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THE PALOS VERDES WEATHER STUDIES

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A summary of results from
June, 1914 to December, 1918

Dated:
Los Angeles
January 7
1919

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By Ford A.Carpenter,Meteorologist.

An experiment was begun four years ago in applied weather study on the Palos Verdes ranch in southern California. Results have been secured as as to now make it possible to summarize. Briefly reviewing the work, mention will be made of some of the objects sought, the methods will be described, and the attainments noted.

Results of four years.

The investigation of the climate was proposed by the writer so that the utility and value of the different portions of the property might be determined. This was the first time in the history of weather observations that a climatically unknown tract of land was scientifically studied with a view of directly applying the knowledge thus gained.

A new weather venture

Reversing the usual procedure, the tract of land was not selected for the experiment, but the experiment was made for the land.

Two features of the preliminary work are prominent: First, it was not necessary to make any changes in equipment or method as the experiment proceded, and Second, the data secured was used month by month as the work progressed.

The location of the property lent itself admirably for this study. The old Spanish land grant of Los Palos Verdes consists of some 16,000 acres which is not now and never has been irrigated. It borders on the city limits of Los Angeles, extending from San Pedro(Los Angeles Harbor)on the east to Redondo Beach on the west. From the roof of one of the office buildings in Los Angeles, the Palos Verdes looks like an island, surrounded as it is by the low lands and the sea. It is physically characterized by a backbone of terraced hills which runs east and west, and attains a height of 1350 feet; the land sloping to the Pacific ocean on the south and to the San Gabriel valley on the north. It is practically the only considerable bit of California coast which has a southern exposure.

Location of tract

Geographical features.

The object of the investigations was to discover the varying climatic features of the Palos Verdes and apply these facts to home-making,farming,fruit-raising and water-supply.

Object of investigations.

The method used was to distribute a number of units of self-recording instruments throughout various locations. When sufficient time had elapsed to establish a record they were moved elsewhere. These stations

Method in use.

simultaneously recorded the temperature and moisture of the air, wind, rain and sunshine.

A study of these records show that even in the limited area under discussion there was 15 in temperature,50% variation in both rain and wind, and 12% variation in air moisture. These variations are the same throughout the regions and constitute what might be called local climates. From the data at hand the individual climate of every 5-acre plot may be determined. Also, by use of comparative figures it has been found practicable to extend the shorter records and use them accurately in connection with the 40-year data at the neighboring station at Los Angeles.

Local climates

The sunshine is practically constant as the photographic sunshine recorder shows. For example, the only day in the period of 365(July 1,1916 to June 30,1917)on which the sun did not shine was January 20.

One day in year without sunshine

The temperature is controlled by the sea itself, if we omit in our consideration the matter of latitude. The Pacific ocean off the Palos Verdes shores is no colder than 52 in winter nor warmer than 62 in summer,proving a heating factor in winter and a cooling influence in summer. The effect of the sea is apparent over one-half of the southern exposure.

Oceanic regulation

In comparison with other districts, this region is beyond the reach of ordinary weather influences such as heated or cooled land areas in the vicinity on account of the barrier of hills.

It is found that vegetation is affected as much by air moisture as by rain. The region up to 700 feet elevation is best suited for residences and gardens; above that the humidity became less although the rainfall and wind velocity both increased. The northern slopes were subject to drying winds and otherwise are generally unsuited for other than grain.

Air-moisture more important than rain

The amount and distribution of rainfall depends on wind and direction of slopes rather than elevation. Areas of heavy rain were plotted and used when planning roads. A study of the water supply in wells showed that it takes 6 months for the rainfall to percolate to the level of the well, so that the heavy January rain, for example, is available in July; and the absence of rain in July is shown in the low level of the wells in January.

Rainfall and elevatio

Rain percolates in 6 months

As in other localities in southern California winds increase with elevation but on the Palos Verdes ocean front the wind was 50% less in velocity than either the eastern or western boundaries of the tract at the same level. This is due to the headland

is due to the southern exposure, as the backbone of hills acts as a wind shield. Observations of shore and sea winds show that motor-boat or seaplane landings could be effected on an average of all but 10 days in the year. Airplane landing fields were surveyed as to wind direction and force, and safe take-offs or landings could be made on any day in the year.

The windshield of hills

The climatic studies of the Palos Verdes inaugerates a new era in practicalizing scientific weather study. As truly as agriculture is the foundation of commerce so climate is the foundation of agriculture. The climate of a place determines its suitability for commerce agriculture and residence. More than half of the mistakes in locating cities, farms or homes would be prevented were it possible to have previously known in detail the varying degrees of heat, cold, air moisture and air movement. It is firmly believed that subsequent developments made in accordance with such data would be uniformly successful.

Developments made according to climate

It may be definitely stated that upon temperature, moisture and wind rests the greater part of success or failure of any enterprise having to do with natural resources.

REFERENCES

It is suggested reference be had in detail to the following reports

Vol.I, May 26,1914 to June 30,1915,
253 pages of text illustrated by 61 photographs
Vol.II July 1,1915 to June 30,1916,
330 pages and 77 photographs
Vol.III 92 pages,and 3 photographs,
July 1,1916 to June 30,1917
Vol.IV 15 pages, 2 photographs
July 1,1917 to June 30,1918

Marginal references in within paper is had as follows: to which attention is directed for detailed reading-

(P.2) Object of investigation Vol.1, p.61-62

Geographical features Vol.1,pp 162,163

Methods used Vol.1,pp.64-66
"Barley and Rain,Beans and Humidity"
Vol.11,pp.78-85

(P.3) Local variation in climate
Vol.111, 79-83"Roads"

Seawater Temperatures
Vol.1,p.67; Vol.111, p.65

(P.4) Air moisture and growth Vol.11,p.78; Vol.1,p.212-214

Rainfall and elevation "Agricultural outlook"Vol.1,p.212-214
"Excessive Rainfall"vol.111,66-68
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Wells and Waterresources"Weather and Water Supply"Vol.1,pp.156-161
"Water Resources"Vol.11,pp.222-246
"Water temperature in wells"vol.11,p.268,269

(P.5) Wind
"Wind Power"Vol.1,pp.150,152
"Wilmington Wind"Vol.11,pp.254-258
"Crop-Damaging Winds"Vol.11,pp.259-261.

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