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SCIENCE, now combined with THE SCIENTIFIC MONTHLY, is published each Friday by the American Association for the Advancement of Science at National Publishing Company, Washington, D.C. SCIENCE is indexed in the *Reader's Guide to Periodical Literature*.

Editorial correspondence should be addressed to SCIENCE, 1515 Massachusetts Ave., NW, Washington 5, D.C. Manuscripts should be typed with double spacing and submitted in duplicate. The AAAS assumes no responsibility for the safety of manuscripts or for the opinions expressed by contributors. For detailed suggestions on the preparation of manuscripts, see *Science* 125, 16 (4 Jan. 1957).

Advertising correspondence should be addressed to SCIENCE, Room 740, 11 West 42 St., New York 36, N.Y.

Change of address notification should be sent to 1515 Massachusetts Ave., NW, Washington 5, D.C., 4 weeks in advance. If possible, furnish an address label from a recent issue. Give both old and new addresses, including zone numbers, if any.

Annual subscriptions: \$8.50; foreign postage, \$1.50; Canadian postage, 75¢. Single copies, 35¢. Cable address: Advancesci, Washington.

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Reading the Fine Print

In Geneva next week a number of Americans, some of whom have made the trip before, will sit down with their British and Soviet counterparts to attempt once again to write a treaty banning the testing of nuclear weapons. Among other matters still to be settled are key scientific disputes concerning the design of an inspection system that will deter cheating without permitting espionage. Not only must solutions be found to these scientific matters, but diplomats and policy makers—and the educated public, too—must understand these solutions. If some of the technical disputes appear minor, tiresome, and overly subtle, just how they are settled can have enormous consequences for good or ill if an inspection system is ever really established.

By way of illustrating an apparently minor point with major consequences, consider the American and Soviet proposals on the conditions under which, in the monitoring of underground explosions, an area becomes eligible for on-site inspection.

The American proposal sets a limit (actually two limits, depending on the kind of data available) on the size of an area that may be inspected. It then requires that once a seismic event is judged suspicious, that is, as possibly not a natural earthquake, the team selects the area that has the highest likelihood of containing the event. The meaning of this position may be clarified by a hypothetical example in which a house represents a nation and one room represents the size of the area that may be inspected. Imagine that a suspicious event has occurred in the house; that the inspection team evaluates for each room the likelihood that the event occurred there; and that the evidence is such that these likelihoods range from 65 percent for the kitchen to 3 percent for the nursery. Under these conditions, the team would inspect the kitchen.

In the Soviet proposal, there is first the complication that the position is not completely clear to the American negotiators, so that the problem is not only one of comparing proposals but of determining the meaning of words. The Soviet proposal requires, before inspection may take place, that the suspicious event be "localized" within an area of a certain size (the size is not larger than that proposed by the Americans for inspection). In this proposal everything depends on the meaning of "localized." If, for example, the word means that the whereabouts of the event must be known with a likelihood of 95 percent, then the Soviet procedure would, in general, make inspection more difficult than the American procedure. In the particular circumstances we have imagined, it would make inspection impossible. In our hypothetical example, the team would not be permitted to inspect the kitchen because the likelihood that the event occurred there is only 65 percent, not 95 percent.

Although the Soviet proposal does not specifically say that the area that may be inspected is the same size as the area within which the event must be localized, the hypothetical example assumes this to be the case. If this is not the case, things could be even worse. Suppose, under other circumstances, that the likelihood that the event occurred in the kitchen actually is 95 percent. Inspection still would not be very effective if it were limited to an area the size of the sink.

We are not, of course, going to get perfect security, but this does not mean that we should settle for anything less than a sound treaty. An unsound treaty would be worse than the present *de facto* ban, which, at least, has the merit of not pretending to be based on an inspection system. We should all hope fervently that the coming negotiations rapidly produce a treaty, but our hope must not allow us to grow impatient over what seem to be minor technical matters.—J.T.

Science

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J. T.

Science **133** (3455), 727.
DOI: 10.1126/science.133.3455.727

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