Letters

Scientific Advisers for Congress

In recent weeks letters and editorial comment have referred to the growing concern in Congress over the exponential increase in R&D supported by agencies of the Federal government. Reflecting this concern are a number of bills and resolutions introduced into the last session, all aimed at providing Congress with some means for adequately evaluating the agency R&D proposals in terms of their potential contribution to the social and economic welfare and military posture of the nation.

In meeting its requirement Congress will want to consider the background of the individuals selected as its advisers on science and technology. Most of the Federal agencies requesting R&D appropriations have, advisory to them, men of recognized standing in the scientific community. By and large they have been drawn from academic life. Before an R&D appropriation request reaches Congress it has had the blessing of such men, and there is little doubt that the research programs involved are scientifically sound and interesting. Whether the results of the research, assuming it is successful, are closely geared to the agency's mission or can be exploited for the country's welfare in the foreseeable future is something else again. This facet of R&D evaluation is usually outside the experience of men wholly dedicated to scientific achievement.

The administrators of industrial research as a class are admirably suited to the type of R&D project evaluation which Congress requires. The recognized practitioners in this field are men with strong scientific backgrounds and dedicated to the concept that scientific research is a powerful force in our social and economic life. In this respect they are true scientists. But in addition they have the advantage of an added perspective. By virtue of their positions in industry they have been forced to weigh not only the purely scientific aspect of an R&D proposal but also its chances of success and more importantly its potential contribution to the growth and profits of the company which supports its cost. They must assess its relationship to the established field of company interest. They must estimate the probable cost to bring the R&D result to market or incorporate it into the central stream of the company's operations. They must understand the ability of the company to finance, produce, and sell the result of research. All these factors they must consider in relation to the potential savings or increment in net income. It is just this type of experience which Congress requires in order to appraise the merit of federally sponsored research programs in relation to the tax dollars required to support them.

ROGER H. LUECK

20016 Winter Lane, Saratoga, California

Pigeons and Cryptococcosis

The current furor in New York City regarding the possibility that pigeons may spread human cryptococcosis is a good example of the hysteria generated by premature or ill-considered pronouncements of public officials. The numerous articles on the subject that have appeared in newspapers throughout the country and in *Time* and *Newsweek* contain many incorrect and misleading statements, and the time and effort already spent in ballyhoo borders on the ridiculous. Before all this leads to a possibly unwarranted expenditure of considerable sums on pigeon extermination, a more critical and unbiased review of the evidence should be presented to the public.

The finding of *Cryptococcus neoformans* in pigeon droppings is nothing new. As long ago as 1955, this organism (which is never referred to in scientific circles as CN, as some articles have stated) was shown to be present in the excreta of pigeons in Washington, D.C., by investigators at the National Institutes of Health. There is no question of the validity of these findings, but there is no clear-cut evidence that the incidence of human cryptococcosis in a city is significantly increased by the presence of pigeons. The birds are not infected, nor is the organism present in their digestive tracts; the pigeons do not actually spread the organism around in the environment in their droppings. The fungus cannot be isolated from fresh droppings, but only from old, dried excreta. It is known that *C. neoformans* is widely distributed in nature, and it has been isolated from a variety of natural substances, including soil, fruit juices, and milk, so that it seems most probable that the fungus gets into the pigeon droppings from the surrounding environment and grows there because the droppings furnish a rich culture medium. Thus humans are constantly exposed to the fungus whether pigeons are present or not. It is true that there have been documented outbreaks of cryptococcosis following such operations as the cleaning of a pigeon roost, and undoubtedly such an operation presents a hazard to the health of the individual engaging in it by exposing him to an unusually high concentration of the infective agent in the dust. The simple solution to this particular problem would be the use of a respirator to prevent inhalation of the dust. However, in the case of isolated infections occurring in the community, it is practically impossible to prove a relationship between the presence of pigeons and the initiation of the disease; the mere fact that the patient had previous contact with pigeons is no proof at all that they were the source of his infection.

In the case of another fungus disease of man, histoplasmosis, it has been demonstrated that the causative agent, *Histoplasma capsulatum*, can readily be isolated from chicken droppings and from soil around chicken houses, and some fatal cases have been linked with a close association with chickens. Histoplasmosis is a much greater public health problem than cryptococcosis; it is estimated that between 20 and 30 million persons have had the primary, usually mild and self-limited, respiratory form of the disease. Yet no one has seriously advocated the mass extermination of chickens.

It should also be pointed out that *C. neoformans* is not found exclusively in the excreta of pigeons, but can be

isolated from the droppings of quite a number of species of birds, including the canary.

The incidence of 20 cases per year reported in New York City is slightly less than two cases per year per million inhabitants, and is not likely to be significantly different from the incidence that might be found in almost any U.S. city, with or without pigeons.

JOHN D. SCHNEIDAU, JR.
Laboratory of Mycology, School of Medicine, Tulane University, New Orleans, Louisiana

Speling and Hostillity

Klingelhofer claims [*Science* **142**, 1123 (1963)] that by misspelling the names of scientists students reveal "a deep-seated and general hostility toward scientists." I wonder whether, if he had asked for the names of ten professional football players, ten composers, ten novelists, ten heads of nations, and so forth, he would not have found that this deep-seated and general hostility extends far and wide.

A. R. PATTON
Department of Chemistry, Colorado State University, Fort Collins

Ingroups and Dropouts

E. G. Boring's letter [*Science* **142**, 622 (8 Nov. 1963)] describes an important phenomenon in contemporary science [the ingroup as a social stimulus to creativity]. A neglected aspect of this phenomenon is its effects on the training of the next generation of scientists. Two main, but related, points deserve attention.

Within the present apprenticeship system students may be divided into two groups, other than those who never get their degrees at all: those who will write such Ph.D. theses and one or two journal articles as will lead them eventually to the obscurity of a safe associate professorship with tenure; and those—a minority—who will become the active researchers upon whom the progress of science depends. Perhaps most of our thinking about science and scientists concerns men and women who are or have been members of the active minority. Perhaps potential contributions of the others are being too much ignored.

A graduate student, especially after his first year, usually has a fairly well-defined field of interest and sufficient competence to appreciate current developments in that field. But his professional growth beyond this is not facilitated by the system of ingroup communication depicted by Boring. In the student, exposed only to the views of his adviser and his adviser's colleagues, attitudes and biases are developed which, while they may generate enthusiasm and apostolic zeal, tend to bias the young investigator against the work of "outgroups," if he ever gets to know their work exists. Thus he is blinded to the work of other investigators which might contribute to his own research and might lead to a broadening of his ideas and to the generation of fruitful new concepts and research. Furthermore, the present system of graduate education would tend to perpetuate these phenomena in future generations of scientists.

In view of the increasing demands made upon the scientists currently active in research, it would seem that the potential ability of those who drop out of the active scientific community although they attain the Ph.D. ought to be better utilized. While the causes of their withdrawal appear to be highly complex, it would seem that one cause might be a lack of knowledge of interesting fields of potential research.

These hypotheses are admittedly somewhat tenuous, and not to be taken as an implied criticism of the institution to which I am attached. It remains for the "empirical epistemology" advocated by B. F. Skinner [*Science* **140**, 951 (1963)] to show what validity they possess.

S. WINOKUR
Department of Psychology, University of Minnesota, Minneapolis 55

Gypsy Moth Control

In a letter to *Science* [**142**, 447 (1963)] Arthur L. Babson proposed that gyplure, the synthetic form of the gypsy moth sex attractant, be broadcast by air over infested areas to confuse or frustrate male moths during the mating period in order to achieve control of the insect.

Actually, a test such as Babson described was undertaken by the Plant Pest Control Division during the summer of 1961. Gyplure, in both liquid and granular formulations, was distributed by aircraft over Rattlesnake Island, a 400-acre island with varying intensities of gypsy moth infestation located in the midst of Lake Winnepesaukee, New Hampshire. Subsequent field observations revealed that the particular gyplure used in this test had no apparent effect on the mating activity of the male moths.

It was evident from this test that a satisfactory method had not yet been developed for the mass production of gyplure. Since then, studies have been continued in an effort to overcome this problem. It is expected that in 1964 a sufficient quantity of highly attractive gyplure will be available which will permit resumption of the confusion-type test.

In addition to such tests, personnel of the Division's Methods Improvement Laboratory, Cape Cod, Massachusetts, are conducting tests with *Bacillus thuringiensis* and its related bacterial strains, with the gypsy moth polyhedral virus, with gamma radiation and chemosterilization, and with parasites and other agents, in an effort to devise safer and more practical and effective methods of controlling the gypsy moth.

E. D. BURGESS
U.S. Department of Agriculture, Plant Pest Control Division, Hyattsville, Maryland 20781

Stemming the Paper Flood

I agree with J. E. Holmes [*Science* **142**, 1252 (1963)] that restraint on the part of authors in replicating reports of their work in different publications would help to curb the frightening proliferation of scientific literature. An author who is able to republish in another language should be encouraged to do so. A report of interdisciplinary interest may advantageously appear in two or more journals if the disciplines involved have only limited contact. But it is only in exceptional circumstances such as these that replication is useful.

To whatever extent authors themselves fail to cooperate to alleviate the problem cited by Holmes, the solution lies squarely in the laps of the editors. Editors, by and large, have been awarded the authority to reject a paper whose essence has appeared elsewhere. They should be encouraged to exercise that authority unreservedly.

J. MURRAY MITCHELL, JR.
1309 Ridge Road, McLean, Virginia