source of funds is Japanese, the choice is the U.S. rather than Europe. Thus, the predominating orientation of the Japanese zoologist seeking foreign research experience is toward this country.

Part of the explanation of the almost exclusive orientation of Japanese zoology toward the U.S. is probably historical. Before 1868 the Tokugawa government had for 250 years virtually sealed the country from contact with outside cultures, and Japanese sciences remained rudimentary while rapid advances were being made elsewhere. When the first university was formed in Japan in 1877, there was no qualified Japanese to accept the first professorship of zoology. Two Americans (E. S. Morse, of Massachusetts, and C. O. Whitman, later the first professor of zoology at Chicago) served in this capacity, successively, until 1881. In 1882 K. Mitzukuri, who had just received his Ph.D. at Johns Hopkins, became the first permanent professor of zoology at Tokyo University. Undoubtedly, the two Americans, the American-trained Mitzukuri, and their students who succeeded them laid the foundation for a strong relationship with the United States. Except in a brief period during the war years, this relationship has flourished. The ready acceptance of Japanese as scientific collaborators by American research workers, evidenced by the rapid growth of the number of such Japanese in this country, must be based on such features as good training, disciplined and energetic work habits, and general effectiveness in production of successful research.

AUBREY GORBMAN
*University of Washington, Seattle*
TAKASHI FUJII
*Tokyo University, Tokyo, Japan*

## Oceanography at Inland Universities

William J. Hargis' letter (27 Nov. 1964, p. 1113) setting forth several objections to Spilhaus' proposal for "sea-grant" colleges seems to be taking aim not only at this imaginative idea but also at the idea that any land-bound university might dare make a serious attempt to get into the business of oceanography. When one considers that about 90 percent of the photosynthetic production of our planet occurs in the sea and that man extracts only about 1 percent of his food supply from the sea, while at the same time more than half the population of the earth is suffering from protein starvation, it is disturbing to read that a plan for a substantial increase in marine research and teaching raises fears of an "inevitable dilution of effort."

Hargis also advises against a "bandwagon leap by institutions whose locations, faculties, and facilities make them more suitable for terrestrial- or space-oriented work." There is no doubt that the marine institutes and laboratories along the Atlantic coast as well as on other coasts could effectively use additional support for their work. However, the argument that noncoastal institutions are automatically disqualified for marine research no longer holds. No university in the country is more than a few hours from a coast by air. There are other ways of carrying on marine research than by ship, for example, by remote sensing from aircraft, analysis of the great quantities of unprocessed ship data, numerical modeling, and laboratory experiments of all sorts. If ships are required, then the investigator can either arrange to "piggy-back" aboard one of the ships of the affluent oceanographic institutions or use one of the ships set aside for the community as a whole, such as Duke's *Eastward* and NSF's *Eltanin* and *Anton Bruun*. Access to the sea is no longer limited to those living on tidewater.

What facilities are peculiar to marine science? Aside from ships and circulating sea-water systems, it is difficult to point to a single facility which does not or could not exist just as well at an inland university: computers, engineering facilities, instrumented aircraft, wave tanks, dishpan models of the ocean or atmosphere, libraries all exist far from the sea.

It is always risky to generalize about university faculties, especially with regard to what they are or are not suited for. Many of our finest science faculties are located far from the sea, and in some of these there are foci of intense interest in marine science. Some of these institutions represent potential centers of excellence in the marine sciences. They have the talent, the interest, and the decided advantage of a fresh point of view. I do not believe that given substantial support they would in any way dilute the present effort. There is a continuing shortage of high-grade talent in marine science. The number of oceanographic problems and the need for their solution is rising much faster than our ability to meet them. I submit that ignoring the potential of the noncoastal institutions is shortsighted and will result in our falling farther behind in our efforts to understand the marine environment.

ROBERT A. RAGOTZKIE
*Department of Meteorology, University of Wisconsin, Madison*

## Eyesight of Astronauts

I understand that one of the physical qualifications required of astronaut-scientists is perfect eyesight. This is something of a puzzle to me. No one available for the program has a skin that will withstand high vacuum, ultraviolet light, or background radiation. Indeed, considerable effort has been expended to make such a hide superfluous. Since more than 500 kilograms must be carried to correct for skin and respiratory deficiencies, what difference can the few ounces of glass or plastic needed to correct optical deficiencies make?

At one time, it was necessary for soldiers to have teeth that occluded precisely, so that they could tear open the tops of ammunition loads. Even in World War II some draftees were classified 4F because of a deficiency in this respect, before this particular anachronism was eliminated. Pilots, and astronauts in particular, do not now look for landmarks while sitting in an airstream which might blow their glasses off. Color vision may be very important, and might reasonably be made a prerequisite, but it seems quite inappropriate that eye defects which can be corrected with ordinary eyeglasses should be cause for exclusion.

FREDERICK W. KANTOR
*600 West 113 Street, New York 10025*

## Antibiotics: The Duplication Problem

The New York *Times* of 18 January carried a story from Moscow entitled, "Russian takes to task discoverers who aren't." This story, quoting *Izvestia*, deals with the competition for a high intellectual prize in the Soviet Union

by candidates representing "a mass of average, not innovatory works," who finally admitted "that they were competing for the prize with a preparation that had been created overseas long before them."

This calls to mind an article in *Science* 8 years ago entitled "Penalty of isolationism" (*1*) in which I said:

> The repetitions and the frequently unjustified creation of "new species" of antibiotic-producing organisms and of "new antibiotics" can be avoided only by close collaboration among the scientific workers throughout the world. The creation of an International Antibiotics Board [for the purpose of comparing new compounds] is also highly essential at this time.

An important development bearing upon the isolation and utilization of new antibiotics may be cited here:

In 1949, a new antibiotic, designated as neomycin (*2*), was isolated in our laboratory. Neomycin in time became important in the armamentarium of the medical profession, and was manufactured by a number of industrial organizations in this country and abroad. As soon as its value became recognized, studies were initiated in numerous laboratories throughout the world in an attempt to isolate similar antibiotics. Some of these efforts proved successful, but, unfortunately, many of the new isolates were identical with neomycin. In the Soviet Union, three such preparations were isolated and were described under the names "colimycin," "mycerin," and "framycin." Although it was suspected, both in the Soviet Union and abroad, that these so-called "new" antibiotics were nothing but neomycin preparations and that all three were identical with neomycin, the manufacture of each of them was carried out in a separate plant. An extensive literature was accumulated dealing with their use (*3*). Much effort and duplication could have been avoided if investigations on the use of neomycin conducted in this country and abroad had been consulted (*4*).

Fortunately, the higher authorities in the Soviet Union have now become aware of this duplication of effort and have issued the following directive (*5*):

> For the period of 1956–1962, the Ministry of Health of the SSSR permitted the medicinal use of 3 antibiotics of the neomycin group: colimycin, mycerin, and framycin.
>
> In the course of further comparative study of these preparations, it was established that they are identical, as a result of which the Pharmacological Committee recommended to produce in the future only one preparation, utilizing for this purpose mycerin and applying to it the name neomycin.
>
> On order of the Ministry of Health of the SSSR for August 6, 1964, the decision of the Pharmacological Committee to produce one preparation of the neomycin group and to utilize for this purpose the producer of mycerin is approved. The preparation will carry the name "Neomycin." The Pharmacological Committee is requested to introduce the necessary changes and instructions in the use of the preparation, stating that the previously produced colimycin, mycerin, and framycin are identical with neomycin. The Government Pharmacopia Committee is requested to make the corresponding changes in the technological treatment of the preparation. The Chief Administration of the Chemico-Pharmaceutical Preparations and Antibiotics is requested, beginning January 1, 1965, to observe the plans of production of medicinal preparations, namely the production of neomycin in place of colimycin, mycerin, and framycin.

One can only welcome this decision of the Ministry of Health of the U.S.S.R. as leading to uniformity in the recognition, evaluation, and use of an important pharmaceutical preparation, and hope that there will be a continued trend in that direction.

SELMAN A. WAKSMAN
*Institute of Microbiology, Rutgers University, New Brunswick, New Jersey*

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## Long-Abandoned Views

Anyone who has worked in an active field for many years is likely to—indeed, *should*—have changed his opinions on various points. It is then disconcerting to find long-abandoned views quoted or attacked as if current, but it is hardly practical to review all of one's corpus regularly and to publish corrections and emendations for every point no longer maintained.

A recent report in *Science* (*1*) refers to my opinion in 1931 (*2*) that the fossil *Anagale* is a tupaioid and to my classification in 1945 (*3*) of the tupaioids as primates. At present I do not believe that *Anagale* is a tupaioid or a primate, although I do think it too strong to say (*1*) that McKenna (*4*) has "shown" that it is not. His work merely indicates that what seemed probable in 1931 seems improbable in 1965.

The affinities of the tupaioids, without *Anagale*, seem to me at present to be quite uncertain. I referred them to the Primates more on the evidence marshaled by Le Gros Clark (*5*) than on the evidence of *Anagale*. Le Gros Clark's evidence still seems valid and it has received much later support, but I agree that such findings as those of Jane, Campbell, and Yashon (*1*) are also valid evidence and change the weight of probabilities. In any case, I would not now place the tupaioids in the Lemuriformes. The tupaioids arose, and still stand, somewhere between the earliest placental (nominally insectivore) stem and that of the Primates. Their reference to one group or the other is in part arbitrary or semantic. Use of them to represent the earliest primate or latest preprimate stage of evolution is as valid and useful, and subject to as much caution, as is any use of living animals to represent earlier phylogenetic stages.

I take this occasion also to record another change of opinion about fossil primates that is still being ignored, as for example by Dobzhansky in a recent excellent book (*6*). In 1945 (*3*, actually written in and prior to 1942) I referred the australopithecines to a subfamily Australopithecinae of the family Pongidae. I now (for example in *7*) consider them as a single genus, *Australopithecus*, in the family Hominidae. As that family includes only two really distinct genera of well-established affinities (*Homo* is of course the other), I do not consider subfamily distinction useful at present.

GEORGE GAYLORD SIMPSON
*Museum of Comparative Zoology, Harvard University, Cambridge Massachusetts*

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