as could usefully be presented through this medium was provided.

As a result of these two projects I have come to the following conclusions. First, and most disturbing, there is a very strong tendency among scientists who are specialists in the field of radiation damage to imagine that other scientists who are not specialists in the field are well informed upon the subject. This is certainly not the case, and in the preparation of our television programs we have had to wade through a plethora of material, usually confusing and badly presented, in order to obtain some sort of rational picture suitable for presentation to our colleagues and the general public. Some of the facts are certainly well summarized in McDonald's letter, but I have no confidence that more than a very small proportion of the scientific fraternity really understands the significance of the problem.

Second, it is quite obvious that the public as a whole does not wish to be informed upon this subject. In my naiveté I confidently expected that for such an exciting series of lectures, given by national experts, we should have a full lecture theatre. In fact, the number of registrations in this city of 250,000 inhabitants was fewer than 100; the attendance fell markedly as the series progressed, and this was no reflection on the lecturers, some of whom gave really outstanding presentations. As far as our television audience is concerned, we have reason to believe it is negligible; it is, of course, impossible for a person to judge his own performance, but we believe that our presentation has not been inadequate. The program is put on at a time of day when TV viewing is at a minimum (12 noon on Sunday), and this in itself is perhaps some commentary on the value placed on educational TV.

Third, it is rather easy to write a striking novel or film script on the subject of a global catastrophe, but it is not so easy to write one on the basis of our present knowledge of fallout. There was some beauty in *On the Beach*, but it is difficult to imagine a novel based on life during a nuclear attack that would be anything but sordid and depressing. I think this is the reason such a novel has not been written.

There is no doubt that the public has many misconceptions. To choose an example at random, despite the care that we took to deal accurately with the problem of radioactive dust in the lungs, it has been inferred by some of our audience that in minimizing this hazard we were, in fact, not quite telling the truth. I am afraid that the plain fact is that the problem is seen by the public in terms of black and white, whereas it is, of course, in tones of the subtlest gray. I see no hope whatever of reaching an understanding with the general public on this or any other aspect of modern military technology, and I think that perhaps we educators are wasting our time in thinking that such education is possible.

JOHN HART
Department of Physics, Carlton University, Ottawa, Ontario

Changes in Liver Function

A recent report by du Buy and Showacre (*1*) ends as follows: "Also, further information might be obtained about the locus of action of tetracyclines in cases where complications occur resulting from prolonged therapy—for example, liver degeneration (*10*)—or about the primary site of action of these compounds in susceptible microorganisms."

An examination of the cited reference by the Army Medical Center group

(*2*) shows no mention of liver degeneration resulting from tetracyclines. On the contrary, this reference states that "one might consider the possibility" that chlortetracycline rather selectively depresses liver function, "but there is nothing to suggest such a possibility." The reference relates to a decline in the excretion of urobilinogen caused by changes in the intestinal flora resulting from the administration of chlortetracycline, and the authors support the concept that urobilinogen is formed by the action of intestinal bacteria on urobilin.

In other studies at the Army Medical Center (*3*), no significant changes in liver function resulted from the administration of chlortetracycline to rats, dogs, and human subjects, and other investigators have reported the alleviation of dietary hepatic necrosis in rats by this antibiotic (*4*). The various findings were reviewed by Hines (*5*).

THOMAS H. JUKES
American Cyanamid Company, New York, New York

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Reference (*10*) in our report should have been to an article by V. M. Sborov and D. A. Sutherland, "Fatty liver following aureomycin and terramycin therapy in chronic hepatic disease" [*Gastroenterology* **18**, 598 (1951)] instead of the article cited. These workers observed a temporary change in liver fat after Aureomycin and Terramycin therapy in chronic hepatic disease, and they compared these liver changes with other side effects reported in the literature to follow administration of tetracyclines.

Reference might also have been made to Yesner and Kunkel (*1*) or to Lepper *et al.* (*2*). The latter reported that, after administration of large intravenous doses to a number of patients, in addition to oral doses, in liver sections "there was much small vacuolization of the cytoplasm, with irregular fragmentation." In such cases the microscopic observation of changes in mitochondria in living liver cells by the technique described by us might supply further information regarding the nature of the changes leading to

fatty metamorphosis (reversible fatty degeneration or, preferably, infiltration) of the liver. Regarding the nomenclature used, see (*3*). We, of course, did not intend to imply that in tetracycline therapy, as presently used, permanent liver damage will occur.

H. G. DU BUY
J. L. SHOWACRE
National Institute of Allergy and Infectious Diseases, Bethesda, Maryland

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Anonymous Reviewers

The letter by R. F. Shaw in *Science* [**133**, 1275 (1960)] impels me to raise another issue connected with the publication of scientific manuscripts—namely, the anonymous reviewer system. The anonymous reviewer system does well enough nine times out of ten, but it is intrinsically objectionable. What editor would pay attention to an anonymous communication? Why should the author of a scientific manuscript submit to such anonymous communications? Indeed, why should any objective reviewer hesitate to put his name to his opinion? Are not scientific book reviews signed?

SAMUEL RAYMOND
Pepper Laboratory of Clinical Medicine, University of Pennsylvania,

Primary and Secondary Carcinogens

Although many chemicals have been shown to have toxic effects when tested in animals, their use as food additives is permitted at specified levels and for specified purposes. This is because the severity and incidence of the toxic effects are related to the dose, a "no-effect" level being demonstrable.

However, when a substance has been found to be carcinogenic, its use in food is considered by many scientists to be unsafe, regardless of the intake. The reason for this is that the carcinogenic property, in relation to other toxic effects, appears unique, and a threshold dose has not been conclusively established.