sively promoting available methods now. It should be apparent to even the most obdurate by now that the net effect of our foreign aid in many cases has been to increase the total number of impoverished and discontented people.

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The ring is an extremely promising development, but many of its most enthusiastic supporters caution that considerably more experience must be gained before it is employed on a mass basis. So far, reports on the ring are highly encouraging, but there is justifiable concern over a number of adverse experiences. These include occasional cases of bleeding, undetected loss of the ring, and conception despite proper placement of the ring. It is not known how the ring functions to prevent conception. This lack of understanding can be regarded as insignificant when viewed against the problem that the ring serves to solve, but in dealing with something so delicate as human reproduction, caution is advisable. AID's efforts in behalf of population planning will not be served if it is later discovered that the agency has been promoting a birth-control method that is harmful over the long run. Fortunately, a good deal of research on the ring is now being conducted.

—D. S. GREENBERG

Chemistry at NSF

The following analysis of the data in the chemistry subsection of Appendix C ("Grants for basic research") of the 13th annual report of the National Science Foundation (1963) is offered both for its own interest and in support of a small suggestion at the end of this letter.

Nearly 250 grants to individual chemistry faculty members at about a hundred institutions are listed. Over $9 million, mostly for projects of 1 to 3 years' duration, was dispensed to these recipients, who included at least one Nobel prize winner, two past presidents of the American Chemical Society, a presidential science adviser, and several other rather famous chemists.

The distribution of grant sizes (from a low of $600 to a high of more than $150,000) is shown in Table 1. Except for the largest grants the distribution would be not far from a Gaussian probability curve. While the implications of this are highly interesting, perhaps suggesting that ordinary applicants base their financial requests on not much more than guesswork (if it is assumed that the amounts received are proportional if not equal to those requested), such wild speculations will not be pursued further.

The institutions favored with the largest share of the money are as a group the same 25 listed (in the "Money Behind Our Colleges," Editorial Projects for Education, Baltimore, 1964) as recipients of 59 percent of all federal research funds for all colleges and universities, though there are individual anomalies. Princeton chemists, for example, received no grants in this section, and several schools not even in the top 100 for general federal support received substantial sums. Still, the overall result was much the same as for federal agencies in general.

There is no hint of irresponsible distribution of large sums of money to individuals either. Recipients of the 23 largest grants were all full professors at major universities, and moreover of mature and responsible years. Not one was under 30, only four were under 40, and eight were 50 or more. Smaller grants often went to lesser rank and age; for example, in the $10,000–$19,999 bracket at least four recipients were under 30 and at least 24 were less than full professors. (Data for this group are incomplete because several members of it are not listed in the American Chemical Society Directory of Graduate Research used to establish academic rank and age.)

The grants by the chemistry section of NSF for 1962–63 were undoubtedly carefully and responsibly allocated. I have the impression that they represented the collective opinions of responsible and careful committees that must have passed judgment on a large number of proposals that were in the main also careful and responsible. However, in view of the small size of NSF support of chemistry relative to that available from several much larger government agencies (a career award from the Public Health Service, for example, can be equivalent financially to a Nobel prize every year or two and may last for life), NSF support must be distinctive if its influence is to be appreciable.

Table 1. Grants by the National Science Foundation for basic research in chemistry. Data from NSF Annual Report, 1963.

Size of grant ($)	No. of grants	Total amount ($)
Under 1000	1	600
1000-10,000	27	128,090
10,000-19,999	47	724,750
20,000-29,999	47	1,207,900
30,000-39,999	40	1,417,600
40,000-49,999	33	1,468,500
50,000-59,999	14	774,100
60,000-69,999	9	583,700
70,000-79,999	8	607,600
80,000-89,999	5	420,800
90,000-99,999	6	565,000
Over 100,000	12	1,415,800

Since the directions for submitting research proposals to NSF are not appreciably different from those issued by many other government agencies, it would be surprising if the proposals themselves were much different. By their very nature, research proposals have a tentative and vague character, and evaluation of them must rest heavily on the status and record of the applicant. Thus the large grants must go to the men with large and established positions, unless the awarding agency is hopelessly irresponsible. The only question is whether the confirmation of the obvious is really a main function of all research sponsorship.

On the assumptions that a more distinctive and possibly more objective type of award would be appropriate for NSF and that recognition of fairly contemporary merit rather than of a long record of past accomplishment would tend to promote science more than research administration, I suggest the creation of one advisory committee to search the contemporary scientific literature for the most brilliant and significant papers it can find. NSF might then negotiate a mutually acceptable grant with authors of such work.

The fact that nearly all published research is already sponsored by some agency should not, I think, detract appreciably from the prestige value of such awards from NSF. Whatever the results in the improvement of scientific research, the effect on the journal literature could not fail to be salutary. The publication of good papers has suffered too large a decline in the scientist's scale of values, and any incentive to improvement would be welcome.

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