

ROUGH DRAFT

July 20, 1960.

The Voice of the Dolphins

by Leo Szilard

On several occasions in the second half of the Twentieth Century— in 1964, in 1972 and again in 1984—the world narrowly escaped an all out atomic war. In each case, the escape was due more to fortuitous circumstances than to the wisdom of the policies pursued by the statesmen.

That the bomb would pose a novel problem to the world was clear as early as 1946. It was not clearly recognised, however, that the solution of this problem would involve political and technical considerations, in an inseparable fashion. In America, few statesmen were aware of the technical considerations, and, prior to Sputnik, few scientists only were aware of the political considerations. After Sputnik, James B. Killian was appointed by President Eisenhower, on a full-time basis, as Chairman of the President's Science Advisory Committee, and, thereafter, a number of distinguished scientists were drawn into the work of the Committee and became aware of all aspects of the problem posed by the bomb.

Why then - so one may ask - did scientists in general and the President's Science Advisory Committee in particular, fail to make a major contribution to the solution of this problem. The slogan that "scientists should be on tap but not on top", which gained currency in Washington, may have had something to do with this failure. Of course, scientists could not possibly be on top in Washington, where policy - if it is made at all - is made by those who operate rather than by those who are engaged in policy planning. But what those who coined this slogan, and those who parroted it, apparently meant was, that scientists must not concern themselves with devising and proposing policies; they ought to limit themselves to answering such technical questions as may be posed to them. Thus, it may well be, that in the 1960's the scientists gave the wrong answers, because they were asked the wrong questions.

In retrospect, it would appear that among the numerous recommendations made by the President's Science Advisory Committee there was only one which has borne fruit. At some

point or other, the Committee had recommended that there be set up, at the opportune time, a major joint Russian/American research project in some field of knowledge having no relevance to the national defence, or to any of the politically controversial issues. The setting up in 1963 of the Biological Research Institute in Vienna under a Russian and American agreement was in line with this general recommendation of the Committee.

Subsequently, when the Vienna Institute came to be established, both the American and the Russian molecular biologists manifested a curious predilection for this Institute. Because most of those who applied for a staff position were distinguished scientists, even though comparatively young, practically all of those applied were accepted.

This was generally regarded at that time as a major set-back for this young branch of science in Russia as well as in America, and there were those who accused Semjon Bresler of having played the role of the Pied Piper. There may have been a grain of truth in this accusation inasmuch as a conference on molecular biology which was held in Leningrad in 1961 may have been due to his initiative. Bresler spent a few months in America in 1960 surveying the advances in molecular biology. He was so impressed by what he saw that he decided to do something to stimulate this new branch of science in his native Russia. The Leningrad Conference was attended by many Americans. It was the first time that American and Russian molecular biologists came into contact with each other and the friendships that formed on this occasion between them were to last a lifetime.

When the first scientific communications came out the Vienna Institute, it came as a surprise to everyone that they were not in the field of molecular biology, but concerned themselves with the intellectual capacity of the dolphins.

That the organization of the brain of the dolphin has a complexity comparable to that of Man had been known for a long time. In 1960, Dr. John C. Lilly reported that the dolphins might have a language of their own, that they were capable of imitating human speech and that the intelligence of the dolphins might be equal to that of humans, or possible even superior to it. This report made enough of a stir, at that time, to hit the front pages of the newspapers. Subsequent attempts to learn the language of the dolphins, to communicate with them and to teach them, appeared to be discouraging, however,

and it was generally assumed that Dr. Lilly may have over-rated their intelligence.

In contrast to this view, the very first communication from the Vienna Institute took the position that previous failures to communicate with the dolphins might not have been due to a lack of intellectual capacity but rather to a lack of motivation. In a second communication the Vienna Institute disclosed that the dolphins proved to be extraordinarily fond of Sell's liver paste, that they became quickly addicted to it and that the expectation of being rewarded by being fed this particular brand of liver paste could motivate them to perform intellectually strenuous tasks.

A number of subsequent communications from the Institute concerned themselves with objectively determining the exact limit of the intellectual capacity of the dolphins. These communications gradually revealed that the intelligence of the dolphins far surpassed that of Man. However, on account of their mode of life, the dolphins were ignorant of the facts, and thus they have not been able to put their intelligence to good use in the past.

Having learned the language of the dolphins and established communications with them, the staff of the Institute began to teach them first mathematics, next chemistry and physics, and subsequently biology. The dolphins acquired knowledge in all of these fields with extraordinary rapidity and, in time, they began to suggest to the staff experiments in the biological field. It soon became apparent that the staff of the Institute might be relegated to performing experiments, thought up by the dolphins.

During the first three years of the operation of the Institute all of its publications related to the intellectual capacity of the dolphins. The communications issued in the fourth year, five in number, were however all in the field of molecular biology. Each one of these communications reported a major advance in this field and was issued, not in the name of the staff members who had actually performed the experiments, but in the name of the dolphins who had suggested them. (At the time when they were brought into the Institute, the dolphins were each designated by a Greek syllable and they retained this designation for life.)

Each of the next five Nobel Prizes for biology was awarded for one or another of

these advances. Since it was legally impossible, however, to award the Nobel Prize to a dolphin, all the Awards were made to the Institute as a whole. Still, the credit went to the dolphins, of course, who derived much prestige from these Awards, and their prestige was to increase further, in the years to come, until it reached almost fabulous proportions.

In the fifth year of its operation, the Institute isolated a mutant form of a strain of commonly occurring algae, which secreted a broad-spectrum antibiotic and was able to fix nitrogen. Because of these two characteristics, these algae could be grown in the open, in improvised ditches filled with water, and they did not require the addition of any nitrates, as fertilizer. The protein extracted from them had excellent nutritive qualities and a very pleasant taste.

The algae, the process of growing them, the process of extracting their protein content, as well as the protein product itself, were patented by the Institute in the name of the dolphins - the original inventors - and the patents were assigned to a non-profit corporation, the Amruss Corporation, created for the purpose. When the product was marketed, under the trade name of Amruss, this corporation collected royalties which it transmitted to the Institute.

If taken as a protein substitute in adequate quantities, Amruss markedly depresses the fertility of women but has no effect on the fertility of men.

Amruss seemed to be the answer to the prayer of countries like India. India had a severe immediate problem of food shortage; and she had an equally severe long-term problem because her population increased at the rate of five million per year.

Amruss sold at about one-tenth of the price of soya bean protein and, in the first few years of its production, the demand greatly exceeded the supply. It also raised a major problem for the Catholic Church. At first, Rome took no official position on the consumption of Amruss by Catholics, but left it to the individual Bishop to issue such ruling for his diocese as he deemed advisable. In Puerto Rico the Catholic Church simply chose to close an eye. In a number of South American countries, however, the Bishops took the position that partaking of Amruss was a mortal sin, no different from

other forms of the practice of contraception.

In time, this attitude of the Bishops threatened to have serious consequences for the Church, because it tended to undermine the institution of the confession. In countries such as El Salvador, Equador, Nicaragua and Peru, women gradually got tired of confessing again and again to having committed a mortal sin and to be told again and again to do penance; in the end they simply stopped going to confession.

When the decline in the numbers of those who went to confession became conspicuous, it came to the attention of the Pope. As is generally known, in the end the issue was settled by the Papal Bull "Food being essential for maintaining life" which stressed that Catholics ought not to be expected to starve when food was available. Thereafter, bishops uniformly took the position that Amruss was primarily a food and not a contraceptive.

The income of the Institute, from the royalties collected, rapidly increased from year to year and within a few years it came to exceed the subsidies from the American and Russian Governments. Because the Institute had internationally recognised tax-free status the royalties were not subject to tax.

The first major investment made by the Amruss Corporation was the purchase of television stations in a number of cities all over the world. Thereafter, the television programmes of these stations carried no advertising. Since they no longer had to aim their programmes at the largest possible audience, there was no longer any need for them to cater to the taste of morons. This freedom from the need of maximising their audience led to a rapid evolution of the art of television, the potential of which had been frequently surmised but never actually realized.

One of the major television programs carried by the Amruss stations was devoted to the discussion of "political issues". The function of the "Voice of the Dolphins"-as this program was called - was to clarify what the issues really were; in taking up an issue the "Voice" would discuss what the several possible solutions were and indicate in each case what the price of that particular solution may be expected to be. A booklet, circulated by the "Voice of the Dolphins" program, set forth why the program set itself this particular task, as follows:

Political issues were often complex, but they were rarely anywhere as deep as the scientific problems which had been solved in the first half of the century. These

scientific problems had been solved with such amazing rapidity because they had been constantly exposed to discussions among scientists, and thus it appeared reasonable to expect that the solution of political problems could be greatly speeded up also if they were subjected to the same kind of discussion. The discussions of political problems by politicians were much less productive because they differed in one important respect from the discussions of scientific problems by scientists. When a scientist says something, his colleagues must ask themselves only whether it is true. When a politician says something, his colleagues must first of all ask "why does he say it?"; later on they may or may not get around to asking whether it happens to be true. A politician is a man who thinks he is in possession of the truth and knows what needs to be done; thus his only problem is to persuade people to do what needs to be done. Scientists rarely think that they are in the full possession of the truth and a scientist's aim in a discussion with his colleagues is not to persuade but to clarify. It was clarification rather than persuasion what it took in the past to arrive at the solution of the great scientific problems.

Because the task of the "Voice" was to clarify rather than to persuade, the "Voice" did not provide political leadership, but by clarifying what the issues were in the field of politics the "Voice" made it possible for intellectual leadership to arise in this field.

A number of political scientists were invited to join the Institute at the time when the "Voice of the Dolphins" went into operation and the first suggestion of the dolphins in the political field was made one year later. At that time the dolphins proposed that the United Nations set up a Commission in every South American capital and that these Commissions function along the lines of the U.N. Commission that had been in operation in Bolivia since 1950. That Commission was advising the Bolivian Government on all matters pertaining to the economic welfare of the nation; in addition, it made available trained personnel on whom the Bolivian Government could draw, if it wanted to put into effect any of the Commission's recommendations.

This proposal of the dolphins was generally regarded as wholly unrealistic. It was pointed out, that the governments of the South American nations did not operate in a vacuum, but were subject to numerous political pressures from private interests. It was freely

predicted therefore that any attempt on the part of a U.N. Commission to influence the action of the Government, to which it was accredited, would be frustrated by the influence of the private interests, no matter how sound the advice might be. But such was the prestige of the dolphins that their proposal, formally submitted to the United Nations by Uruguay, was adopted by a two-thirds majority of the General Assembly, after it had been vetoed in the Security Council.

Still, the sceptics might well have turned out to be right, had it not been for the activities of the "special agencies" which the Vienna Institute established in every one of the South American capitals where a U.N. Commission was in operation. These ^{special} agencies had no policy of their own; all they did was to support the policies of the local United Nations Commissions. All of them operated on a rather limited budget, of less than \$15 million a year, yet the conspicuous success of the "Commissions" in South America may have to be attributed to their activities. The amounts which these "special agencies" spent, small though they were, were spent exclusively for the purpose of bribing the members of the government in office to do what was in the public interest to do, rather than to yield to the pressures of private interests.

Had it not been for the extra income of the Vienna Institute, derived from the sale of Amruss, its activities would have come to an end at the time of the Communist revolution in Iraq, when all Russian-American agreements were cancelled.

In order to make the subsequent events fully understandable to the reader it might be well to recapitulate here the main events which preceded the Communist uprising in Iraq.

Between 1962 and 1965 the world passed through an agonizing transitional phase in the so-called atomic stalemate. At the beginning of this period America still had to rely on intermediate range rockets launched from foreign bases located in the geographical proximity of Russia. Russia, on the other hand, had no foreign bases, nor was she in need of any, since she possessed an adequate stockpile of long-range rockets which could be launched from bases inside of Russia and which were capable of carrying hydrogen bombs large enough to demolish a city. By 1965 America had an adequate stockpile of such long-range rockets also and, thereafter, she was no longer in need of having foreign bases either.

By 1965 America and Russia were capable of destroying each other to any desired degree, by means of long-range rockets which could be launched from trucks or railroad cars that were kept constantly on the move. From 1965 on, it would have been impossible for either Russia or America to destroy by one single sudden blow the power of the other to strike a devastating counter blow. With the fear of a surprise attack thus eliminated, the atomic stalemate began to gain a stability which it did not formerly possess.

As the world moved closer and closer to the long-range rocket stage of the stalemate, nations like France, Italy, Western Germany and Japan realized more and more clearly that they could not count on American protection if they got involved in a war with Russia; America could hardly have been expected to risk the loss of her own cities for the sake of protecting theirs. This consideration led to an increasingly strong demand on the part of these nations for having under their own control hydrogen bombs and rockets suitable for their delivery. America might have resisted such demands had it not been for the fact that by then America had begun to look upon her allies more and more as potential liabilities rather than potential assets. America felt inclined to provide her allies with bombs and rockets which they could use in their own defence if the necessity arose and thus to free herself from any moral commitment to defend them.

Not long after America undertook to provide France, Germany, Italy and Japan with their own long-range rocket and bombs, Russia decided to provide China with the bombs and rockets that China felt she needed for her security. The Central African Federation which was initially formed to constitute a Non-Nuclear Block was not provided with bombs and rockets until about ten years later.

By 1965, people in America ceased to think in terms of massive retaliation. It was clearly recognized that, at a time when America and Russia could destroy each other to any desired degree, the threat of massive retaliation would be tantamount to a threat of murder and suicide. Such a threat might be believable if made by a nation whose very existence was at stake in a conflict, but it would not be believable if made by America in a conflict in which American interests were at stake but not America's existence, as a nation. America, therefore felt that for the defence of her national interests she could not rely any longer on large bombs and long-range rockets. Therefore she put more and

not rely any longer on large bombs and long-range rockets. Therefore she put more and more reliance on highly mobile forces which could be rapidly transported to almost any part of the globe. It was assumed that, in the case of an armed conflict, America would send troops to the area involved and resist by using atomic bombs against troops in combat, within the contested area. In time, Americans came to understand well enough that the real aim of such a limited war could not be victory, which clearly might not be obtainable in every case, but rather the exacting of a price from the "enemy". If America were able to exact a price higher than the price which the enemy would be prepared to pay, then America's capability of fighting a limited war, anywhere on the globe, would effectively deter the "enemy" from attempting to change the map by force. It was recognized, of course, that in order to freeze the map America would have to be prepared to pay a price as high as she proposed to exact, both in money and in lives - the lives of the young men who would die in the fighting.

It was generally taken for granted that the large bombs and the long-range rockets would play no role in any of the foreseeable conflicts. They were kept as an insurance for the sole purpose of discouraging Russia or China from attacking America, by means of such large bombs. In this sense, and in this limited sense only, did the large bombs seem to serve a useful purpose as a deterrent.

No one had any doubt that the revolution in Iraq, which caught America by surprise, was in fact communist-inspired and America responded promptly by landing troops in the Lebanon and Jordan. This time she was determined to settle the issue of the control of the Middle East and thus to end, once and for all, the threat that Western Europe might be cut off from its Mid-Eastern oil supply. Egypt and Syria declared that they would regard an invasion of Iraq by American troops as an attack against themselves. Turkish troops were poised to move into Syria, and Russia was concentrating troops on the Turkish border, for the purpose of restraining Turkey.

At this point America proclaimed that she was prepared to send troops into Turkey, to use small atomic bombs against Russian troops on Turkish soil and in hot pursuit perhaps also beyond the pre-war Turkish-Russian boundary.

It would appear that Russia disliked the prospect of fighting an atomic war on her southern border, with little assurance that such a war would not spread and finally end up in an all-out war; rather than to take this risk Russia decided to adopt another kind of strategy. In a Note, which was kept very short, she proclaimed that she would not resist locally, by force of arms, an American intervention in the Middle East but would rather seek to deter America by setting a high price. The price would not be set, however, in terms of human life but in terms of property. The Russian Note listed twelve American cities by name. Russia stated that if American troops crossed over into Iraq she would single out one of these twelve cities, give that city four weeks of warning to permit its orderly evacuation - as well as to allow time to make arrangements for the feeding and housing of refugees - and thereafter the city would be demolished with one single long-range rocket.

The American reply indicated that for each city that Russia would demolish in America, America might demolish two cities in Russia.

To this, Russia replied in a second Note - a Note of unprecedented length - that if America were to demolish two cities in Russia for each city that Russia may have demolished in America, and if Russia were to demolish two cities in America for each city that America may have demolished in Russia, then the destruction of one city would trigger a chain of events which would step by step lead to the destruction of all American as well as Russian cities. Since clearly America could not possibly want this result, she may not make such a threat of "two for one" and expect it to be believed. Russia, on her part, would tolerate that America demolish one Russian city, in return for Russia having demolished one American city. But for each additional city that America might demolish, Russia would demolish one and just one additional city in America.

This second Note made it clear that even though Russia would abide by such a principle of "one for one", this did not mean that America would be free to demolish a large city in Russia in return for a small city demolished in America. What would count in this respect, so the Note stated, would be the size of the city, as expressed by the number of inhabitants, rather than by the number of square miles covered by the city.

Twenty-four hours after this Russian Note was received in Washington, the Division of Vital Statistics of the Vienna Institute issued a document which listed the number of inhabitants of all American and all Russia cities. In their preface the dolphins stated that if American troops were to invade Iraq and Russia were to demolish one of the twelve cities she had a listed, a very undesirable controversy might arise on the issue of which American city may be equal to which Russian city unless an authentic list of the number of inhabitants was readily available.

This document was issued so promptly that it aroused Russian suspicion. The Russians thought that somehow the Vienna Institute may have had inside information about Russian intentions and thus was able to prepare in advance this list of cities. American and British statesmen had so often said that the Russians were unpredictable that finally the Russians themselves came to believe it. There is no reason, however, to think that the Vienna Institute had any advance information. Rather, it seems that the dolphins, being no inferior in intelligence to the men in Moscow who devised Russia's policies, were frequently able to predict the moves that Russia would make next. This view is borne out by the few records of the Vienna Institute which survived the fire that destroyed the Institute in 1986.

The second Russian Note caused a turmoil in Washington. Various groups urged the Government that it adopt a rigid policy of demolishing two Russian cities for each city demolished in America, that it accept the principle of "one for one", and that it do nothing but just keep the Russians guessing.

At a meeting of the National Security Council several experts expressed the view that were Russia actually to demolish one of the twelve cities she had listed, the public would demand that America retaliate by demolishing a large number of Russian cities. They said that the President would thus not be able to abide by the principle of "one for one" without seriously risking the defeat of his party at the next elections. The Government thereupon asked Gallup to conduct a poll on an emergency basis. Residents to the thirty largest cities were asked whether if Rochester, N.Y., one of the twelve cities named, were

demolished, America ought to retaliate by demolishing just one Russian city, or whether she ought to retaliate by demolishing more than one Russian city. To the surprise of the Government, 85% of those who had an opinion declared themselves against America demolishing more than one Russian city. In retrospect, this response does not appear to be so very surprising, since the people polled very well knew that if America were to demolish two Russian cities in retaliation for Rochester, Russia would demolish one additional American city and that additional city might be their own.

Some of the members of the National Security Council declined to take this poll at its face value and said that the people ~~were~~ ^{would} react differently if Rochester were actually demolished. The rather involved psychological argument they cited in support of this view was never put to a test, however, for America did not intervene militarily in Iraq.

Within a few days after the receipt of the first Russian Note which listed the twelve cities, people began to register in Washington as lobbyists for one or other of the twelve cities, and ten days later there was not a hotel room to be had in the whole city. It was the most powerful lobby that ever hit Washington. With steadily increasing editorial support across the nation, after an initial period of uncertainty, this lobby succeeded in forcing a re-examination of the whole Mid-Eastern issue. Doubts were raised as to whether Western Europe was really in danger of losing its supply of oil, since there was no other market for mid-eastern oil. It was said that, while the price of oil from the Middle East could be raised, it could not be raised very much, since it could be replaced by oil from the Sahara. As the result of a re-examination of the whole Mid-Eastern issue, America decided to withdraw her troops from the Lebanon and Jordan.

This decision was reached in the face of strenuous opposition on the part of a small, but vocal and influential group of opinion makers. There were prophets of doom who declared that if America yielded to Russia's threat on this occasion, then from here on Russia would be in a position to get her way on any issue; ~~then~~ she would be in a position to change the map at will, simply by threatening to demolish a limited number of American cities, in case America should try to resist locally, by force of arms.

Fortunately, these prophecies proved to be incorrect. For the time being at least, Russia appeared to be quite satisfied with the map as it stood. True enough, a number of nations in South-East Asia went communist and so did several nations in Africa. On the other hand, the Communist Government of Iraq broke diplomatic relations with Russia, in protest against Russia's supplying oil at cut-rate prices to Western Europe, thus demonstrating once more that the capitalist nations have no monopoly in feuding with each other.

Russia did derive great economic benefit from her decision to forego war. In short order, she abolished her air force and her entire navy, including her fleet of submarines; she also reduced her army and retained only a comparatively small number of highly mobile units equipped with machine guns and light tanks. Russia continued to maintain, of course, a large number of long-range rockets mounted on trucks and on railroad cars, which were constantly moved around, along her highways and railroad tracks.

As the result of the economies thus achieved, Russia was able to invest 25% of her national income in capital goods serving her consumer goods industry and her standard of living was increasing at the rate of 8% per annum. Her per capita consumption of meats and fats rapidly approached that of America and, as the result, deaths from coronary attacks rose very markedly and were approaching the American figures.

Propaganda-wise the Russians stressed the moral issue involved and made the most of it. All over the world Communists and Russians sympathisers proclaimed that wars, which initially merely meant the killing of soldiers, but in the end came to mean the wholesale killing of civilians - men, women and children - as well as soldiers, were now a thing of the past, thanks to Russia's decision to forego, abrogate and abolish war. They said, over and over again, that Russia was the ~~only~~ truly Christian nation since she alone, among the Great Powers, was upholding the Fifth Commandment. *

* The possibility that it might be to Russia's advantage to adopt this type of strategy was discussed by Szilard in an extensive article which appeared in the February issue of the Bulletin of the Atomic Scientists in 1960. It is not known whether Szilard's article

elicited any response other than a notice in Newsweek, in America, and in Crocodile, in Russia. Newsweek condensed this article beyond recognition and managed to convey the impression Szilard had proposed that Russia and America ought to demolish each other's cities in exchange - to no sensible purpose. Taking its information from Newsweek, Crocodile suggested in its issue of April 20, 1960 that Newsweek carry an ad for Szilard offering to exchange his room 812 in the Medical Division of Memorial Hospital, New York, for a bed in Ward 6 in the Psychiatric Division. Some of his American colleagues do remember that Szilard made some prediction concerning the strategy which the Russians would adopt if there is no general disarmament, but they remember only that he had predicted something rather crazy without recalling what it was that he had predicted. After his death, Szilard appears to have received some recognition, however, on the part of his Russian colleagues, who named a small crater after him - on the back side of the moon.

Following the Iraq crisis there arose two rival schools of thought in America and both had about equal influence in Washington,

One of these held that America ought to follow Russia's example and counter any threat of Russian "aggression" by the threat of demolishing a strictly limited number of Russian cities. Having embraced such a policy, America should then cut down on her arms expenditure by reducing the Army, Navy and the Air Force.

The other school argued that operating with the threat of demolishing cities would favor Russia rather than America, because the American Government was more responsible to the will of the people and the people did not like to see their cities demolished. They urged therefore an all-out effort to develop an anti-missile missile, capable of destroying incoming Russian rockets in flight. They explained that a defence system based on such missiles could nullify the Russian strategy of demolishing cities and thus restore America's ability to deter Russian aggression through limited wars. On the ground that the development of such a missile was imminent, they advocated that America maintain a military establishment capable of transporting highly mobile units by air to any part of the globe.

They stressed that as soon as America was capable of protecting her cities from long-range rockets, her capability of using atomic bombs against troops in combat would enable her to freeze the status quo.

The President's Science Advisory Committee took a dim view of the development of an effective anti-missile missile defence system but in the end the views of the Department of Defense prevailed; thus, an appropriation of \$20 billion per year for the development of such a defence system was included in the Budget and unanimously passed by Congress.

Pending the completion of the development of the anti-missile missile system, America continued a dual policy of maintaining long-range rockets and also a combat-ready military force capable of fighting local wars. Since maintaining such a dual system was costly, America had an arms budget of around \$60 billion. This cut down the amount invested in capital goods serving the consumer goods industry to 3% of the national income and slowed the rise in the standard of living to about 1% per annum. Such a stagnation in the standard of living was not deemed to be a very serious detriment, however, since the standard of living was high enough as it stood; moreover, a high defence expenditure was regarded as an insurance against the possibility of a recession.

The depression which hit America in 1975 began with unemployment in the construction industry, which subsequently spread to other industries. In the hope of inducing the Federal Government to finance large-scale construction, in the second year of the depression ^{the} construction industry established a lobby in Washington. But, in spite of large-scale Federal construction, there was no marked economic improvement by 1979, at the time when the Iranian upheavals occurred.

The Government responded to these upheavals by promptly proclaiming that if Russia should send troops into Iran, America would not fight her in the contested area, but, instead, two Russian cities of about one million each would be demolished, after receiving four weeks of warning. Americans understood fully that should Russia actually invade Iran not only Russia but also America would lose two cities. It was generally felt however that, because of the large-scale unemployment prevailing in the construction industry, America would be in a position to rebuild, in short order, the cities which she might lose.

The Government's proclamation had strong support in Congress. It would be ~~uncalled for~~ ^{however} to attribute this to the influence of the lobby of the construction industry. Undoubtedly Congressmen realized that, with the development of the anti-missile missile still lagging, the Government had no other recourse but to adopt the "Russian Strategy". Moreover, there was some reason to believe that Russia might not be willing to sacrifice two cities for the sake of Iran.

In fact, Russia did not send troops into Iran. Whether she refrained from doing so because she would have lost two of her cities or whether she never really had any serious intentions of militarily intervening in Iran, may be regarded today as debatable. At that time, however, the press in America stressed that the Russians had an emotional attitude towards property and abhorred the destruction of property, particularly public property. They also stressed that the loss of a city would mean ^{much} more to Russia than just the loss of property, that it would disrupt the social fabric and cause dislocations which the precariously balanced Russian social system could not easily stand.

The Iranian incident was followed by a period of quiet and many people began to believe that the strategic stalemate had reached a stage where it was virtually stable. The map appeared to be frozen, at least in the sense that such changes as came about came about through genuine internal revolutions and no nation sent its troops across the frontier of another nation in an attempt to increase the territory under its control, ~~by resorting to arms~~

Around 1980 there appeared, however, a new kind of instability. As the Russian rockets increased in numbers and became capable of carrying larger bombs the situation of the United Kingdom, France, Germany, Italy and Japan became precarious. Up to then, these nations had based their security on rockets which were constantly moved around within their territory. Rockets are guided by delicate instruments, however, which are ruined if the rockets get badly shaken up. All these countries were small, and had Russia exploded about one-fourth of her rockets in a sudden attack say over France and Germany, the French and German rockets would have been so badly shaken up that neither of these two countries would have been capable of striking a counter-blow. In these circumstances, all the atomic

nations, with the exception of America, Russia and China, felt compelled to shift their defence, from land based rockets, to rockets based on submarines-equipped for the launching of rockets. This solved the problem of surprise attack with which these nations were faced, but - as we shall presently see - it created a new problem for the world.

Just at that time when the nations were thus converting to "submarine defence" there was political tension caused by the situation in Japan, in the Pacific, and by the situation in Germany, in Europe. In part as a result of the high tariffs which America had promulgated to balance her high military budget, Japan found herself in economic difficulties which swept the Japanese militarists into office. The power of China blocked the possibility of a Japanese adventure in South-East Asia, but Japan, having built up a powerful navy, could have moved into the Philippines if America had lost her ability to protect those islands. Thus Japan, while potentially explosive, was, for the time being, bottled up. The same was true also of Germany. By this time all Germans were united on a single political objective; they all wanted the territories lost to Poland, at the end of the Second World War, returned to Germany.

Fears were growing both in America and in Russia that one day a bomb might be launched from a German or a Japanese submarine and destroy, say, an American city. Since the identity of the attacker would remain concealed America might counter-attack Russia, with the inevitable result that Russia would counter-attack America.

To what extent such fears were justified is difficult to say, but it is certain that if Russia and America had mutually destroyed each other, this would have left both Germany and Japan in a much better position to pursue their ~~political~~ aspirations. (The reader may recall that during the Second World War, a few days after Germany went to war against Russia, there was an attack from the air against the Hungarian city of Kaschau. The Hungarians examined the bomb fragments and found that the bombs were of Russian manufacture. As we know today, the bombs were dropped by the German Air Force to create the impression that Russia was the attacker and of thus to induce Hungary to declare war on Russia. This ruse was successful.)

Apprehensions reached such a level that wealthy Americans went to live in Arizona and New Mexico, where they built luxurious homes, equipped with air conditioned shelters

capable of storing a year's supply of food, and with attics, complete with machine guns mounted in the windows. Many Americans transferred funds to Switzerland and this movement of funds reached such proportions that Swiss banks ceased to pay interest on deposits and levied a 2% annual "carrying charge". This flight of capital forced America to raise the price of gold. Ostensibly America did this in order to render economic help to South Africa where, as the result of a revolution, an all-black government took over, which America was quick to recognize. In fact, however, the chief beneficiary of the rise in the gold price was Russia, which up to then refrained from exporting gold at the prevailing low prices, and had begun to line the walls of her public toilets with sheets of gold, in token fulfilment of a prophecy once made by Lenin.

By 1985 there was strong sentiment in America for general and total disarmament, whereas Russia was more in favor of controlled arms limitations and appeared to be reluctant to accept general and total disarmament until such time as it would be possible to set up an international armed force under the United Nations, which would guarantee the status quo.

In this respect, the situation was thus quite similar to what it had been in 1960, except that the positions of America and Russia were now reversed.

In other respects, however, the situation of the world was quite different from what it had been in 1960, and this different must be kept very much in mind, lest we over-estimate the role of the dolphins in the achievement of general ~~and virtually complete~~ disarmament. This writer agrees with the generally accepted view that, without the intellectual guidance of the dolphins, it would not have been possible for the Governments to reach agreement on arms control in 1986. I am not prepared, however, to concede that such an agreement could have been concluded between the Powers as early as 1960, if the advice of the dolphins had been available at that time.

Since the main object of this dissertation is to evaluate the role which the dolphins played in bringing about peace, it is necessary at this point to examine three things.

- (a) The reasons why earlier efforts failed to bring about disarmament and to rid the world of the bomb.

(b) To what extent the failure to reach an agreement on disarmament in 1960 was due to faulty thinking, and to what extent it was due to the unfavorable world situation.

(c) How the world situation changed between 1960 and 1985, and to what extent this change facilitated the reaching of an agreement on disarmament.

(a) Why the early efforts ^{had} failed.

The first disarmament conference of the League of Nations convened in 1925. It so happened that Albert Einstein passed through Geneva during this conference and when they discovered his presence, reporters asked him how he was impressed ^{by} the progress the conference was making. "What would you think," Einstein asked "about a meeting a town council which is convened because an increasing number of people are knifed to death each night in drunken brawls, and which proceeds to discuss how long and how sharp shall be the knife that the inhabitants of the city may be permitted to carry?" After a somewhat shocked silence, one of the reporters asked Einstein "Do you mean to convey that the disarmament conference is bound to fail?" Einstein said, "Yes, I do."

In 1934 there was a proposal before the disarmament conference of the League of Nations in Geneva to outlaw bombing from the air. This proposal was rejected by Britain. Anthony Eden, at that time still a civil servant, acted as the spokesman for his Government. He stated that His Majesty's Government would not be a party to an agreement which would make it illegal to drop bombs from the air, because the only practical way of deterring the unruly tribes on the northern frontier of India from making forays into Indian territory, was to destroy, if need be, their mud huts through bombing from the air. (Some Americans seem to have recalled this incident in the 1960's. At that time Russia proposed that the Powers should each pledge themselves not to use atomic bombs against a nation, unless that nation used atomic bombs against them, and America rejected this proposal on the ground that refraining from using atomic bombs might, in certain circumstances, put her to a military disadvantage.)

The first negotiations aimed at international control of the bomb centered around the Baruch Plan. The outlook for a success of these negotiations was never very bright, but while these negotiations were still in progress, many Americans had already arrived at the

conclusion that as long as America had the bomb, and Russia did not, the best way to deter Russia from intervening militarily in Europe was for America to hold on to the bomb and to threaten massive retaliation against the cities of Russia.

A policy which calls for the dropping of bombs on Russian cities and the killing of men, women and children, in retaliation for Russian military intervention in Western Europe, was of course difficult to justify from a moral point of view, particularly if one simultaneously proclaimed that the Russian Government was not responsive to the wishes of the Russian people. No objection could be raised, however, to such a policy on the grounds of expediency, as long as Russia was unable to strike back, and the policy advisors of the American Government concluded that America should hold on to the bomb, for the time being, but that she ought to be willing to give it up when Russia would come into possession of the bomb and the threat of massive retaliation would thus lose its effectiveness.

It did not occur to any of these advisers, at that time, that it might be possible to use atomic bombs as a tactical weapon against troops in combat; ~~and~~ thus America's willingness to give up the bomb by a certain date came to depend on the single issue, of just how long Russia would take to develop the bomb. In his book "Speaking Frankly" James Byrnes relates that when he ^{became} ~~was~~ Secretary of State and the negotiations on the Baruch Plan began, he went to considerable trouble to find out how long it would take before Russia would have the bomb. From the best advice he could get he concluded that this would take between 7 and 15 years. He added that this estimate ^{had been} ~~was~~ based on the assumption of fairly rapid reconstruction after the war and that because reconstruction was in fact slower than anticipated, his estimate of 7 to 15 years ought to be revised upward rather than downward.

The first Russian atomic bomb was in fact detonated four years after Hiroshima. In 1945 and 1946 the atomic scientists who developed the bomb went to great trouble to convince the American Government that Russia would take no longer than five years to get the bomb. This view was opposed, however, by the brass hats, who had administered the development of the bomb, and their views prevailed with the Government.

(b) Why did the disarmament negotiations fail in the 1960's?

In 1960 Russia proposed that the nations agree to general and complete disarmament, that such disarmament be put into effect within a few years and that, as a first step, all rockets and all other means suitable for the delivery of bombs be destroyed. The Russian proposal was not acceptable to America, either as it stood, or even as a basis for discussion.

Russia blamed America's reluctance to go along with any of her proposals on the influence of militarists and arms profiteers but, even if such influences may have played a certain role, they hardly played a decisive role. That the Army and Navy would not have cherished being drastically cut down in size is certain, but it was customary in America for generals and admirals to look forward to an early retirement. Many of those who retired accepted the chairmanship of the board of directors of one company or another at a ten-fold increase of their salary. Thus, it would not have been difficult to compensate the "brass", if drastic cutbacks had made their early retirement necessary, by making suitable arrangements for them.

Some Americans were fearful that drastic cutbacks in defence expenditure might trigger a major recession; they held that even though means to forestall such a recession were at hand, no one could be certain that these means would be applied in time and on an adequate scale.

These apprehensions could not have blocked disarmament, however, except for the fact that most people in America, including many men of good will, had serious doubts - on two scores - about the Russian proposals: they doubted whether disarmament was feasible and, more important, they doubted whether it was desirable.

Thus Walter Lippmann, for instance, wrote in his column on June 30, 1960: "...there is good reason to think that ... the Soviet aim of total disarmament is almost certainly impossible and also undesirable ... There is nothing we can do about the Soviet aim except to say that if total disarmament could be achieved the disorders in the world would probably be very great." Despairing of the possibility of disarmament, Lippmann suggested that the Americans say to the Russians: "On the critical issue of the big lethal weapons

let us both base our security on developing invulnerable deterrents. Let this understanding that we will do this be our agreement. Then let us negotiate about saving money by reducing other components of military power."

Most of those Americans who thought that disarmament would not be feasible, did so because they could not see any way of making sure that Russia would not secretly hide a large number of bombs and rockets. As we know today, the difficulties of instituting safeguards against secret evasions were grossly over-estimated in the 1960's; people did not understand at that time the true nature of this problem and also they tended to look to pedestrian methods for the solutions of an unprecedented problem.

But why did so many men of good will in America doubt that disarmament was desirable?

Even though this was not explicitly stated by the Russians at that time, Americans generally assumed that virtually total disarmament would mean a world in which there would be no bombs or rockets, no air forces or navies and no mobile heavy equipment, such as heavy tanks and guns. ~~Nobody believed that~~ ^{Clearly,} machine guns could ^{not} be effectively eliminated and, even though in a disarmed world, all armies would be disbanded and military service abolished, improvised armies equipped with machine guns could spring up so to speak over night.

Both America and Russia would have been secure in such a disarmed world, for neither of these two countries could have been conquered by an improved army equipped with machine guns. Moreover, even in a disarmed world, America and Russia would have been strong enough to exercise a measure of control over their neighbours. Apparently this would have satisfied Russia in 1960, but it did not, at that time, satisfy America.

Americans asked what would happen if a North Korean Army equipped with machine guns were to march into South Korea; what would happen if North Viet-Nam were to attack South Viet-Nam; could the Chinese not invade Formosa with barges mounting machine guns?

For a few years after the Second World War these areas were of some importance to America from the strategic point of view. Even though they would have had no strategic importance, either in the long-range rocket stage of the atomic stalemate, or in a virtually totally disarmed world, the loss of these areas would have meant a serious blow to American prestige and self confidence. Legal commitments can sometimes be abrogated

but it is not so easy to get out of moral commitments.

It might well be true that American prestige was at stake only because America foolishly had engaged her prestige, but, as matters stood in 1960, any military disengagement in the contested areas in the Far East would have had to be preceded by a disengagement of prestige and a disengagement of prestige would have required a political settlement with China. In 1960, China was not ready for a political settlement and neither was America.

In 1960, Americans were just beginning to ask themselves how America had gotten into such a mess in the Far East. It is probably fair to say that this would not have happened had the Chinese Government been seated in the Security Council of the United Nations, in accordance with the Charter, as soon as it achieved full control over the mainland.

At the end of the Second World War, Korea had been divided, by the stroke of the pen, into North Korea and South Korea. Neither of these two territories accepted this division with good grace and both wanted to unify Korea, if necessary by force of arms. America furnished arms to South Korea and Russia furnished arms to North Korea. When North Korean troops crossed the 38th Parallel and penetrated deeply into South Korea, America decided to land troops in South Korea. This intervention was given the semblance of greater respectability by a vote taken in the Security Council which permitted the intervention to take place under the flag of the United Nations. Had China been seated in the Security Council - as she ought to have been - she would have vetoed such intervention by the United Nations. Presumably this would not have prevented the United States herself from intervening, but it is almost certain that, in that case, the United States would have had to satisfy herself with pushing the North Korean troops out of South Korea; troops fighting under the American flag could not have crossed the 38th Parallel without flagrantly violating the United Nations Charter.

The troops, fighting under the flag of the United Nations, did cross the 38th Parallel and fought their way all the way up to the Yalu River which forms the boundary between North Korea and China. It was at this point that China intervened and there ensued a war between China and the United Nations which the United Nations was not able to win.

It may be well to remember at this point that when the United Nations was organized, it was set up as an instrument that was supposed to maintain the peace among all nations, as long as the Great Powers acted in concert with each other to this end. In order to exclude the possibility that the United Nations might get involved in a war which it would be unable to win, the Charter provided that the United Nations may apply sanctions involving armed action only with the concurring votes of the five permanent members of the Security Council.

Even though there were numerous attempts to use the United Nations for purposes other than that for which it was intended, and all of these weakened the United Nations, the worst of these was the attempt to unify Korea by sending troops under the flag of the United Nations into South Korea and ordering them to cross the 38th Parallel into North Korea.

This led, among other things, to a hostile attitude on the part of Americans towards China, because many of us find it difficult to forgive those to whom we have done wrong.

After the Korean War, America opposed the seating of China in the United Nations and she adopted a policy of 'No Speak' towards China. By 1960 most Americans seem to have realized the foolishness of such a policy, but apparently they found themselves powerless to change it.

Szilard's diary, recently reprinted by Simon & Schuster, contains an entry made in 1960 to the effect that he ~~does~~^{did} not know personally anyone who still thought that America ought to persist in opposing the seating of China in the United Nations. In flagrant contrast to this, virtually all of those who ran for elected office, in that year, went on ~~the~~ record against the seating of China.

This is not so surprising, as it might seem, if one recalls to what extent the American two-party system favors minority rule. A few percent of the voters who feel strongly enough on an issue, to be willing to throw their vote, on that single issue, from the Democratic to the Republican candidate or vice versa, may well be in the position to determine which of the two candidates shall win. This explains why under the American

political system, a minority may force its will on the nation as a whole. Thus America's long-sustained opposition to the seating of China in the UN was forced upon her by an emotional minority of the voters, representing less than 5% of the votes.

America never actually changed her vote on the issue of the seating of China in the United Nations but, in 1975, she allowed herself to be out-voted by a two-thirds majority in the General Assembly.* That the dolphins had anything to do with bringing this about

*Footnote: This outcome of the voting was partly due to some of the neutral members, such as Austria, who changed their previous vote, and partly to the newly-admitted African nations who, in the absence of American and Russian pressure, voted in an unpredictable fashion.

was not suspected at the time, for people did not know that the dolphins interfered in American politics and exerted influence through the American Research Foundation.

This Foundation derived its income from the Amruss Corporation and its income exceeded that of the Ford Foundation twenty-fold. The trustees of the Foundation served on a part-time basis, without salary. Membership of the General Advisory Board of the Foundation was, however, a full-time job, carrying a salary of \$200,000 a year - for life - and when, in the course of the years, the Advisory Board was built up to full strength its membership consisted of twenty distinguished politicians, Democrats and Republicans about equal in number.

The first politician to join the Advisory Board was Peter Douglas, who became Secretary of State when the new Administration took office - following the 1972 elections. Douglas, who was irrevocably committed to opposing the seating of China in the UN, resigned his position as Secretary of State in June 1973 to accept a life membership on the Advisory Board. His successor in office was Roger Knowland*, a Californian, who was also strongly

*Footnote: No relation of the late Senator William Knowland.

opposed to the seating of China. He, in turn, resigned his office in February 1974 to join the Advisory Board. His successor as Secretary of State, Milton Land, former Senator from Massachusetts, did not share the views of his predecessors and apparently he made no effort

to prevent the seating of China in the UN.

According to the charter of the American Research Foundation, the General Advisory Board wielded great power, for its recommendations were supposed to be binding on the Board of Trustees. However, the charter also specified that these recommendations must be passed by a unanimous vote and it seems that no resolution ~~has~~ ever passed the Advisory Board by unanimous vote. While this must have been rather frustrating to its members, there is no record of anyone ever having resigned from the General Advisory Board.

It is quite evident - in retrospect - that membership in the Advisory Board had never been offered by the Foundation to any Cabinet officer or any member of the Senate who pursued, or supported, a constructive foreign policy. It should be borne in mind, however, that only in the light of subsequent events does it become evident ~~beyond dispute~~, whether a foreign policy is constructive or not.

In the circumstances, the world might well have remained unaware of the role which the dolphins played in American politics, except for the revelations contained in Alex Gamov's "Conversations with Pi Omega Ro", (Harper & Brothers, 10th edition 1998, New York N.Y.), which covers the two years immediately preceding the establishment of the Foundation.

There was a time when people thought that the discussions reported in ^{the} "Conversations" ~~with Pi Omega Ro~~ were transcripts of the conversations which staff members of the Vienna Institute had with Pi Omega Ro. In view of the inconsistencies discovered, this view is probably no longer tenable, and today it is regarded as more likely that Gamov reconstructed these conversations from memory.

As the reader may recall, Gamov had been a member of the staff of the Vienna Institute who had married the sister of one of his American colleagues, and did not return in 1986 to Russia, but joined the Salk Institute in La Jolla, California. Upon his retirement, ten years later, he began to write the "Conversations".

In this book he relates that the dolphins, who grasped mathematics, chemistry, physics and biology with ease, found it difficult to comprehend America's social and political system. The American staff members whose task it was to explain America to Pi Omega Ro got at times so exasperated, by the questions asked by this dolphin, that they asked Gamov, who spoke flawless English, to come to their rescue.

Thus, on one occasion, Pi Omega Ro asked whether it would be correct to assume that Americans were free to say what they think, because they did not think what they were not free to say. On another occasion, he asked whether it would be correct to say that an honest politician was a man who had to fool himself in order to be able to fool others. When Pi Omega Ro became interested in foundations he wanted to know everything about them, including the legal technicalities of their tax exemption. Upon being informed that a tax-exempt foundation may not spend its funds to influence legislation but it may spend them on education, he asked whether this implied that in America education did not influence legislation.

Pi Omega Ro was puzzled why money, which would otherwise be taxed away and go to the Treasury, should be permitted to go to foundations, when obviously foundations never did any-thing worthwhile except what the government was doing anyway, and in many cases was doing better. He regarded the by-laws of the foundations, which provided that grants for research projects be allocated by the trustees by a simple majority vote, as an ingeniously contrived device to make certain that no imaginative project ever gets approved. "Let us assume, for the sake of argument" so he argued "that one-third of the trustees are men endowed with imagination and two-thirds of them are not so endowed. Does not the majority vote then automatically bar any imaginative project? And even if we accept as the basic tenet of true democracy, that one moron is as good as one genius - is it necessary to go one step further and to hold that two morons are better than one genius?"

These conversations must be regarded as authentic, in spite of the doubts which were raised by some of those who knew Gamov at La Jolla. Their observation that Pi Omega Ro's sense of humour showed a remarkable resemblance to Gamov's own sense of humour is of no relevance, since his long association with Pi Omega Ro may well have colored Gamov's own sense of humour. As a matter of fact, the "Conversations" is the only document that provides us with a key to the understanding of the following important points:

- (a) The peculiar voting procedure through which the Foundation allocated grants to research projects, submitted to the trustees;
- (b) The establishment by the Foundation of a large number of highly paid Fellowships, granted for life;

- (c) The voting procedures through which the members of the National Academy selected the candidates for these life fellowships;
- (d) The evolution of a leisured class composed of the Fellows of the Foundation;
- (e) The fact that so many of the Fellows persistently gave financial support, frequently amounting to half of their salary, to certain key members of the Senate and of the House of Representatives;
- (f) The role which the Fellows of the Foundation played in the passage of the 24th Constitutional Amendment, which established a highly paid federal civil service for high school teachers.

Since these points - important though they are - do not bear directly on the issues of disarmament and peace, I am relegating their further discussion to a Note which is appended to this dissertation (see Appendix). For a full discussion the reader is referred to "The American Research Foundation" third edition, 1997, Simon & Schuster, New York, N.Y.

The Changes in the Far East and in Europe

By 1960, it was clear to all who did not choose to shut their eyes that the Chinese Communists would be **successful** in building up their economy and that China was destined to play a major role in the modern world. What was really novel and unique about China was not so much that China had a Communist government but that she had a government. In 1960, the ultimate success of the Chinese build up was not as yet assured, however. It was clear that the Chinese would be able to greatly raise production, but it was not as yet clear whether they would succeed in getting the rate of population increase under control - at the time when this would become necessary. Had they failed in this, no amount of economic progress, within the limits of the obtainable, could have appreciably raised their standard of living. It is anyone's guess whether China would have succeeded in solving her population problem, had it not been for the replacement of much of her rice diet by a diet of Amruss.

When the Chinese population became stationary, the standard of living in China began to rise rapidly and, with increasing prosperity, there was an increase in China's expansionist tendencies. This is quite understandable, even though it is the exact opposite of what people had generally predicted. All individuals and nations who believe that they are in the possession of the truth are in a sense dangerous and in this sense, for a while, China became

dangerous.

But, just as the vigor of British imperialism persisted only as long as the English thought that by extending their system to other nations, they could bring them happiness and prosperity, thus also the expansionist tendencies of China persisted only until the Chinese realized their inability to bring about a betterment of the lot of the Indians.

It is curious that, of all nations, India should play this role of bringing disenchantment to imperialism. It is even more curious that she should do so twice within this century and under such different circumstances. No one has done more to disenchant British imperialism than Gandhi and he did it because he was the incarnation of the highest virtues of the Indians. The disenchantment that India brought to China, however, was not due to any virtues, but rather to the absence of virtues.

When India became Communist, China went all out to make Communism in India a success. After fifteen years of Communist rule in India, it began to dawn on the Chinese, however, that the success of their own regime in China may have been to a large extent due to the civic virtues of the Chinese which were totally lacking in India. The recognition of this greatly increased China's national pride, and at the same time, it decreased her zeal to extend her political and economic system to ~~other~~ other nations.

The American attitude towards China started to change even prior to 1975, when China was seated in the United Nations. Soon after China became an atomic power, there was a marked change in the American attitude on the issue of the islands of Quemoy and Matsu. Up to that time, for reasons of expediency, the press urged the Chinese Nationalists to hold on to these islands. Afterwards, however, it was said, with increasing frequency, that it would be morally wrong for America to encourage the Nationalists to persist in the occupation of these islands.

The major changes came however after 1980, when, after Chiang Kai-Shek's untimely death, the "Formosa for Formosans" movement began to gather strength rather rapidly. Formosa had been separated from China for two generations and Formosans liked neither the Chinese on the mainland nor those who had recently come to Formosa from the mainland. There were rumours that the American Government secretly encouraged the "Formosa for Formosans" movement; there is no evidence, however, that any Government funds were in fact involved, even though funds for cultural activities may have come from private sources in the United States, such as the Rockefeller Cousins Fund.

After a while, the situation became rather uncomfortable for the remnants of the Chinese Nationalists and most of them wanted to leave Formosa. China, which had a severe shortage of clerical workers, offered asylum to all those born on the Mainland; a law enacted by Congress made it possible for those of them who wanted to come to America to do so, provided they ~~pledged themselves~~ ^{did} not to take up residence in California.

Most people expected that China would thereafter occupy Formosa but China appeared to have somehow lost interest in that island. ~~This was very much to the contrary of what anybody would have expected and there were probably a number of different factors involved.~~

Apparently, the Chinese came to look upon the native Formosans as semi-barbarians. The Americans, the English, the Germans and the

Russians were always regarded as barbarians by the Chinese whereas the Japanese were looked upon as semi-civilised. Formosa had been under Japanese rule for two generations, which left its mark, and the Chinese came to regard the native Formosans as no more civilised than the Japanese. More important than their active dislike of the Formosans may have been, however, the drastically changed outlook of the Chinese towards their own political and economic system.

But whatever the most important reason may have been, it certainly became manifest that China was not interested in Formosa any longer and this set the stage for the possibility of a political settlement in the Far East, based on the freezing of the map in South East Asia.

At the same time, however, a political settlement in Europe appeared to be as far off as ever. In Germany, united since 1980, the Social Democrats, being the largest party in Parliament, were in office. But there were four parties holding seats in the German Parliament and the position of the Government was precarious. All Germans were united in their determination to recover from Poland the territories which Germany lost to her at the end of the Second World War, but there was violent disagreement between the political parties, as to the method of accomplishing this. The Social Democrats and the Christian Democrats wanted to force Poland to return these territories to Germany,

through negotiations, conducted under such economic pressure as Germany was now capable of bringing to bear. The People's Party, however, (which had been rapidly increasing in strength in the years prior to the raising of the gold price and came to control 45% of the votes in Parliament) advocated the use of force - if necessary.

Poland had made it abundantly clear that she would in no circumstances attempt to fight a war on the Polish-German border and that if German troops were to invade her territory she would exact a high price from Germany by demolishing two German cities, of an as yet unspecified size, for every 10 miles depth of penetration of her territory by German troops. Following Russia's classic example, she proclaimed that she would not retaliate, if Germany demolished no more than one Polish city of equal size for every city demolished by Poland.

Poland did not possess at that time any submarines, capable of firing rockets. About half of the Polish rocket bases were located in the eastern provinces of Poland; the other half, however, were located on Russian territory.

The People's Party advocated that Germany should resort to force and should be willing to pay whatever price may be set by the Poles. They argued that Germans being industrious, as well as prosperous, would be in a better position to rebuild their cities than would be the Poles. They contended that the return of former German territories was not a matter which could be discussed in terms of loss, or acquisition, of property, because it was essential to the spiritual integrity of the German Nation.

This was the situation in the world, in 1985, when the dolphins called an informal conference to discuss the possibility of disarmament. As one may recall, this was the year in which America was forced to raise the price of gold and in which a great famine occurred in India, which was mainly due to a collapse of the Indian transportation system.

In order to be able to appraise the contribution made by this conference to the achievement of disarmament, it is necessary to recall the political thinking that prevailed on this subject at that time. This thinking is reflected in articles which appeared over a period of years in the Bulletin of the Atomic Scientist, mainly by American, Russian and

Chinese authors.

In these articles, American authors were inclined to favor general and total disarmament. They took it more or less for granted that a world disarmed down to machine guns would be a world of peace, but they were less certain about the feasibility of such disarmament. Many Americans held the view that there would be no way to make reasonably certain that bombs and rockets, which a nation might want to hide, could be detected.

The Russian authors, while in principle in favor of general and total disarmament, took the position that such disarmament must follow rather than precede the establishment of an international armed force, capable of protecting the security of smaller nations such as Poland. The Russians pointed out that even if all heavier weapons were eliminated and all armies were disbanded, in the western countries as well as in Russia, an improvised German army equipped with machine guns could spring up so to speak overnight. If such a German army were to invade Poland, Russia, having disbanded her own army, would be unable to protect her.

No American author favored the establishment of an international armed force, presumably because they all assumed that such an armed force would be set up under the United Nations where America might be out-voted.

In those years America had been forced more and more often to use her veto in the Security Council. The Russians frequently accused America of misusing ~~her~~^{the} veto, but no Russian has ever been able to define the difference between the use of the veto and the misuse of it. Also, Russia sometimes deprived America of her right to the veto by managing to shift the controversial issue - under the 'Uniting for Peace' resolution - to the General Assembly, where Russia was frequently able to count on a two-thirds vote.

Some American authors suggested that, in place of setting up an international armed force, the nations of the world should enter into a covenant and pledge themselves to apply stringent economic sanctions against an "aggressor."

Russian authors expressed doubt as to whether nations who entered into such a covenant would live up to their commitments if, by doing so, they would have to pay a high

price in terms of their own economic welfare. The Russians pointed out that when Italy attacked Abyssinia, it proved to be impossible to embargo the supply of oil to Italy, because the oil interests in America were opposed to America's participation in such an embargo. They reminded the Americans that when Japan attacked China, the United States continued to supply oil and scrap iron to Japan and that she stopped the supply of oil, only when she deemed it to be in her interest to enter the Second World War herself. With an eye on Europe, more than any other continent, the Russians stressed again and again that, while Germany was economically integrated with Western Europe, politically she was not; they stressed that Western Europe was politically incapable of restraining Germany from taking armed action against Poland, and that Western Europe could not apply economic sanctions against Germany, without suffering staggering economic losses.

The Special Disarmament Number of the Bulletin of the Atomic Scientists of June 1985 contained a number of remarkably lucid articles by American, Chinese and Russian authors. Those who read these articles today gain the very definite impression that the Americans were willing to go much further towards total disarmament than were the Russians. The Russians were willing to consider controlled arms limitations, the idea being that, in return for a total elimination of all submarines capable of launching rockets, America, Russia and China would cut down the number of their long-range rockets and bombs below the shake-up level of the small atomic countries. Apparently, this was as far as they were willing to go - in the absence of a reliable world security system.

The Americans wanted to go much further. They stressed that the problem that the bomb posed to the world could be solved only by eliminating the possibility of war between the Great Powers and that the kind of controlled arms limitations which the Russians favored would not accomplish this. They drew a sharp distinction between controlled arms limitations, of the kind which the Russians had in mind, and virtually total disarmament which would eliminate the possibility of war between the Great Powers. In a major article, a distinguished Chinese scientist took the position that if the nations each retained legitimately a certain number of bombs and rockets, this ought not to be objectionable, as long as these are retained only as an insurance against a surprise attack that might be

launched against them by some other nation that has illegally and secretly retained a substantial number of bombs and rockets. The dividing line between controlled arms limitations and genuine disarmament is set - so this Chinese pointed out - not so much by the number of bombs and rockets which the nations may be permitted to retain, ^{as} ~~but~~ by the purpose for which these bombs and rockets are retained. Even if the number legally retained is substantial, this would still be perfectly compatible with genuine disarmament, as long as the bombs and rockets are retained merely as an insurance. But if they are retained in order to be used as a threat, which might deter other nations from pursuing their legitimate, or illegitimate, aspirations, then their retention would defeat the purpose of genuine disarmament; ~~that~~ the abrogation of war.

This Special Number of the Bulletin accurately reflected the general setting of the political ideas on the subject of disarmament, prevailing at the time the conference was convened by the Vienna Institute.

The dolphins invited to this conference mostly Russians, Americans and Chinese who ~~were advising~~ ^{were advising} ~~advised~~ their governments on policy, but did not hold any formal governmental position. Because of the slow process of coding and de-coding, which the communications with the dolphins ^{entailed} ~~involved~~, the dolphins did not propose to participate in the actual meetings. It was planned, however, that the meetings would adjourn, from time to time, to permit the staff of the Institute to consult the dolphins.

Because of the political tension in Europe, the conference was generally regarded in Russia as badly timed and, up to the very last minute, it was uncertain whether the Russians would participate in the conference. However, the Russians did come, and they came in time to permit the conference to start on schedule.

The agenda of the conference called for informal discussions of the working papers which would be submitted from time to time by the Institute. These informal discussions were scheduled to last two weeks and to be followed by an intermission of ten days' duration. The members of the conference were supposed to spend these ten days in the Semmering Mountains, conversing with each other unencumbered by any agenda.

The key note of the conference was set by a document prepared under the guidance of the dolphins, which was circulated in advance of the conference.

This 'Introduction' took the position that in previous negotiations concerned with the problem of disarmament, ~~some of the~~ major difficulties ^{(were} encountered ^{because} ~~arose from the fact~~ ~~that~~ the nations did ~~not~~ were apprehensive of secret violations of the agreement. These difficulties appeared insurmountable at the time of the ill-fated Geneva negotiations of 1960, because people were thinking in terms of an agreement to which Russia, America, as well as the other Great Powers would be irrevocably committed. If this were the case, then the agreement would have to spell out in detail the methods of inspection, to which all nations must submit. Possible secret evasions are almost innumerable, however, and as time went on there would arise new ways of evasions, which were not previously apparent. ^{Thus} ~~Moreover~~, in 1960 many Americans had doubted that there would be any way for America to make sure that Russia would not retain a large number of bombs and rockets, hidden away in secret.

The 'Introduction' stressed that it lies in the very nature of an agreement providing for arms limitations, that it could remain in force only as long as Russia, America and China each wanted to keep it in force. Therefore, the agreement would not be weakened by giving these three nations, and perhaps also to the other permanent members of the Security Council, the legal right to abrogate the agreement at any time, and without cause. Quite on the contrary, the agreement would in fact be strengthened by giving the Great Powers such a right to abrogate, because in that case there would be no need to spell out in the agreement any specific measures of inspection. Instead, it would then be understood that if Russia, for instance, were unable to convince America that there were no major evasions on her territory, America would have no choice but to abrogate the agreement. The same would, of course, hold in the reverse for Russia. If the problem is presented in this manner, then clearly the issue is no longer what rights of inspection America should demand from Russia or Russia from America, but rather in what manner Russia might choose to convince America that there were no secret evasions on her territory, and in what manner America might choose to convince Russia.

When the meeting convened, the staff proposed, that in order to simplify the discussion, the conference ~~would~~ make certain assumptions - for the sake of argument. In

particular, it was proposed that an agreement providing for virtually complete disarmament be assumed, for the sake of argument, and that there be discussed, on this basis, in what manner Russia and America could convince each other that the agreement would not be secretly evaded.

This proposal encountered opposition from some of the Russians; they said that, since virtually total disarmament would not be acceptable to Russia, a discussion of the topic proposed by the Institute would be a sheer waste of time. Thereupon, the meeting was suspended to permit the Russians to discuss this point among themselves. When the meeting reconvened a Russian spokesman reiterated that total disarmament would not be acceptable to Russia, under prevailing world conditions, but he said that the Russian members of the conference would have no objection to assuming the opposite - for the sake of argument - and they would be willing to discuss on that basis the feasibility of total disarmament. The majority of the Russian members were, of course, scientists, who were accustomed to dealing with abstractions and to the clarification of issues through discussions, ~~which~~ based on premises that were accepted merely for the sake of argument.

As the discussion got under way, the Russians made it clear that in the case of virtually total disarmament, where there would be no military secrets left to be safeguarded, Russia would have no objection to admitting as many foreign inspectors to her territory as appeared desirable to America or to any other nation.

At this point some of the Americans expressed doubt whether Russia could convince America that she had not hidden rockets or bombs in substantial numbers, even if she were to admit foreign inspectors in practically unlimited numbers. If the Russian Government wanted to hide bombs and rockets, so these Americans pointed out, as long as she had the wholehearted cooperation of her scientists or engineers in such an endeavor, America could not be sure that foreign inspectors would be able to discover the bombs and rockets that may be hidden.

~~At this point~~ ^{then} The meeting was adjourned for a day to permit the Russians and Americans to discuss among themselves the issues that had been raised.

^{When} ~~After~~ the meeting reconvened, the Russians presented a new approach to the problem.

They said that if a disarmament agreement, providing for general and complete disarmament, were concluded, then Russia may reassure America on the issue of secret evasions by adopting a novel approach, as follows: When the agreement is signed and published the President of the Council of Ministers shall address the Russian people and, above all, Russian engineers and scientists, over radio, television and through the newspapers. He shall explain why the Russian Government had entered into this agreement and why it wished to keep it ~~indefinitely~~ in force. He shall make it clear that any secret violation of the agreement would endanger the agreement and that the Russian Government would not condone ^{such} any violation ~~of this agreement~~. If such violations did occur, as they well may, they would have to be regarded as the work of over-zealous subordinates, whose comprehension of Russia's true interests was rather limited. In these circumstances, it shall be the patriotic duty of Russian citizens in general, and Russian scientists and engineers in particular, to report any secret violations of the agreement to an agent of the International Control Commission, ~~to be made to the informant~~. In addition to having the satisfaction of fulfilling a patriotic duty, the informant shall receive an award of \$1 million from the Russian Government. A recipient of such an Award, who wished to enjoy his wealth by living a life of leisure and luxury abroad, shall be permitted to leave Russia with his family.

The Russians pointed out that, by repeating the same thesis over and over again, as they well ~~know~~ ^{knew} how to do, the Russian Government could create an atmosphere which would virtually guarantee that Russian scientists and engineers would come forward to report secret violations.

The Russians proposed that agents of the International Control Commission might maintain establishments in all Russian cities, and that they might maintain several establishments in the larger cities. An informant could simply walk into such an establishment with his whole family and make a deposition. If the International Control Commission held that the information revealed a violation of the agreement, then the Russian Government would at once deposit the award of \$1 million with the Commission. This sum would be returned to Russia if the information later on turned out to have been invalid, but the burden of proof would be on the Russian Government.

The Russians thought that most Russian informants would prefer to remain in Russia. They should be free to remain, but in that case they would be required to report their whereabouts to the Control Commission once every six months, in order to satisfy the Commission that they had not been arrested or shot. Each time they report they would receive an instalment of the million dollar award.

The Russians made it clear that the arrest and shooting of an informant ought to be classed as a violation of the disarmament agreement and that the reporting of this type of violation ought to rate an award of \$1 million - payable by the Russian Government.

The response of the Americans to this Russian approach was very enthusiastic. The Americans reminded the conference that, in 1949, Niels Bohr had addressed a letter to the United Nations in which he stressed the danger that the bomb posed to the world and recommended "Openness" in order to combat this danger, and said that the proposal of the Russians appeared to fit in well with "Openness".

The Americans said that they would favor America adopting the same approach for reassuring Russia on possible secret violations. They said that the President would never condone such violations but that the possibility of such violations cannot be ruled out, since they might well be kept secret from the President. They also said that an award of \$1 million would be almost meaningless in America, income tax being what it is, unless the Treasury issued a ruling that such awards would free from tax. They did not doubt, however, that the Treasury could be prevailed upon to issue such a ruling.

The Americans also said they would recommend that every boat and plane capable of carrying a bomb across the Atlantic or the Pacific should carry a team of inspectors on board in order to reassure Russia and China that these planes or ships did not carry any illicit bombs.

Towards the end of the session the Russians cautioned against undue optimism on the issue of detecting secret violations. They said that, under the prevailing world conditions, Russia would undoubtedly want to retain bombs and rockets in her defence; these would have to be moved about on trucks and railroad cars and their location would represent an important military secret that needed to be safeguarded. For the time being,

Russia would not be able therefore to embrace "Openness", since this might permit information regarding the location of her rockets to leak out.

This ended the discussion on instituting safeguards against secret evasions of the disarmament agreement - in the case of virtually total disarmament. The issue of what safeguards might be adequate in the case of controlled arms limitations was to be the topic of the next session.

In preparation for that session, the dolphins had the Institute prepare a memorandum entitled "On Inspecting the Inspectors". It assumed that as a first step all nations would destroy all bombs and rockets, in excess of a certain agreed upon number, which would be legitimately retained, at least for the time being. It further assumed that as far as Russia, America and China were concerned the number of bombs and rockets legitimately retained would be reduced below the shake-up level of the smaller nations, and that all submarines capable of firing rockets would be destroyed. The memorandum proposed that trains and trucks of any nation which carried rockets, ~~would~~ also carry an international team of inspectors, but agents of the National government would watch the members of the team in order to make certain they did not communicate the current location of the rockets. *TP* It was assumed that a sufficient number of rocket tracing stations would be set up all over the world, so that if a rocket were launched these stations would *be certain to* locate the origin of the rocket and thereby identify the nation responsible for the attack. If the government of that nation disclaimed responsibility for the attack and blamed the attack on *unauthorised action on one of her,* unidentified, mobile rocket units, then the teams of international inspectors, assigned to the various rocket units, would be in a position to exonerate the innocent rocket units.)

Thus one could identify, by elimination, the particular rocket unit that fired the rocket, and those responsible could then be brought to justice.

The memorandum pointed out that the teams of international inspectors assigned to a rocket unit would also serve as a marker, and any would-be informant would know that a rocket unit that was not so marked was an illegitimate unit.

The memorandum stressed that even if the number of bombs and rockets, which initially

the nations were permitted to retain were very large, the further reduction of these numbers would be easy to police, because international inspectors could witness the destruction of each bomb and rocket.

How fast the initially retained number of rockets and bombs would be reduced would have to depend on the wishes of the nations, participating ~~in the disarmament agreement.~~ The reduction would have to take place step by step and the magnitude of each step, as well as the timing of each step, would have to be agreed upon from time to time.

The memorandum warned that the conclusion of such a disarmament agreement would not per se eliminate the danger of war, unless it might prove possible to make a transition from the state of controlled arms limitation to genuine disarmament rather fast. Just how fast this transition could take place would depend on the solution of the political problems, which would be discussed during the second part of the conference.

This memorandum was thoroughly discussed by the conference and as the discussion progressed the Americans began to show some uneasiness. They did not doubt that secret violations of the agreement would be detected if the approach of "Openness", which the Russians had earlier proposed, were adopted, but they were not so sure whether America would in fact abrogate an agreement, even if rather serious violations were discovered. The Russians remarked that they were prepared to deal with the difficulties arising from the Americans' distrust ^{of} ~~the~~ Russian Government, but that at this point the trouble seemed to come from the fact that the Americans did not trust their own government.

Much of the ensuing discussion revolved around the problem of abrogation and finally the meeting was adjourned to permit the staff to consult the dolphins on this subject. These consultations resulted in a "Working Paper" which was presented to the conference, when it reconvened. It started out from the premise that the right to abrogate could obviously not be retained by every nation. Moreover, the Great Powers who retain the right to abrogate must not be forced to choose between tolerating violations of the agreement and abrogating the agreement in toto. The Working Paper proposed that the transition from controlled arms limitations to virtually total disarmament go through ten predetermined stages. The transition from a higher arms level to a lower level, was to be brought about through a majority decision of the

Security Council, with the concurring vote of the five permanent members of the Council. An "abrogation" would reverse this process and raise the level of arms from the prevailing stage to one of the higher stages. Any of the permanent members of the Security Council was to have the right to "abrogate" and thereby to determine to which one of the higher stages, specified in the agreement, the world must revert.

The Working Paper proposed that a certain fraction of the amounts saved by the nations in arms costs, go to a fund, the Fund for Compensations. If nations who did not retain the right to abrogate, were to violate the agreement, they could then be effectively restrained by economic sanctions, because the nations putting into effect such sanctions could be, and would be, compensated by the Fund, for such economic losses as they themselves would suffer.

When subsequently, in 1986 - after six months of bickering - the inter-governmental negotiations on disarmament became deadlocked, someone drew the attention of the negotiators to this working paper and when it became apparent that its recommendations were acceptable to all the nations involved, the deadlock was resolved.

The second part of the Vienna Conference, which convened when the participants returned from the Semmering, was regarded, in a sense, as a flop, because the political situation in Europe made discussions of a political settlement appear to be purely academic.

A Blue Book, prepared by the staff in consultation with the dolphins, was placed before the Conference when it convened. It analysed the situation in Europe and it attributed the difficulties to the fact that the political structure in Europe did in no way reflect the economic interdependence of the nations of Europe. It suggested that if Germany were not only economically but also politically integrated in Europe, Europe would pose no greater problem to the world than any of the other continents.

The dolphins took a dim view of the possibility of bringing about political integration of Europe through the creation of supra-national political agencies. Instead, they proposed a method of political integration which could be carried out gradually, step by step, and could start out for instance with the integration of France and Germany.

As a first step, Germany would be represented in France, in the Parliament of the Seventh Republic, by delegates who would have 5% of the total votes. Similarly, France would be represented in the German Parliament by delegates having 5% of the total votes. In subsequent years these representations could increase step by step, in a predetermined fashion, until they might amount to 25% of the votes in both Parliaments.

In much the same manner, so the dolphins thought, through mutual representation of the nations in each other's Parliament, the whole of Western Europe could be politically integrated.

This proposal of the dolphins was received with much scepticism by the conference. It was pointed out that while such a proposal might be received enthusiastically in France, it would have no chance of being passed by the German Parliament. There, it would be opposed by the People's Party, controlling 45% of the votes, and would thus fall far short of the required two-thirds majority. Those who read the transcript of the conference ~~transcript~~ may notice, that the Chinese and the Americans were much more vocal in expressing these misgivings than were the Russians, who seemed to be in a somewhat subdued and pensive mood; it is doubtful, however, whether this difference was noticed at the time of the conference.

The conference, having run out of topics that could be usefully discussed, closed one week earlier than scheduled.

Governmental negotiations on disarmament started about ^{four}~~six~~ months after the close of the Vienna Conference. They did not evoke much enthusiasm in Russia and in America. Americans were generally lukewarm toward them because they could have at best achieved controlled arms limitations, which would not eliminate the possibility of war between the Great Powers; the Russians had misgivings that world public opinion might push them further towards total disarmament than they felt they ought to go. The fears of the Russians proved to be groundless, inasmuch as the agreement ~~concluded~~ closely followed the line that the Russians had taken at the Vienna Conference. The agreement reduced the number of rockets and bombs, to be retained by America, China and Russia, below the shake-up level of the smaller nations, and it did eliminate all submarines, capable of firing

rockets. It left, however, Russia, America and China each, in the possession of 500 long-range rockets, capable of carrying 10 megaton clean hydrogen bombs. Of course, the agreement also fixed the number of rockets and bombs which the other nations were permitted to retain.

The nations were able to reduce their arms expenditure somewhat, as the result of this agreement, but they were obliged to pay a good portion of what they saved in arms cost into the ~~Fund~~ ^{Fund} for Compensation, set up under the provisions of the agreement.

The agreement did not offer much hope that general and virtually complete disarmament would be achieved in the predictable future. True enough the agreement defined the stages, ten in number, through which the world could go from stage 1, the initial arms level, to the virtually complete disarmament of stage 10. But the determination of when the transition from one stage to the next lower stage should take place, was left to the Security Council where Russia had the veto, and there was no way of telling when, if ever, any further progress towards disarmament might take place.

Then, three months after the ratification of the agreement, Russia suddenly offered to cede to Poland each year over a 25-year period, strips of territory 3 to 10 miles wide along Poland's eastern border, if Poland would cede year by year similar strips of territory to Germany, on her western border. Poland declared herself willing to accept such a switch, but demanded a compensation of \$25,000 for each Polish family who had to be relocate. This would have meant an outlay of \$100 billion, payable over a period of 25 years, or about \$4 billion a year.

The Fund for Compensation, set up by the agreement, would have been able to take on this load without much difficulty, but this would have required approval by the Assembly and many nations were outraged by Poland's demand, which they regarded as blackmail.

Still, in the end, the Assembly did approve and since not even the Germans are prepared to go to war, for something they can get without war, the approval of the Assembly split the People's Party in the German Parliament. Half of its members seceded from the party and joined the other parties in Parliament in voting for the constitutional amendment which seated delegates from France in the German Parliament.

The constitutional amendment provided for French representation in the German Parliament, initially amounting to 5% and - after a lapse of a period of 3 years - amounting to 10%, of the total votes.

With the adoption of this amendment the danger that the People's Party might gain a majority in the German Parliament receded and one year later the Security Council voted, with all five permanent members concurring, to reduce the arms level from stage one to stage four. Within five years the arms level was down to stage seven.

The reduction of arms cost did not amount to very much in the case of Russia, since Russia had based her defence almost exclusively on long-range rockets, but it was very substantial in the case of America. It has always been taken for granted that when disarmament makes a substantial reduction in arms cost possible there will be a great increase in aid to under-developed countries. What happened was exactly the opposite. Americans felt that, after a long period of stagnation, the time had come to increase the standard of living. There was a substantial reduction in taxes and wages went up. The annual income of the average American family jumped up by about \$1500. In the first five years following ratification of the disarmament agreement Congress failed to appropriate any funds for foreign aid. There was retained a modest point 4 program, on paper, but since higher education had steadily deteriorated, America was in no position to send any engineers or physicians abroad.

Russia had retained the six-hour working week but had increased the annual paid vacation to three months and was in the process of trying to extend the vacation period to four months.)

Russia continued to loan funds to under-developed nations even after the ratification of the disarmament agreement but she charged 5% on such loans. Russia also continued to make available to under-developed nations ^{(the} services of her engineers and physicians, and this was being done on a large scale. But after the conclusion of the disarmament agreement, Russia began to charge for these services, what the market would bear. ¶ While the events of the decade that followed general disarmament are of great historical interest, they do not come within the scope of this dissertation, which has as its sole object the evaluation of the contribution that the dolphins made towards the

establishment of peace, and the dolphins faded out of the picture soon after the conclusion of the disarmament agreement.

A week after the arms level was reduced to stage seven, a virus epidemic broke out among the dolphins at the Vienna Institute and one of the dolphins after another died. Two weeks after the death of the last dolphin, a fire broke out in the library of the Institute, which destroyed most of the books and, with a very few exceptions, all of the records. Thereafter, the Russians and the Americans, who composed the staff of the Institute, decided to abandon Vienna and to return to their homeland. The Amruss Corporation which had financed the work of the Institute in the later years of its operation, remained in existence, however, continued to collect royalties from the sale of Amruss and distributed its income to various research institutions.

The decision of disbanding the laboratories of the Vienna Institute was regarded as a major blow to science and was greatly deplored all over the world. The Russian and the American scientists who returned home were able to continue their work in the Crimea and in California respectively, where new research institutes were set up to accommodate them. In the years that followed these institutes turned out work which was in no way inferior to the work of the Vienna Institute. However, neither the Russian nor the American scientists, who returned home, attempted again to communicate with dolphins. Nor was any other international research project set up to emulate the work of the Vienna Institute with dolphins, even though suggestions to set up such a project on a broader international basis were made by the British, French, Italian and Chinese Governments.

The German Government, however, established a very large research institute in Munich on a purely national basis, with the aim of continuing the work of the Vienna Institute with dolphins. This institute was staffed entirely with German biologists and, inasmuch as the funds were provided by the German Government alone, it was deemed proper that the results of the work should benefit Germany only. The Director of the Munich Institute announced that the results from experiments initiated by the staff themselves would be published, but that experiments undertaken on the advice of the dolphins and information relating to the dolphins themselves, would come under the Official Secrets Act.

From the very first year of its existence, the Munich Institute published papers on a great variety of scientific subjects, many of them rather voluminous. All of them were published under the name of the scientists who performed the experiments and no credit was given to any dolphin. While all of this work was respectable and some of it quite informative, none of it was extraordinary.

In the fifth year of the operation of the Munich Institute, one of the members of the staff was sued for divorce by his wife. During the ensuing court wrangle, which was exceedingly bitter, the wife testified that, in addition to his salary from the Munich Institute, her husband derived an about equal amount of income as a consultant from the Amruss Corporation. She said, on the witness stand, that in the third year of the operation of the Munich Institute, there was some talk that the Director might resign, that the Institute might be dissolved and that the staff might be transferred to various research institutions in Frankfurt, Goetingen, Cologne or Leipzig, all of which were much less pleasant places to live than Munich. At that time there were rumours that the staff had found it impossible to learn the language of the dolphins, that they came to doubt that the dolphins had a language that could be learned and that all of the experiments carried out by the staff represented the efforts of the staff themselves. She testified that, at that time, the Director and other staff members of the Institute including her husband, were approached by the Amruss Corporation and were offered consultantships, each at a retainer equalling his salary from the Institute - on condition that the Institute would remain in operation. Asked why the Amruss Corporation would want to do this, she said that she would not know.

These proceedings in court attracted considerable attention in Munich, where it has been noted previously that the staf of the Munich Institute appeared to live above their means.

Soon thereafter the Senate Committee on Internal Security got into the act and they sub-poenaed several of the former staff members of the Vienna Institute who had returned to America. A minor stir was created when all of these men pleaded the Fifth Amendment, but since they were not suspected of being Communists, there was no attempt to cite them

for contempt. Some columnists chided the scientists and sided with the Congressional Committee, but most of the others stressed that refusing to testify for fear of self-incrimination could in no way be construed as an admission of guilt.

There were of course those who questioned whether the Vienna Institute had in fact been able to communicate with dolphins and whether the dolphins were in any *way* responsible for the conspicuous achievements of the Vienna Institute. They were unable, however, to cite any reason why the scientists would want to give the credit to the dolphins, unless such credit was in fact due to the dolphins.

An article that appeared in the University of Chicago Law Journal indulged in some speculation to the effect that, according to American law, patents have to be taken out in the name of the inventors and all patents applied for by the Amruss Corporation named dolphins as inventors. Had it been established that the inventions were made not by the dolphins, but by the staff members, these valuable patents would have been declared invalid in court.

America being a free country, any one can of course think and say what he pleases, but it is difficult to see how the Vienna Institute could have accomplished as much as it did, if it hadn't been able to draw on more than merely the knowledge and wisdom of the Russian and American scientists who composed its staff.

THE END

APPENDIXThe Operations of the American Research Foundation

Apart from "staffing" the General Advisory Board, probably the most important operation of the Foundation was the introduction of a novel method for supporting basic research in science through the granting of highly endowed life-term fellowships. The Foundation asked the National Academy of Sciences to select - as early in life as possible - young men who were genuinely interested in science and possessed both the originality and critical abilities which creative work in science demands. Those selected, received from the Foundation a salary of \$40,000 a year - for life. If they spent any part of their salary, up to half, on their own research work, the Foundation would match their contribution ^{five} ~~four~~ to one. Thus, if a young man decided to live on \$20,000 and invest yearly \$20,000 in his own research he had a research budget of \$120,000 available for his work. If three such young men teamed up, they had at their disposal a research budget of \$360,000 - as long as each of them was willing to live on his remaining salary of \$20,000 per year.

Any of these Fellows, or any group of them, were free to select any University as a place for their work and if they were acceptable to that University then the Foundation would build ~~the~~ laboratories for ^{their use.} them. In an attempt to attract Fellows of the Foundation, Universities tried very hard to create conditions which would be congenial to them. In this endeavor, some Universities were more successful than others, and about half of the Fellows congregated at seven Universities. Most of the Fellows settled in the Boston area, or on the West Coast.

When the creation of these fellowships was first announced, there were ^{dire} predictions that few of the Fellows would be likely to part with a substantial fraction of their salary for the sake of spending it on their research work, and that most of them would instead elect to lead an idle life of luxury. In part, these predictions proved to be correct. In the first years of the operation of the fellowships only about ^{of the Fellows} one third spent part of their salary on their research and claimed a matching contribution from the Foundation, ^{while} ~~and~~ two-thirds of the Fellows lived in idleness. ^P The Foundation did not seem

to mind this. Those who lived in idleness did not cost the Foundation very much, they did not clutter up any laboratories with their equipment and their papers did not clutter up the scientific periodicals. The Foundation took the position that the work of those Fellows who chose to live in idleness would at best have been mediocre, had they been kept at work through "external" incentives. Thus, the loss to science was small. Science benefited greatly from the work of the other Fellows, for these were free to tackle problems which held no promise of immediate results, but offered a chance - though not necessarily a high one - of leading to fundamental insights.

In the course of a generation, the number of Fellows who failed to spend part of their salary on their research work dropped from two-thirds to about one-third. This shift came about as the result of the specific mode of selection of the Fellows. ^PFor a young man to receive a fellowship from the Foundation he had to receive the vote of three members of the National Academy of Sciences. Each member of the Academy had a limited number of votes which he could "spend" in any given year, and when a member spent the votes allotted to him, then in that year he had no influence on the selection of additional Fellows.

~~At this point it is necessary to remind the reader that~~ ^PPrior to their selecting the Fellows for the Foundation, members of the National Academy had no other function but to elect additional members. Since membership of the Academy lent respectability to a scientist such membership was sought after mainly by those who aspired to be respectable. Thus, the one characteristic that all members of the National Academy had in common was respectability. Fortunately, respectability and scientific creativity are not mutually exclusive and therefore the membership of the National Academy included quite a number of creative scientists. Generally speaking, these were inclined to keep in fairly close touch with each other, and they were largely responsible for the selection of those Fellows who subsequently made good. These were the Fellows, who subsequently became members of the National Academy, because the other Fellows, who chose to live a life of idleness, did not bother to write any papers and

the respectability of a scientist was adjudged more on the basis of the number of papers he published than anything else. Accordingly, within a generation, the proportion of creative scientists among the members of the Academy increased quite considerably and this, in turn, reflected itself in a greatly improved selection of the Fellows.

The research budget placed at the disposal of a Fellow by the Foundation did not exceed \$120,000 and even if several of such Fellows teamed up ^{their} ~~the~~ joint budget fell, on occasion, short of the budget which was necessary for the project which they wanted to tackle. In cases of this sort, the Fellows could apply for a special grant to the trustees of the Foundation. The Foundation had twenty trustees and allocated grants ⁱⁿ ~~to~~ the amount of \$200 million a year for such ~~special~~ projects. Any three trustees who approved of certain projects were free to allocate to those projects their ^{joint} ~~share~~ which amounted to \$30 million. If a given project demanded a larger sum, then more than three of the trustees had to team up. Once a trustee allocated his share, in any given year, then he had in that year no further voice in the allocation of grants. In retrospect, it is possible to say that about one-third of the trustees were imaginative men and the remaining two-thirds were not, and accordingly about two-thirds of the grants were wasted. Still, compared to other Foundations, this may well be considered as a highly satisfactory result.

The main reason why Europe was so much more successful in basic science, in the first half of this century, than America was the different attitude towards leisure. The establishment of a system of life fellowships by the American Research Foundation came very close to the creation of a leisured class and the attitude of these Fellows towards leisure came very close to the traditional attitude of European scientists towards leisure. Those of the Fellows who were successful in science usually worked very hard for periods of time, but occasionally they took a year off from their work and took interest in some field of science, other than their own, or even in politics. On the average, the Fellows who were successful in their own work took off from their work about one year in five. ^P It came as a surprise to many people, though there is reason to believe that it had been foreseen by the dolphins, that a substantial fraction of the Fellows who were successful in their ~~work, also took an active interest in politics.~~

work, also took an active interest in politics.

Under the terms of their appointment they could, if they wished, spend up to half of their salary ~~on~~ ^{on} political contributions. Their ~~own~~ political contributions counted just as much, as their contribution to their own work, inasmuch as ~~it~~ ^{they were} matched five to one by the Foundation - except of course that the contribution of the Foundation could be used only for the expenses of their scientific work. This then meant that a Fellow, whose yearly political contributions amounted to \$20,000, still had \$100,000 - the matching contribution of the Foundation, available for his scientific work. Even though, as far as political contributions go, the amounts which the Fellows could spend were not large, the political influence of the Fellows became, in time, quite substantial. It would appear that these Fellows supported certain key members of the Senate and the House persistently over ~~the period of~~ a number of years, which led to the establishment of lasting friendships. Because such legislation as these Fellows proposed, was eminently reasonable, ~~the~~ Congressmen and Senators who regarded them as ~~their~~ friends, were willing to listen to them. In general, Congressmen and Senators gained credit, when they introduced bills suggested to them by Fellows of the Foundation.

Many of the Fellows were ~~concerned about~~ ^{disturbed by} the low quality of the high schools in the United States. Attempts to improve the high schools piecemeal had been to no avail and some of the Fellows began to urge the setting up of a federal system of high schools, in competition with the schools maintained by the States, the counties, the cities and the churches. They held that only creating a highly paid and highly respected civil service for teachers and putting teachers on a par with officers of the Army, Navy and Air Force could high school education in the United States be salvaged. They were told that because the Constitution reserved education to the States the creation of a federal system of high schools could not be set up without amending the Constitution. Because the Fellows were not ~~politically experienced~~ ^{experts in the field of politics}, they did not realize that such a constitutional amendment could not possibly pass. They reasoned, wholly without justification, that if it had been possible to amend the Constitution in order to keep people from drinking alcoholic beverages, and to amend it again in order to make it possible for people to drink

alcoholic beverages, then it ought to be possible to amend the Constitution ^{also} in order to provide the young people of America with the education that they needed. The Twenty-Fourth Amendment, enabling the Federal Government to set up ~~system of~~ high schools was adopted in 1986.