

APPENDIX NO. 2 (Unpublished)

The Voice of the Dolphins

By Leo Szilard

The 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 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 joint 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 the place of their work and if they were acceptable to that University then the Foundation would build these laboratories for their use. 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 some seven Universities. Most of the Fellows settled in the Boston area, and on the West Coast.

When the creation of these fellowships was first announced, there were 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 one third of the Fellows spent part of their salary on their research, claiming a corresponding contribution from the Foundation, while two-thirds of the Fellows just lived in idleness.

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.

For 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.

Prior 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 joint budget fell, on occasion, short of the needs of 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, who allocated grants, in the amount of \$200 million a year, for such 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 satisfactory result.

The main reason why, in the first half of this century, Europe was so much more successful in basic science than America was its different attitude towards leisure. The establishment of a system of life-fellowships by the American Research Foundation came very close to creating a leisured class and the attitude of the 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 certain 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.

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. Under the terms of their appointment they could, if they wished, spend up to half of their salary on political contributions. Their political contributions counted just as much, as their contribution to their own work, inasmuch as they were matched five to one by the Foundation - and the contribution of the Foundation could be used for 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. As far as political contributions go, the amounts which the Fellows could spend were not large, yet the political influence of the Fellows

became, in time, quite substantial. It would appear that the Fellows supported certain key members of the Senate and the House with modest contributions, but they did this persistently over a number of years, and this led to the establishment of lasting friendships. Because such legislation as these Fellows proposed, was eminently reasonable, Congressmen and Senators who regarded them as 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 disturbed by the poor 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, and the cities. They held that only by creating a highly paid and highly respected civil service for teachers and by 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 experts in the field of politics they did not realize that such a constitutional amendment could not possibly be passed. 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. As is generally known - the Twenty-Fourth Amendment, enabling the Federal Government to set up high schools was adopted in 1986.

~~To the Voice of~~ Appendix No 2 (unpublished)  
~~The Voice of~~ the Dolphins.  
~~(unpublished)~~ APPENDIX 2 Leo S. Lillard

The 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 ~~four~~ <sup>five</sup> 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 ~~joint~~ research budget of \$360,000 - as long as each of them was willing to live on his remaining salary of \$20,000 per year.

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When the creation of these fellowships was first announced, there were 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 one third spent part of their salary on their research and claimed a matching contribution from the Foundation, ~~and~~ <sup>while</sup> two-thirds of the Fellows <sup>just</sup> lived in idleness. <sup>of the Fellows</sup> 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.<sup>PP</sup> For 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~~ Prior 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

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Many of the Fellows were ~~concerned about~~ <sup>disturbed by</sup> ~~poor~~ 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, <sup>and</sup> the cities, ~~and the churches.~~ They held that only <sup>by</sup> creating a highly paid and highly respected civil service for teachers and <sup>by</sup> 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 ~~experts in the field of politics~~ Fellows were not ~~politically experienced~~, <sup>See ed</sup> 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 <sup>also</sup> in order to provide the young people of America with the education that they needed. <sup>as is generally known</sup> The Twenty-Fourth Amendment, enabling the Federal Government to set up ~~system~~ high schools was adopted in 1986.