astronomical objects using the protected band 1400 to 1427 Mhz. In May 1976, we began receiving strong interfering signals every day. Their characteristics clearly indicated that they originated in an orbiting satellite in contravention of the ITU Table of Radio Allocations (*1*). The transmissions occur simultaneously at three frequencies, which peak at 1427.23, 1427.43, and 1427.63 Mhz. The signals are so powerful that they are received in the sidelobes of our antennas regardless of where the antennas are pointing.

We wish to draw to the attention of our colleagues at observatories in other countries the existence of these interfering signals and warn them of possible deleterious effects on observations. We have been unable to ascertain officially the national administration responsible for these internationally nonconforming transmissions, but we appeal to all our colleagues to urge their own authorities to restrict space transmissions to frequencies sanctioned by the International Table of Allocations.

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References and Notes

1. *Radio Regulations Resolutions and Recommendations* (General Secretariat of the International Telecommunications Union, Geneva, 1976). Article 3, Section 1, reads: "The Members and Associate Members of the Union agree that in assigning frequencies to stations which are capable of causing harmful interference to the services rendered by the stations *of another country*, such assignments are to be made in accordance with the Table of Frequency Allocations and other provisions of the Regulations" (emphasis added).

A Coming Battle?

Anyone who would like a preview of the coming battle between the old guard of scientists who identify with Big Science agencies (AEC, ERDA, NRC, NASA, NAS, and so forth) and the new breed of scientists who identify with the public that feels threatened by the technology of Big Science can read all about it for the price of postage ($0.50 in the United States). The *Proceedings of a Congressional Seminar on Low-Level Ionizing Radiation* has just been published. This seminar has many of the features of an adversary science hearing. For instance, there were accusations that radiation in the vicinity of 1 rad is a serious hazard, a total denial of this accusation, cross-examination of sorts, a transcript of testimony, and a public au-

dience. In this open public hearing, the tactics of infighting that are so effective in closed professional groups did not work very well. The old guard came off rather badly.

This was also a clash between scientists who had found evidence of serious hazards in their studies of humans exposed to nuclear or diagnostic radiation and scientists who denied these hazards on the basis of traditional theoretical calculations, animal studies, and the usual "put-downs" of human data. However, at this meeting the scientists who deal directly with human data and human problems were in no mood to give physical scientists pride of place. They argued that in public health issues it was human data that mattered. The concerned citizens in the audience clearly accepted this argument and rejected the claim of the old guard that it spoke "in the name of science." This seminar may well be the beginning of an increasingly bitter schism in the sciences.

In the past, the old guard has controlled the organizational machinery of science. They have often used this clout to block publication, honors, grants, and other benefits for public-interest scientists who have spoken out against radiation or other technologies pushed by Big Science. The struggle is no longer so one-sided because the public is fed up with being the guinea pigs for Big Science technologies. The scientists who have long opposed the abuses of technology are beginning to get the political clout to retaliate in kind. An all-out battle between the old guard and the new breed could bring back the good old days of the 1930's, when there was very little federal support for any science.

None of the house organs of Big Science have reported this important seminar, but any reader who would like to read the handwriting on the wall can get a transcript by writing to the House Environmental Study Conference, House Annex Building No. 2, Washington, D.C., Attention: Sarah Glazer. The moral is clear: If science does not support the public, the public will not support science.

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Mass Vaccination: Probability of Three Sudden Deaths

Recent events dramatize how hard it is to gauge the risks and benefits of a large-scale vaccination program for a disease which may or may not become epidemic. Evidence of increased risk to Guillain-Barré syndrome has curbed the swine flu vaccination program. I shall focus on the other major event which discouraged early public acceptance of the program, namely, the three sudden deaths following swine flu inoculations in Pittsburgh.

Philip M. Boffey's article (News and Comment, 5 Nov. 1976, p. 590) gives many interesting medical details pertinent to deciding whether the three deaths following swine flu vaccination in Pittsburgh were coincidental. Probabilistic arguments show that, although the chances of three or more deaths in any one clinic on a single day are minute, the chance that some clinic would experience three or more deaths on some day during the first week of the inoculation program is appreciable and could easily be as high as 10 percent, even if the vaccine is perfectly safe. This line of reasoning is pertinent, since if any clinic experienced three or more deaths on some day early in the vaccination program, it is likely that this event would come to public attention and adversely affect public acceptance of the program.

Suppose n_{ij} patients with the average death rate α_{ij} visit clinic i on day j of the program. Then the expected number of deaths for that clinic and day is $\lambda_{ij} = n_{ij}\alpha_{ij}$, and the probability of two or fewer deaths, p_{ij}, is, from the Poisson probability law

$$p_{ij} = (1 + \lambda_{ij} + \lambda^2{}_{ij}/2)\exp(-\lambda_{ij})$$

assuming that each individual has a small, statistically independent chance of dying each day. The probability that all clinics experience two or fewer deaths on all seven days of the initial week of inoculations is the product

$$\prod_{j=1}^{7} \prod_{i=1}^{m} p_{ij}$$

where m is the total numbers of clinics, and the probability that some clinic experiences three or more deaths on some day during this week is 1 minus this product.

To use these formulas we must know the numbers of people who visit each clinic each day and their average death rate. Suppose $m = 100$ clinics each care for $n_{ij} = 1000$ people each day, and that the average death rate is $\alpha_{ij} = 10$ deaths per 100,000 patients per day. This is approximately the death rate for all U.S. people aged 65 to 75 (*1*). The probability of fewer than three deaths in one such clinic is

$$(1 + 0.1 + 0.005)\exp(-0.1) = 0.99985 = p_{ij}$$