either civil or military, or shall be skilled in aeronautical engineering or its allied sciences." The members elected their own chairman and exercised all the powers mentioned by Walker with regard to the original concept of the National Science Board. . . .

The NACA enjoyed great prestige and authority in all scientific and engineering matters concerning aeronautics. This prestige resulted from the character of its members and the excellence of its staff. There is every reason to suppose that the National Science Foundation would have enjoyed similar prestige in its wider field if Bush's plan had succeeded. It is interesting to note that the NACA also enjoyed excellent relations with the Congress, and generally with the White House under seven presidents. Wilson was originally hostile and the NACA was established only as a rider to a Naval appropriation which he could not very well veto. His attitude changed after entry into World War I. Hoover was also hostile throughout his entire connection with government. Truman was an active supporter of the NACA, which made his veto of the original National Science Foundation bill the more surprising.

Bush served as vice chairman of the NACA in 1938 and as chairman in 1939–40. His knowledge and admiration of this organization is apparent in his attempt to set up the National Science Foundation in the same pattern. It is unfortunate that this successful experiment in governmental organization of scientific research came to an end in 1958 with the National Space Act, and that it has been all but forgotten.

IRA H. ABBOTT

Post Office Box 156,
Moultonboro, New Hampshire 03254

Long-Term Drug Dangers

In addition to those drug catastrophes discussed by Modell ("Mass drug catastrophes and the roles of science and technology," 21 Apr., p. 346), I think we can consider another type of situation. Let us assume that a drug (such as a combination psychic energizer and diuretic) with no known side effects is aggressively promoted and very widely used throughout North America and Europe. Some 16 years after its adoption, the first hints of unexpected side effects begin to appear and several more years are required before they are con-

firmed. All children born to mothers using this drug during the first 3 months of pregnancy (effective as it is for morning sickness) are found to be sterile. Use of the drug for 20 years has affected the larger portion of an entire generation so that populations of the countries affected drop sharply for several decades and require several additional decades to recover—if given the opportunity.

The effects of thalidomide were relatively easy to discover and limit, but how readily can we detect more subtle side effects in time to prevent the possibility of a history-changing catastrophe? In contrast to such a situation, the individual tragedies attributed to past and present drugs would seem rather tolerable.

HERBERT FRIEDMAN
Department of Psychology,
College of William and Mary,
Williamsburg, Virginia 23185

When the public is alarmed about the dangerous side effects of many of the products of our modern technology, their fears are not going to be allayed by articles such as Modell's. Instead the effect is to widen the credibility gap between scientists and the general public. Who will believe that "No drug catastrophes of modern times compare even remotely with those of the past. . ."? Who will be reassured by the assertion that in the case of thalidomide " . . . the horror might well have been greater but for modern methods of pharmacologic detection. . ."? These "modern methods" did not even detect trouble until well over 2000 cases of phocomelia had occurred (although the malformation is so bizarre that an adequate detection system should have detected and identified the trouble before more than 25 or 50 malformations had occurred).

In ordinary discourse (as well as in most technical discourse) a "drug catastrophe" refers to the side effects of an agent that is used as a medicine or in the making of a medicine. The term would not be applied to "gin, opium, coca, tobacco . . . [which] were used by ancient man for their pleasurable effects alone." Furthermore most of the above mentioned agents did not become major health hazards until technological "improvements" resulted in a more dangerous product. Tobacco did not become a major health hazard in the remote past; it became a hazard in this century (when the machine-made cigarette replaced pipes and cigars). Again,

it is questionable whether "pesticides, herbicides, gasoline additives," and so on " . . . should count as drug hazards" but in any event they hardly support the contention that modern drug hazards are minor compared to those in the pretechnological era.

The only way to close the credibility gap is for the spokesmen for science to speak plainly, honestly, and bluntly —without minimizing mistakes, evading responsibility, rewriting history, or otherwise trying to cover up unpleasant facts. Language games in technical jargons have long been a favorite academic sport, but this is too dangerous a game to play when human lives and well-being are at stake.

IRWIN D. J. BROSS
Roswell Park Memorial Institute, Buffalo, New York 14203

Research in Parasites

The U.S.–Japan Cooperative Medical Science Program was established so that these two nations could cooperate in improvement of health conditions in the underdeveloped countries in Southeast Asia. Two parasitic infections, schistosomiasis and filariasis, are of particular importance in these areas. The U.S. Panel on Parasitic Diseases is attempting to stimulate studies on the physiology and biochemistry of the parasites, the pharmacology of drugs effective against the parasites in their vertebrate hosts, the ecology and physiology of vectors, the mode of action of chemical agents against the vectors, and the immunological mechanisms operating in both invertebrate and vertebrate hosts.

The maintenance of parasite life cycles is a tedious and difficult undertaking, and such projects have received little attention in recent years. In order to make materials available to investigators who would be interested in schistosomes and filariids, the Panel has established sources of supply of three species of human schistosomes, *Schistosoma mansoni*, *S. japonicum*, and *S. haematobium*, either in their invertebrate or vertebrate hosts. At least five different filariid parasites can also be supplied. Individuals interested in work with these parasites may obtain information from the Office of International Research, NIH.

LEON JACOBS
National Institutes of Health, Bethesda, Maryland 20014