—those by Hirsch (p. 1436) and Erlenmeyer-Kimling and Jarvik (p. 1477).

Suppose we do find irrefutable evidence of genetically determined differences among human beings in socially important traits—what then? I do not presume to answer this immense problem, but suggest that it is a sort of problem to which the efforts of a committee on "Science in the Promotion of Human Welfare" should be directed. It is not a scientific problem, but the title of the committee implies that nonscientific matters are within its province; perhaps it will have to add some philosophers to its membership to help specify what it means by "human welfare." Both the committee and Putnam are deriving their ethical postulates by selection from the vast and contradictory fund of values that our tradition affords. As long as this procedure is followed, one can justify almost anything. If, however, the committee made a serious effort to render its ethical assumptions as clear and consistent as it would render a scientific theory, the ambiguity in the ethical aspect of the debate might at least be reduced.

There is another line of argument open to the committee, which can be reconciled with scientific information that may be developed about genetic differences among individuals or groups in socially significant characteristics. This is that any action that might be justified with respect to genetic differences would certainly be inefficient if applied to the socially defined dichotomy "Negro–White." This dichotomy defines as "Negro" some persons nearly all of whose genetic characteristics are of Caucasian origin. Even if there should arise some evidence of important genetic differences between persons of pure Caucasian and pure African orgin (heterogeneous categories themselves), this would provide no justification for differential treatment in terms of "race" as socially defined in the United States.

To give some perspective to the argument, let us suppose that statistics on intelligence or genetic studies of families should reveal Jewish persons to be genetically more intelligent than Gentiles. The principles advocated by Putnam would seem to imply that Jews should then be given uniformly superior opportunities for education and influence than Gentiles, from their earliest years. This might indeed have some advantages, granted the facts I assume; but would the advocates of segregation take this action to segregate themselves?

One might reply that we do not have such data about Jewish superiority. The norms of science would then demand that we seek evidence on the point—for the purposes of applied science, if not theory. Those who advocate white (Gentile) superiority would probably not rush to do so. But this presumed reluctance may be parallel to the reluctance of equalitarians to seek out evidence of human genetic differences. This would not be the first time that scientists had shown a certain blindness to scientific evidence opposing a valuative position they advocated. Barber, in writing of "Resistance by scientists to scientific discovery" [*ibid.* **134**, 596 (1961)], has observed that scientists' actual behavior can diverge somewhat from the norms cited self-righteously by the committee. A little more humility—if it could be practiced on both sides—might also help bring the "race" issue nearer to the degree of resolution possible in a scientific journal.

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National Policy for Science: A Congressional Responsibility

The editorial in the issue of 22 November [*Science* **142**, 1025 (1963)] charges, undoubtedly with cause, that the retiring senior scientist of the executive branch of the government, in pursuing his executive duties, has failed to provide an adequate intellectual basis (or long-term policy) for support by the scientific community, such as could be furnished by a planning office marshalling the wisdom of the nation to give guidance for the future.

Perhaps this failure is as it should be, even to the extent of being a long-term gain for a democratic society in which the freedom of science, as well as other freedoms, is protected by a separation of powers. We seem constantly to forget of late that it is the office of the legislative branch to establish long-term policy and to give guidance, after sufficient public debate, in the form of laws containing statements of national intent, which are only to be carried out in daily or annual business by the executive branch.

The proven and stable system which gives Congress responsibility for policy is enforced by legislative control of taxation and appropriations. This situation was clearly recognized by the editor in his previous statements [*ibid.* **140**, 1364 (28 June 1963)] that "the future shape of science is being determined by legislative actions . . ." and that there were "other ways of improving the scientific judgments of Congress," including the nomination of scientific counselors by the National Academy of Sciences.

May I suggest that the earlier proposal by the editor is a sounder one, far less likely to produce an "arrogant mode of operation." It appears far more healthful for our way of life and for the future of science.

I also think that it is within the nonpolitical objects of AAAS, as published on each editorial page, and within the proper functions of its Board of Directors and the editor, as representative of scientists in all the disciplines, to take steps to bring about active consideration of the June suggestion of the editor, by Congress and the NAS. This may be done with a view to encouraging Congress to find the best way to fulfill its broad deliberative office in science policy, so that appointment to its group of counselors would bear the highest prestige of all scientific appointments in government. Possibly the entire academy might be invited to tender formal policy suggestions through accredited liaison. This could only apply to the very broadest issues. It is to be hoped that in such considerations the established responsibilities of state legislatures for public universities and for local research experiment stations would not be forgotten.

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An Experiment in Communication: The Information Exchange Group

An information-exchange group has been set up to provide better communication among scientists in the related fields of electron transfer, oxidative and photosynthetic phosphorylation, ion transport, and membrane structure and function. The National Institutes of Health provide the means by which any member of the group can within a matter of days dispatch a communication to all other members.

Anyone actively working in the field in any country of the world is eligible. No restrictions are imposed on the nature of the communications. No editorial prerogatives are exercised. The communications distributed have the status of private communications and can be quoted as such in the literature.

The exchange has nearly 150 members here and overseas. Each member may recommend for membership any individual who is an active worker. In 2½ years the group has distributed over 90 different communications from its members, the number in the second year being about three times that in the first year. These have included preprints of articles in press, discussion of points of difference among workers in the field, papers on methodology, and reprints of talks given at symposia or lectures.

The exchange makes it possible for all members to be fully informed in record time of all developments in the field. It insures members against unfair practices because everyone is fully aware when a particular idea or experiment is presented. The important priority is the one assigned by one's colleagues. Where every colleague is given full opportunity to judge for himself the origin of a discovery from the dated records, the risk inherent in the dissemination of privileged communications is negligible.

Argument, which should play a vital role in science, is all but squeezed out of contemporary journals. The inevitable long delay in publication, coupled to the distaste of editors for polemics, has effectively eliminated argument as a public instrument of scientific progress. Anyone in the exchange can criticize prevailing views, and speak out as the mood and facts dictate. Several significant problems which have never been aired properly, if at all, in the scientific journals have been the subjects of incisive communications sent through the exchange. Bringing controversy into the open may well become one of the exchange's most valuable features.

Even with the most enlightened editorial policy no journal can escape completely the danger that worthwhile ideas may be ambushed by some overzealous or overopinionated reviewer. The Information Exchange provides an outlet for anyone who feels choked by editorial intransigence. Admittedly, the lack of editorial discipline and restraint could open the door to a flood of rubbish, but actually potboilers are conspicuously absent from the communications offered through the exchange; the certainty that the experts in the field will look with disfavor on a paper of poor quality is a restraint which achieves the same net effect as editorial supervision, without the inherent risk of censorship. Moreover, an initial readership of experts could well stem the flood of inferior material to the journals.

The investigator working at the border line between two disciplines runs the risk that his work will be published in a journal not readily available to an important segment of his potential readership. This particular problem is completely solved by the exchange. The esoteric "journal" comes to the reader—not the other way around.

The working of the exchange is simple. Communications, typed on ordinary bond paper, are sent to the office of Errett Albritton of the National Institutes of Heatlh (the originator of the experiment and its guiding spirit), where they are photocopied and copies are mailed to each member of the exchange. There are no mailing or service charges to the members. As chairman of the group I have the responsibility of ensuring that applicants for membership are qualified and that innovations be introduced whenever necessary.

Plans are afloat to set up additional exchange groups in biochemistry, still on an experimental basis. How far the experiment can be and should be carried over to other biomedical sciences will depend upon the initiative of workers within these areas and the interest of the National Institutes of Health and other agencies.

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Grants to Nonconformers

The letter [*Science* **142**, 11 (4 Oct. 1963)] on the reasons why Koch and Jenner would be refused a research grant in our day is much too true to be passed by without comment. Surely something must be fundamentally wrong in our present system of grant allocations if none of us seriously doubts that applications of such scientists would be rejected.

The problem is by no means a simple one. Even large material resources can be quickly exhausted if research grants are given indiscriminately. Choices have to be made. Phantasts have to be distinguished from real geniuses without our really knowing how to make this distinction before they have been given an opportunity. On the other hand, a committee of even the best specialists will of necessity be biased in ways of thought which are in vogue. They may differ from each other because each of them may have a special point of view, but a point of view differing from those in mode at the time will arouse interest only in the very best of them. And not many of the very best will sit on the committee. Nonconformists will have very small chances to win understanding, though many of the really major advances in science come from nonconformists.

A step toward improving the situation could be as follows. Naturally, committees dealing with grant applications should be formed of scientists of high scientific and moral reputation. As far as possible, this policy has already been adopted. However, decisions should not be bound to the majority vote of the committee. Each member should have the right to act independently on a small number of applications after due consultation with his colleagues. If discussions with them do not convince him that an application which he thought a good one is unworthy of help, he could help it through singlehandedly, knowing that his resources to act in this way are limited and that he must use them only for the best.

Thus the uniforming effect of the majority of the committee would be neutralized and the spectrum of applications approved would widen appreciably. A committee of strong scientific personalities could perpetuate differences in scientific approach instead of giving in to colorless compromises in favour of subjects within the domain of well-behaved normality. And ingenious outsiders could sometimes have a chance in their handicapped race against overspecialized colleagues who possess the academic degrees so overestimated in our scientific communities, which are becoming mandarinized at an alarming rate.

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