.N.

by

Lieut. W. L. Maury and other officers of the

U.S. JAPAN EXPEDITION

in

1853-54

SAILING DIRECTIONS FOR THE HARBOR OF SIMODA

Vessels bound to the Harbor of Simoda from the South'd. and West'd. should make Cape Idsu, from which Rock I. bears E.S.E.¼E. dist. about 5 miles, and if the weather is at all clear, the chain of islands at the entrance of the Gulf of Yedo will be plainly visible.

Between Rock Id. and the main land there are a number of rocks awash and above water, among which the Japanese junks freely pass, but a ship should not attempt a passage inside of Rock Id. unless in case of urgent necessity, particularly as the north easterly current, which sweeps along this point, seems to be capricious, both in direction and velocity. Giving Rock Id. a berth of a mile, the Harbor of Simoda will be in full view, bearing N.½ W. dist. 5 miles. Vandalia Bluff on the E. side of the entrance, may be recognized by a grove of pine trees on the summit of the bluff and the village of Susaki which lies about one third of the way between it, and C. Diamond. C. Diamond is a sharp point making out to the eastward of the entrance of the harbor.

Standing in from Rock Id. you will probably pass through a number of tide rips, but not get soundings with the hand lead, until near the entrance of the harbor, when you will be in from 14 to 27 fathoms. Should the wind be from the North'd. and fresh, a vessel should anchor at the mouth of the harbor, until it lulls or shifts, or until she can conveniently warp in, as it is usually flawey and always baffling.

Approaching from the North'd. & East'd, a vessel can pass on either side of Oho-sima, from the centre of which, Cape Diamond bears W. by S. dist. about seventeen miles. Between Oho-sima and Simoda, no dangers are known to exist, but the north-easterly current must be borne constantly in mind, particularly at night and in thick weather. Its general strength is from two to three miles per hour, but as this, as well as its direction, is much influenced by the local winds, headlands, islands, etc. neither can be relied upon. Should Oho-sima be obscured by thick weather, before reaching C. Diamond, endeavor to sight Rock Id. for there are no conspicuous objects on the main land, by which a stranger can recognize the harbor at a distance, and the shore appears as an unbroken line. To the West'd. of the harbor there are several sand beaches and three or four sand banks. These can be plainly discerned when within six or eight miles and are good land marks. A vessel from the southward and eastward, should pass to the west'd. of the island of Kozu-sima, which may be known by a remarkable snow white cliff on its western side. There is also a white patch on its summit to the north'd. of the cliff. From this island the harbor bears N. by W. ¾ W. dist. about 26 miles.

Approaching from the East'd. the harbor will not open, until you get well inside of C. Diamond. To the North'd. of Cape Diamond is the Bay of Sirahama, which is quite deep, and as it has several sand beaches, it may be mistaken for Simoda, but as you approach this bay, C. Diamond will shut in the Ukona rocks and Rock Id. to the south'd, whilst in the Simoda roads they are visible from all points.

There are but two hidden dangers in the harbor, the first is the Southampton Rock *which lies in mid channel, bearing N.¼ W. from Vandalia Bluff, about three fourths of the way between it and Centre Id.; This Rock is about 25 feet in diameter, and has 2 fathoms water on it, it is marked by a white spar buoy. The second is* Supply Rock, *bearing S. by W. a short distance from Buisako Id. and is a sharp rock, with 11 ft. of water on it, its position is designated by a red spar buoy. Both of these buoys are securely moored and the authorities of Simoda have promised to replace them, should they by any cause be removed.*

Centre I. which receives its name from being the point from which the Treaty limits are measured, is high, conical and covered with trees. A cave passes entirely through it. In the outer roads or mouth of the harbor, a disagreeable swell is sometimes experienced, but inside of Southampton Rock and Centre Id. vessels are well sheltered and the water comparatively smooth. Moor with an open hawse to the southward and west'd. There are good landings for boats in Simoda Creek and at the village of Kakisaki.

A harbor master and 3 pilots have been appointed, wood, water, fish, fowls, eggs, sweet potatoes and other vegetables may be procured from the authorities.

Latitude Centre Id.	*34°. 39'. 49" N.*
Long.	*138°. 57'. 30" E.*
Variation	*0°. 52' W.*
H. Water F. and C.	*V h.*
Extreme rise of Tide	*5 ft. 7 inches*
Mean	*3 ft.*
Redfield Rocks Lat.	*33°. 56'. 13" N.*
" " Long.	*138°. 48'. 31" E.*
" " Lat.	*33°. 57'. 31" N.*
" " Long.	*138°. 49'. 13" E.*

The Soundings are in fathoms.

SAILING DIRECTIONS FOR THE BAY OF YEDO

Vessels from the Southward, bound to this bay, should pass up to the Westw'd. of the chain of Islands lying off the Gulf of Yedo, and are cautioned against mistaking the deep beight of Kawatsu or Wodawara Bay for the entrance of Uraga channel, for on the N.E. side of this bay there is a ledge of rocks several miles from the shore bearing from Cape Sagami about W.N.W. distant ten miles, upon which one of the vessels of our squadron grounded. A stranger without a correct chart would naturally make this mistake, as the opening of the channel is not seen at a distance from this quarter, the shore appearing as an unbroken line.

The entrance to the channel bears from the centre of Oho-sima N.E.½ N. distant about 20 miles. Stand in upon this line, and the Saddle Hill, to the North'd. of Cape Sagami will be readily recognized, as well as the round black knob on the Eastern side of the channel. On approaching Uraga, the Plymouth Rocks will be plainly seen, give these a berth of half a mile to clear the "Ingersoll Patch", a sunken rock, with but one fathom on it, and which is the only known danger in the channel. Between Plymouth Rocks and Cape Kami-saki, the ground is clear and the anchorage good, if care be taken to get pretty well in, so as to avoid the strong tides which sweep round the latter with great rapidity. A spit makes out a short distance to the South'd. of kami-saki, but to the North'd. of the Cape the shore is bold and the water very deep.

On rounding C. Kama-saki, if bound to the City of Yedo, steer N.W.½ N. until Perry I. bears South, when Webster I. will bear West. This will clear the Saratoga spit which makes well out from the Eastern shore; then haul up N. by E. and run on this course, until Treaty Pt. bears S.W. by W. keep on this bearing, by steering N.E. by E. until the Beacon bears N.W. where there will be found good anchorage in 15 faths. water.

At this point our survey terminated, the boats however, found a clear channel with plenty of water for the largest vessels several miles further to the North'd. and within a few miles of the city.

If bound to the American anchorage: from Cape Kami-saki, steer N.W. and anchor in 8 or 10 fathoms water with Perry I. bearing S.S.E. and Webster I. S.W. by S. To the S'd. of Webster I. there is also good anchorage in 6 and 7 fathoms. Near this anchorage, there are two snug coves, very accessible, in which vessels may conveniently repair and refit. Susquehanna Bay, 3 miles W.N.W. from Cape Kama-saki is well sheltered, but contains a number of reefs and rocks and is therefore not recommended as an anchorage.

Mississippi Bay is 4 miles N. of the American anchorage; it is well sheltered from the prevailing winds. Upon anchoring it is necessary to give the shore a good berth to avoid a shoal which extends out from a half, to three quarters of a mile. The conspicuous head land or long Yellow Bluff on the North side of this Bay is called "Treaty Point", a shoal surrounds the point from two thirds of a mile to one mile distant. Between the American anchorage and Treaty Point, the soundings are irregular, shoaling suddenly from 12 to 5 fathoms on a bank of hard sand.

To the North'd. of Treaty Point and N.N.W. from Cape Kami-saki distant 14 miles, is Yokohama Bay. To reach this anchorage, bring the Wooded bluff, which terminates the high land on the North side of the Bay, to bear N by W.¾ W. and steer for it, until Treaty Point bears S.W. by S, this clears the spit off the point, then haul up about N.W. by N. for the bluff over the town of Kanagawa, and anchor in 5½ or 6 fathoms, with the Haycock just open to the East'd. of Mandarin bluff. Mandarin, is the steep bluff a mile to the North'd. of Treaty Pt. A flat extends out from the Northern shore of this Bay, between Kanagawa and Beacon Point from one to two miles. Off Mandarin Bluff there is also a shoal extending a mile to the North'd.

The Bay of Yedo is about 12 miles wide and 30 deep, with excellent holding ground and capable of sheltering the fleets of the world. Our survey embraced the Western shore only, from Cape Kami-saki to Beacon Point. We had no opportunity of examining the Eastern side. The soundings from Treaty Pt. across in an E.S.E. direction are regular, and 3 fathoms were found about a mile and a half from the opposite shore.

Of Uraga channel, a reconnoissance was made of the Western shore only.

During our stay in the Bay, from the 17th of February to the 18th of April, the weather was generally fine, being occasionally interrupted by strong winds and heavy rain. The gales came up suddenly from the South'd. and West'd, with a low barometer, and continued for a short time, when the Wind hauled round to the N'd. and W'd. and moderated. We had no Easterly blows; in fact, the wind was rarely from that quarter, except when hauling round from N'd. as it invariably did, by East to the S'd. and W'd.

The tide is quite strong out in the Bay, and off the tail of Saratoga Spit, Perry Island and Cape Kami-saki, its velocity is much increased. But at the anchorage in the Bay of Yokuhama it was scarcely felt. At Yokuhama the Japanese Authorities supplied us with wood and water and a few vegetables, fowls, eggs, oysters and clams.

Lat. Cape Sagami	*35° 06' 30" N.*
Long.	*139° 42' 45" E.*
Lat. Webster Island	*35° 18' 30" N.*
Long.	*139° 40' 34" E.*
Lat. Treaty Building (N. End of Yokuhama.)	*35° 27' 15" N.*
Long.	*139° 40' 23" E.*
Variation	*25' W.*
High Water Fu. & Ch.	*VI*
Rise and Fall at Yokuhama	*6 ft.*

The Soundings are in fathoms.

Drawn by Edw. Selz

Engr. by Selmar Siebert

SIMODA HARBOR

I. OF NIPPON

Surveyed by order of

COMMODORE M.C.PERRY U.S.N.

by

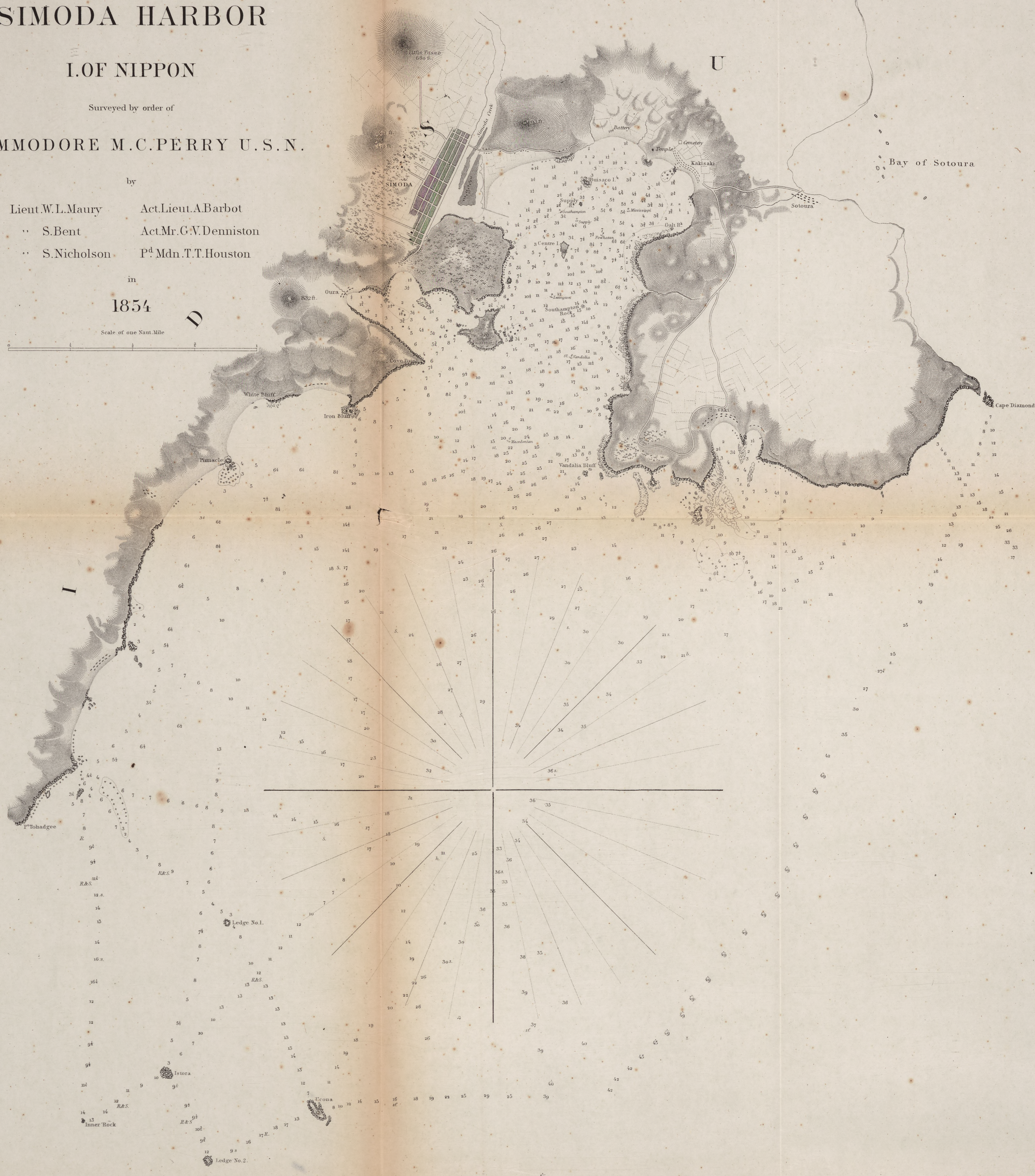
Lieut. W.L.Maury	Act. Lieut. A.Barbot
" S.Bent	Act. Mr. G.V.Denniston
" S.Nicholson	P.d Mdn. T.T.Houston

in

1854

Scale of one Naut. Mile

0 ¼ ½ ¾ 1



SAILING DIRECTIONS

Vessels bound to the harbor of Simoda from the Southward and Westward, should make C.Idsu, from which Rock Island bears E.S.E.¼E. distant 5 miles, and if the weather is at all clear, the chain of islands at the entrance of the Gulf of Yedo will at the same time be plainly visible.

Between Rock Island and the main land there are a number of rocks awash and above water, among which the Japanese junks freely pass, but a ship should not attempt a passage inside of Rock Island, unless in case of urgent necessity, particularly as the north-easterly current, which sweeps along this coast, seems to be at this point capricious, both, in direction and velocity. Giving Rock Island a berth of a mile, the harbor of Simoda will be in full view, bearing N.¼W. distant 5 miles.

Vandalia Bluff, on the east side of the entrance, may be recognised by a grove of pine trees on the summit of the bluff, and the village of Susaki, which lies about one third of the way between it and C.Diamond.—C.Diamond is a sharp point making out to the eastward of the entrance of the harbor.

Should the wind be from the northward and fresh, a vessel should anchor at the mouth of the harbor, until it lulls or shifts, or until she can conveniently warp in, as it is usually flawey and always baffling. Approaching from the northward and eastward, a vessel can pass on either side of Oho-Sima, from the centre of which Cape Diamond bears W.by S. distant about seventeen miles. Between Oho-Sima and Simoda no dangers are known to exist, but the north-easterly current must be borne constantly in mind, particularly at night and in thick weather. Its general strength is from two to three miles per hour, but as this, as well as its direction, is much influenced by the local winds, headlands, islands &c. neither can be relied upon. Should Oho-Sima be obscured by thick weather, before reaching Cape Diamond, endeavor to sight Rock Island, for there are no very conspicuous objects on the main land by which a stranger can recognise the harbor at a distance, and the shore appears as an unbroken line. To the westward of the harbor there are several sand beaches, and three or four sand banks. These can be plainly discerned when within six or eight miles and are good landmarks.

A vessel from the southward and eastward should pass to the westward of the island of Kozu-Sima, which may be known by a remarkable snow white cliff on its western side. There is also a white patch on its summit to the northward of the cliff. From this Island the harbor bears N.by W.½W. distant about 26 miles. There are but two hidden dangers in the harbor, the first is Southampton Rock, which lies in mid-channel, bearing N.¼W. from Vandalia Bluff, about ⅔ of the way between it and Centre Island. This rock is about 25 feet in diameter, and has two fathoms of water upon it, it is marked by a white spar-buoy. The second is Supply Rock, bearing S.by W. a short distance from Butsako islet, and is a sharp Rock, with 11 ft water upon it, its position is designated by a red spar-buoy. Both of these buoys are securely moored, and the authorities of Simoda have promised, to replace them, should they by any cause be removed. Centre Island, which receives its name from being the point from which the Treaty limits are measured, is high, conical and covered with trees. A cave passes entirely through it.—In the outer roads, or mouth of the harbor, a disagreable swell is sometimes experienced, but inside of Southampton Rock and Centre Island, vessels are well sheltered and the water comparatively smooth. Moor with an open hawse to the southward and westward.

There are good landings for boats in Simoda Creek and at the village of Kakisaki. A Harbor Master and three Pilots have been appointed, wood, water, fish, fowls and eggs, also sweet potatoes and other vegetables may be procured from the authorities. It is necessary to supply them with casks, to bring the water off.

Centre Island	Latitude 34° 39′ 40″ N.	H.Water F.& C. 5 hr.	The Soundings are in English fathoms.
	Longitude 138° 57′ 30″ E.	Extreme rise of tide 5 f. 7 in.	
	Variation 0° 52′ W.	Mean 3 f.	

To make the foregoing directions more easily comprehended, they have been rendered as concise as possible, but to furnish further information to navigators bound to, or passing the port, the following additional remarks are appended. The harbor of Simoda is near the southeastern extremity of the peninsula of Idsu, which terminates at the cape of that name. To the northward of the harbor a high ridge intersects the peninsula, and south of this all the way to the cape it is broken by innumerable peaks of less elevation. The harbor bears S.W.by W. from Cape Sagami, at the entrance of Yedo Bay, distant about 45 miles. Rock Island is about 120 feet high, and a third of a mile in length, with precipitous shores and uneven outlines. It has a thick matting of grass, weeds, moss &c. on the top. From the summit of the island Overfalls were seen, bearing N.¼W. distant a mile or a mile and a half. These may be caused by a rock or a reef. An attempt was made to find it, but the strong current and the fresh wind prevented a satisfactory examination. The Japanese fishermen, however deny the existance of any such danger.

Should the buoy on Southampton Rock be removed, the east end of Centre Island on, with the west end of Butsako, will clear the rock to the westward. Off the village of Susaki and distant one third of a mile from the shore is a ledge of rocks, upon which the surf is always breaking, give them a berth of two cables in passing.

Approaching from the eastward, the harbor will not open, until you get well inside of Cape Diamond. To the northward of Cape Diamond is the bay of Sirahama, which is quite deep, and as it has also several sand beaches, it may be mistaken for Simoda, but as you approach this bay, Cape Diamond will shut in the Ucona Rocks and Rock Island to the southwarad, whilst in the Simoda roads they are visable from all points.

Cape Idsu.	Latitude 34° 36′ 00″ N.	Longitude 138° 50′ 35″ E.		
Rock Island.	do do 34° 34′ 20″ N.	do do 138° 57′ 10″ E.		

S.W. from Kozu-Sima, distant 20 miles and south a little westerly from C.Idsu, distant 40 miles there are two patches of dangerous rocks, 15 or 20 f. high, named Redfield Rocks.

Redfield Rocks	Latitude 33° 56′ 13″ N.	Longitude 138° 48′ 31″ E.		
	do do 33° 57′ 31″ N.	do do 138° 49′ 13″ E.		(These positions are approximative only.)

Rock Island dist.1 m. 120 ft.

Rock Island dist.1 m.

Simoda Harbor Entrance

Drawing by Edward Sels

Engraved by S.Siebert, Lettering by C.A.Knight

View entering the Bay of Hakodadi

THE HARBOR
of
HAKODADI
YESSO Ip JAPAN.

Surveyed by order of

COMMODORE M. C. PERRY. U. S. N.

by

Lieut.s W. L. Maury, G. H. Preble, S. Nicholson,

& A Barbot.

in

1854

Note — *The Soundings are in Fathoms*

SCALE

2 inches to 1 mile

Round Knob

Aga Ngawa

Arekana

Nuai Kawa

Toma Ngawa

Var 4° 30' W.

Yanenai Pt

Battery

Kamida Creek

Kamida Kura

Macedonian

Vandalia

Powhatan

Mississippi

Southampton

Sand Hills

Pt Anama

Pier

Fort

Temple

Cemetary

Tsuki Pt

White Bluff

Water

845f

Pk of Hakodadi 1136f

Cavern Pt

Shai-Sawabe

East Pt

Ohobana Pt

Moheedzie

Patches of Kelp

Musele Pt

1136f

Ohobana Pt N.W. by N.

Peak of Hakodadi

SAILING DIRECTIONS

Approaching this harbor from the eastward, after passing Cape Suwo Kuwo or Cape Blunt, which is a conspicuos headland 11 miles E. by S¼S from the town, the junks at anchor in the harbor will be seen over the low isthmus. Rounding the promontory of Hakodadi and giving it a berth of a mile to avoid the calms under the high land, steer for the sharp peak of Komaga daki, bearing North, until the east peak of the Saddle, bearing about N.E. by N. opens to the westward of the Round Knob on the side of the mountain, then haul up to the northward and Eastward, keeping them well open until the centre of the sandhills on the isthmus bears S.E. by E.½E. (these are recognized by the dark knolls upon them). This will clear a spit which makes out from the northwestern point of the town in a N.N. Westerly direction two-thirds of a mile, then bring the sandhills a point on the port bow, and stand in until the north-western point of the town bears S.W.½W. when you will have the best berth with 5½ or 6 fathoms water. If it is desirable to get nearer in, haul up a little to the eastward of S. for the low rocky peak, which will just be visible over the sloping ridge to the southward and eastward of the town. A Vessel of moderate draught may approach within a quarter of a mile of Tsuki point, where there is a building yard for junks. This portion of the harbor, however is generally crowded with Vessels of this description, and unless the want of repairs or some other cause renders a close berth necessary, it is better to remain outside.

If the peak or saddle is obscured by clouds or fog, after doubling the promontory, steer N.N.E. until the sandhills are brought upon the bearing above given, when proceed as there directed.

A short distance from the tail of the spit is a detached sandbank with 3½ fathoms on it. The outer edge of this is marked by a white spar buoy; between this and the spit there is a narrow channel with 4½ fathoms water. Vessels may pass on either side of the buoy, but it is most prudent to go to the Northward of it.

Should the wind fail before reaching the harbor, there is good anchorage in the outer roads in from 25 to 10 fathoms.

Excellent wood, water, potatoes, eggs, fowls, fish and other supplies may be procured from the authorities of the town, or if preferred, water can be easily obtained from Kamida Creek, which enters the harbor to the Nd. and Ed. of the town.

The bearings are true.

Kamida Creek	*Latitude*	41° 49' N.
	Longitude	140° 47' 40" W.
Variation		4° 30' W.
High Water F. & C.		Vh
Extreme Rise & Fall		3ft

Drawn by Edward Sels

Engraved by S. Siebert

ENDERMO HARBOR

ISLAND OF JESSO

Surveyed by order of

COMMODORE M.C.PERRY U.S.N.

by

Actg Master C.A.Stevens and Midn R.L.May

of the

U.S.S.SOUTHAMPTON

J.J.BOYLE LIEUT. COMg

1854

Lat. 42° 21' N. } C. Jetomo
Long. 140° 56' 30" E. }
High Water F & C N. Rise 6 Feet.

The Soundings are in fathoms.

VOLCANO BAY

Hard

Clason I.

Hard

Hard

Hard

Soft

Soft

Soft

Hard

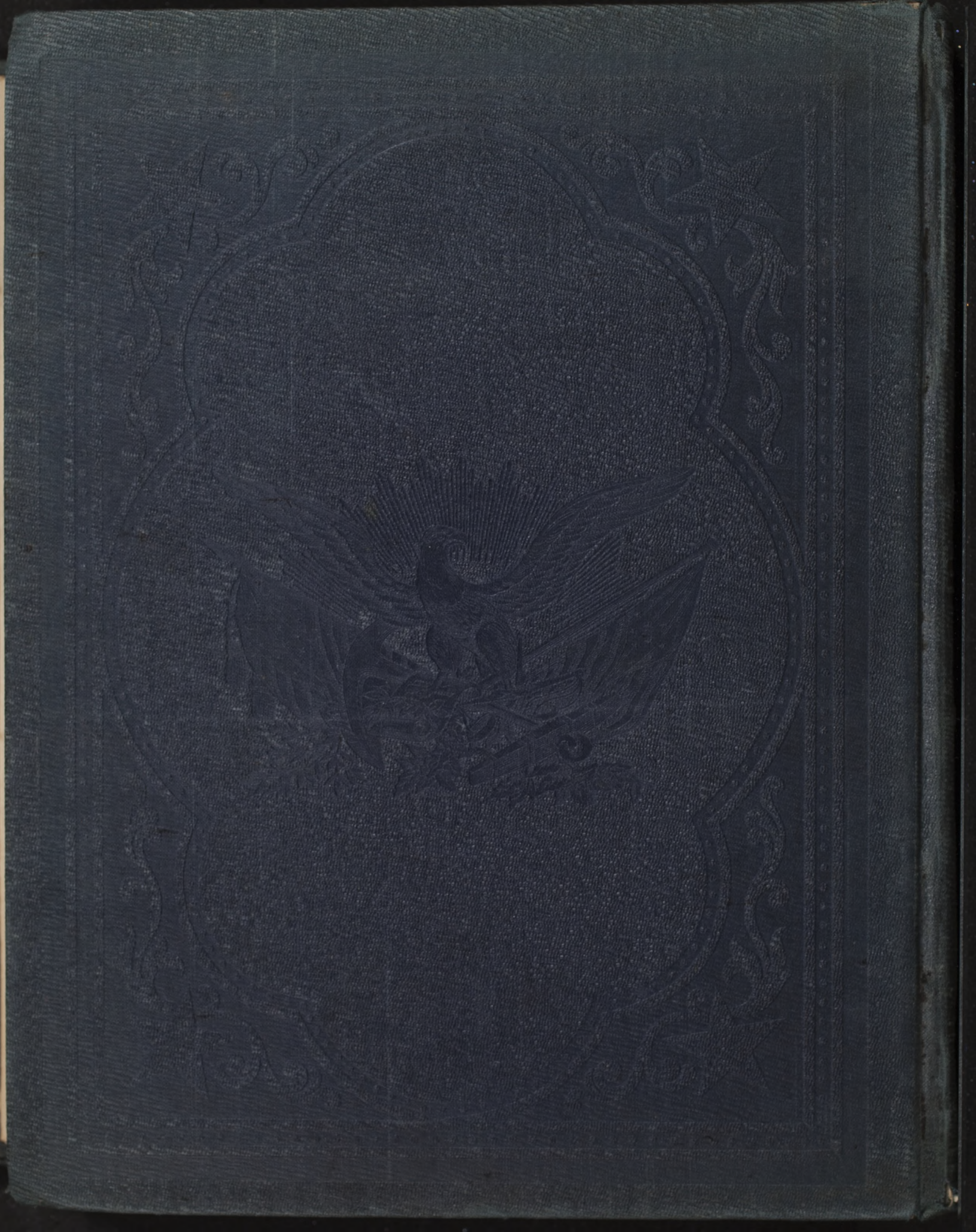
C. Jetomo

Nearly dry, at low Water

Scale of one Statute Mile

0 ¼ ½ ¾ 1

Scale of one Nautical Mile

0 ¼ ½ ¾ 1

Engr by Selmar Siebert