

News and views

The Alphabet

A Letter to the Editor

Dictionaries, telephone-directories, subject-indices, membership-lists, etc., etc., are arranged in alphabetic order. But if two or more people write a scientific article, a painful problem often arises concerning the order in which the names of the authors should be placed. "Alphabetic order, of course!" says an innocent bystander. "Certainly not!" come voices from many quarters. "It should be the senior author (by age, or position) whose name should be quoted first" conclude some people interested in the problem. "No, the senior author should put his name at the very end to give a chance to youth!" retort the others. "Maybe one should list names in order of relative merits in accomplishing the work," suggest the adherents of still another school of thought. "But who is going to decide whose contribution was most important?" ask the critical-minded ones.

The disputes about the order in which the names of the authors are to be placed in the printed article often lead to quite amusing situations, such as the one which took place in a certain research institute quite a number of years ago. The assignment was to study the properties of a certain chemical compound by using the radiations of all different wave lengths. Within a few months the work was concluded, and by the combined efforts of three persons the properties of the aforesaid chemical compound were studied by means of infrared, ultraviolet, and x-rays. The researchers were summoned to the office of their group leader, Dr. A, who raised the "important question" of how their names were to be placed in the joint article on the subject.

"Why, in alphabetic order, of course", volunteered Mrs. X, who was doing infrared spectrography. But, looking on the grim faces of the others, she immediately realized that she had made a social mistake. Indeed, the other two researchers were Mrs. Y and Mr. Z!

Thus it was decided to pull the tickets from a hat in the best tradition of country sweepstakes, and a janitor agreed to play the role of the innocent lottery boy. The first ticket was "Mrs. X", the second, "Mrs. Y", and the third, "Mr. Z".

"You see, even the law of chance honors the alphabetic order!" exclaimed Mrs. X, who had gotten interested in the game. But the faces of the others remained grim, and a vague suggestion was made that the experiment be repeated a few more times to establish a better statistical pattern. However, for some reason no repeti-

tion was made, and for the time being the order was accepted.

Later in the day Mrs. Y came to Mrs. X's office. "Look here," she said. "Both you and I are just working here part-time, and we are not career women. But Mr. Z has a wife and children to take care of. Would you mind too much if we put his name first?"

"But, of course!" replied Mrs. X, "it does not make any difference to me. Alphabetic order, X, Y, Z, would in fact correspond to arranging the contents according to increasing frequency, since you took the ultra-violet spectrum, and Mr. Z worked with x-rays. We can just as well arrange the subject matter according to increasing wave length, and have it Mr. Z (for x-rays), Mrs. Y (for ultraviolet) and Mrs. X (for infrared)."

"Oh, no! exclaimed Mrs. Y. I would not think of having my name ahead of yours!"

As the result, in the printed article the names appeared in the order:

A, Z, X, Y.

This bore no relation to the alphabet, in which case the names would have read:

A, X, Y, Z.

Neither was there any relation to contents of the article, in which case the ordering should have been:

A, Y, X, Z, A.

Another extremity of honoring the alphabet, the Greek alphabet in that case, was the inclusion of the name of Bethe (β), in an article of Alpher (α) and Gamow (γ) on the origin of chemical elements. But this was just a frivolous, although friendly, gesture.

Frivolity aside, a serious proposal can be made to the editors of *The Physical Review*, and, for that matter, to the editors of all other scientific magazines:

The names of the authors in multiauthor articles should appear in alphabetic order, and it should be so stated in a special announcement. In special cases, when one of the authors feels that his name should come first in violation of alphabetic order, a special footnote stating his merits should be added to the title of the article. It would be highly desirable that this question be taken up at an early meeting of the American Physical Society, and that a definite decision be reached.

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National Science Foundation

Annual Report Stresses Need for Funds

One of Mr. Truman's last official acts as President of the United States was to transmit to Congress on January 16th the second annual report of the National Science Foundation, which had been submitted by NSF Director Alan T. Waterman in review of the Foundation's work during the 1952 fiscal year. A week earlier,

in his final budget message to Congress, Mr. Truman urged that \$15 million be appropriated for NSF operations during the 1954 fiscal year. "The law," he added, "should be amended so as to permit a higher level of appropriations in the future."

In view of congressional response to budget requests made in previous years, and especially in the light of promises made by leaders of the Eighty-third Congress that government spending will be reduced this year to permit a balanced national budget, NSF's prospects would seem to be little brighter now than in the past. For the fiscal year 1951 it was decided by Congress that NSF should be granted funds sufficient only to cover organizational and administrative expenses, and for that reason the Foundation was unable to begin effectively to discharge its responsibilities under the law until 1952, the year with which the present report is concerned. The requested \$14 million appropriation for 1952 was, however, slashed by Congress to only \$3.5 million, which forced the Foundation to alter its plans in a drastic manner. The approved budget for the 1953 fiscal year fared somewhat better, being cut only to \$4.75 million.

Meanwhile, the employers of scientists, in government, industry, and elsewhere, have been confronted by mounting evidence that the need for the services of scientists is increasing more rapidly than are the numbers of available scientists. It has been widely conceded that the Science Foundation could and should be immensely helpful in determining measures to be taken in response to the growing shortage of scientific manpower, but it has also been recognized that the agency is restricted in its usefulness by its present financial plight.

It should be recalled that the National Science Foundation Act of 1950 was passed by the Eighty-first Congress in recognition of the need for a single federal agency to aid in coordinating the national research effort and to stimulate and encourage scientific progress. In particular, the Foundation was directed to carry out the following eight-point program:

1. To develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences;

2. To initiate and support basic scientific research in the mathematical, physical, medical, biological, engineering, and other sciences, by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such basic scientific research and to appraise the impact of research upon industrial development and upon the general welfare;

3. At the request of the Secretary of Defense, to initiate and support specific scientific research activities in connection with matters relating to the national defense by making contracts or other arrangements (including grants, loans, and other forms of assistance) for the conduct of such scientific research;

4. To award scholarships and graduate fellowships in the mathematical, physical, medical, biological, engineering, and other sciences;

5. To foster the interchange of scientific information among scientists in the United States and foreign countries;

6. To evaluate scientific research programs undertaken by agencies of the Federal Government, and to correlate the Foundation's scientific research programs with those undertaken by individuals and by public and private research groups;

7. To establish such special commissions as the Board may from time to time deem necessary for the purposes of this Act; and

8. To maintain a register of scientific and technical personnel and in other ways provide a central clearing-house for information covering all scientific and technical personnel in the United States including its territories and possessions.

In his introductory remarks to the Foundation's second annual report, National Science Board Chairman Chester I. Barnard has termed the first two appropriations "inadequate except to begin to perform the functions contemplated in the act establishing the Foundation" and has suggested that these financial limitations reflect a "lack of understanding" of the purposes for which the agency was created.

"... The significance of basic science for our national life, indeed for our international interests," he concluded, "is not well understood. This partly results from confusion with respect to the spectacular technological results of certain *ad hoc* researches which indeed have been almost glamorous—a fact not improperly exploited by industrial organizations which have had much to do with them.

"It may also in a deeper sense be related to the fact that until comparatively recently, it has been generally impossible to look for practical results from application of science except to very specific problems and quite sporadically. This is still true, of course, in many branches of science, where the density of knowledge is low and the comprehensiveness and utility of theory is restricted, but we have now reached the stage of social organization and scientific development where these earlier limitations are being much reduced. This justifies the expenditure to a degree not possible earlier of manpower, resources, and money solely to extend our knowledge and develop fundamental scientific ideas for their potential, if not immediately apparent, practical significance. Thus, we have reached the stage where the maintenance of an expanding pool of tested scientific knowledge is good economics as well as indispensable in effective utilization of the world's natural resources for the needs of an increasing and largely half-starved population and necessary for maintaining the competitive position of this Nation for military or economic purposes.

"Whether such competition is desirable or merely unavoidable depends on the point of view. In any event the bottleneck in the future will be men. The proportion of our population potentially capable of assimilating the training required of scientists, or having the curiosity, interest, and ambition to pursue effective sci-

entific careers, is narrowly limited compared with the need for such trained individuals in the development of basic science. Thus, the proportionately limited amounts of funds now required, even with the most liberal estimates, are of small consequence in the economy that we are here concerned with.

"Our national interest requires full development of our potential scientific manpower resources and sufficient funds for this have not been available. Indeed, the present restriction in the National Science Foundation Act holding appropriations to a maximum of \$15,000,000 in any year seriously limits the capacity of the Foundation to carry out effectively its statutory directives."

Research, Fellowships, and Manpower

Progress made during NSF's second year is covered in the report under the headings: Development of National Science Policy, Scientific Research Support, Scientific Manpower and Education, and Dissemination of Scientific Information.

Development of a national science policy was furthered in 1952 with the establishment of the Foundation's Program Analysis Office, which is designed to carry out statistical studies concerning the organization of federal agencies for research administration and with their budgets for research and development, the content of their research programs, and the impact of federal support of research upon industrial development and upon colleges and universities. Preliminary data from a survey of federal obligations for research and development at nonprofit institutions have already been released (see *Physics Today*, January 1953, p. 22). Such fact-gathering, the report emphasizes, is a needed preliminary step before the long-range goals of policy development can be reached.

During the year ending June 30, 1952, a total of \$13.3 million in basic research proposals was received, of which \$1.1 million (8 percent) was approved, \$5.1 million (38 percent) was declined, withdrawn, or represented reductions in budgets of approved proposals, and \$7.1 million (54 percent) was pending. "It is clear, however, that limited Foundation funds for research support have discouraged many competent investigators from submitting proposals," the report stated in connection with its estimate that new proposals submitted in 1953 would total more than in 1952.

About three thousand applications were received for graduate fellowships in the sciences for the academic year 1952-53, of which only 624 were granted the awards by NSF. The largest group of fellowships, 158, was awarded to graduates in the biological sciences, which compares with 140 in chemistry, 137 in physics, 75 in engineering, 62 in mathematics, 36 in the earth sciences, 7 in agriculture, 6 in astronomy, and 3 in anthropology.

The graduate fellowship program represents an immediate attack by the Foundation upon the shortage of scientists, but the report is careful to say that the granting of fellowships cannot solve the whole problem. Pointing out that the United States is currently

falling behind on the production of new scientists at the rate of ten percent or more per year, the report emphasizes that the shortage stems from deep roots in our educational, social, and economic structure, and that its eventual correction will require long-range attack on these underlying problem areas.

The Foundation has also been carrying out studies on a number of the factors affecting the dissemination of scientific information, including surveys on the present status of journal publication, abstracting and translation services, and scientific libraries.

Statement on Visa Situation

Approved by Physical Society Council

The following statement was approved by the Council of the American Physical Society at its meeting in St. Louis, Missouri, on November 28, 1952.

"In the past few years, the progress of American physics has been impeded by United States visa and passport restrictions. A few American scientists have been denied passports and many distinguished foreign scientists have failed to receive United States visas even for short visits to attend scientific meetings. Other foreign scientists fail to come because their visas arrive too late after delays of many months or because they had been irritated by inappropriate questionnaires and inquisitorial personal interrogations. The international notoriety of these difficulties is now such that some international scientific meetings that originally were to be held in the United States are transferred to other countries.

"The personal exchange of ideas and the collaboration with foreign scientists are essential sources of information and ideas which cannot be replaced by written correspondence or by the study of foreign publications. The present restrictions of personal contacts are cutting deeply into this important source of our scientific production. This loss of scientific potential may even jeopardize our national security. Had similar regulations been in force prior to 1942, it is questionable if the United States would have developed radar or the atomic bomb during the last war.

"This loss to the United States is not compensated by any gain in the security of classified information, since the meetings from which the visitors are excluded are open scientific meetings on unrestricted subjects. The main reliance for the security of our technical secrets must necessarily be on the very strict guarding of the information by those who have access to it and not on such illusory and ineffective procedures as the exclusion of foreign visitors from open scientific meetings. Furthermore, the interrogations of foreign scientists are chiefly effective in excluding and humiliating scientists who believe in political and intellectual freedom rather than in detecting spies who would be less scrupulous about their answers.

"The Council of the American Physical Society is not questioning the propriety of excluding any person who wishes admission to this country with any idea of advancing communism here. However, the Council strongly urges a more realistic approach by the authorities to the problem of travel restrictions so that free scientific interchange will not be impeded."