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are assured that war today is "unthinkable," let us now think how our President could initiate the attainment of world peace.

He has the power to start a disarmament process, a necessary prelude to the establishment of world law. The reciprocal disarmament plan proposes that the President order the destruction of 2 percent of each class of our arms and then invite all nations to follow suit. If they should reciprocate, he would have another 2 percent destroyed, and so on. Midway in the process we would begin to turn over arms to a World Authority, which would thus grow in strength to become the single deterrent against any individual nation's aggression. This process would give industry time to adjust; would create a favorable climate for the organization of world law; and would continually preserve the balance of power until the World Authority attained "superpower." Furthermore, the plan promises, as a by-product, to break the deadlock on inspection procedure that has wrecked previous conferences.

Doubtless in implementing this process we would make some mistakes, but we would not be making the supreme mistake of talking until it is too late.

IRVING F. LAUCKS

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### On Educating the Public

Perhaps I may add something useful to James E. McDonald's letter [*Science* 133, 1271 (21 Apr. 1961)]. Stung by repeated references to the callousness and indifference of scientists in the face of a threat of all-out nuclear war, and alarmed by the misinformation published by people who might be expected to know better, we at this university undertook a twofold project to educate the public. The first part of the project consisted of a series of 26 lectures on radiation and fallout, given in the extension department at a popular level. We are fortunate, being situated in Ottawa, which is the scientific as well as the political capital of Canada, in being able to call on experts from many different fields, ranging from the physicists and biologists at Atomic Energy of Canada, Limited (Chalk River), to the strategical and tactical experts associated with the armed forces. The second part of the project consisted of a series of dispassionate half-hour programs on television in which as much information



### Examine these relationships when variations in findings are difficult to explain

There are a number of factors which alert investigators must constantly scrutinize and evaluate if biological experimentation is to result in maximum productivity.

One of the most important of these is the relationship of one factor to another. For should the reaction of these relationships be overlooked, variations in experimental results would be hard to trace.

What are these relationships? Some of the more basic ones are the relationship of nutritional requirements to: body surface area; energy-amino acid content of the diet; food intake. And within the nutrients themselves, many other relationships exist. Relationships such as those indicated by an optimum balance between essential amino acids; the effect of change in the calcium-phosphorus ratio; and the sparing effect of niacin on the tryptophane requirement.

Some relationships are more complex than others. For example, one of the most critical relationships which the investigator should consider is the relationship of physiologic status and nutritional deficiencies. This relationship is indicated when nutritional abnormality results in a diseased state. Often this presents a perplexing problem because systemic disease unrelated to nutrition may precipitate a nutritional deficiency even though normally adequate intake of nutrients is maintained. The use of diets improperly balanced and controlled (from a quality or manufacturing viewpoint) could cause even further variations in findings.

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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 presenta-

tion 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 at-

tendance 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

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### 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