

OFF THE BEAT

Political Rx: Science with a grain of patience

"Molecular biologists are quite good at what they do, but to take them seriously is nonsense," James D. Watson quipped at a recent public meeting considering revisions of the guidelines for recombinant DNA research (SN: 12/24/77, p. 420). Watson blames the existence of the regulations on scientists confusing "liberal guilt" for scientific evidence.

Watson's opinion is not the final word on recombinant DNA policy, but he has hit on a problem common in the increasing gray area where science and politics overlap. Scientific evidence, ready or not, is crucial for many policy decisions in health, environment and energy. And scientists are moving their experiments out of obscure journals into the public arena, only to find themselves sometimes embarrassed. One source of embarrassment has been researcher bias that may color experiments as the expected impact of the results increases. But the very methods of science can be embarrassingly incompatible with the pressure of settling political issues. "One day they tell us something is dangerous, the next day they say it's safe," is one annoyed public response to a common scientific progression of results.

The Laetrile experiments recently reported from Sloan-Kettering Institute (SN: 1/7/78, p. 4) illustrate the clash between scientific processes and the impatience of political issues. The SKI scientists' report was recently challenged because it omitted mention of a few experiments that show a beneficial impact of Laetrile, and because it made one clearly erroneous statement. The authors knew that their report, which remains unpublished but has been available to the press since June, would have both scientific and policy impact. The erroneous statement in it, that tumors responsive to known anti-cancer drugs were unaffected by Laetrile, seems an attempt to sway a lay audience to accept the relevance of a set of findings. Daniel Martin, the statement's author, said he put in that paragraph (which will be deleted from the published version) to help Laetrile critics answer enthusiasts.

Though a false statement is unacceptable in any scientific or political argument, omitting contradictory experiments might not be so serious a scientific crime. Scientists select, to some extent, which of their experiments to rely on in forming theories. Often some results seem anomalous and simply remain unexplained. Statistics also can mislead, even when no error is made or no variable is overlooked. For example, biologists generally consider a significant

result as one where the probability is less than 5 percent that the experimental and control groups do not differ. Therefore, on average, one such result in every twenty will actually be "wrong." Thus, important results grow in credibility as they are repeated. As the saying goes: "In research, the emphasis is on 're.'"

In high school one learns "the scientific method": hypothesize, control the variables, get results. But in real experiments, creativity must enter, not only in dreaming up hypotheses, but also in interpreting results. And interpretation does involve selection. "Good science is knowing what results to throw out," a bacteriology professor explained in a discussion of how François Jacob and Jacques Monod unraveled the now classical description of control of bacterial genes. Even Gregor Mendel probably fudged to get the perfect ratios in his pea experiments. But the basic genetic laws that he discovered persist. The line between intuition and bias must be finely drawn.

A crucial problem with the political use of scientific results is that action must often be taken before all the results are in, and before the gradual accumulation of conclusions from imperfect experiments builds to a consensus. When the answers to scientific questions develop slowly, important factors, overlooked early, can turn up again in later experiments. The Sloan-Kettering report's statement that "all" experiments fail to confirm an earlier positive Laetrile result appears an attempt to reach certainty prematurely. "The top leaders of SKI are terrified of reporting any positive results with Laetrile, even if these are modified by more negative findings," the challenging group charges.

Scientific results are relevant to political issues, but we must have patience. Results rarely stand out as "conclusive" for complex issues, such as the safety of recombinant DNA, the effectiveness of Laetrile or the danger of saccharin. Thus, results churned out while debates rage tend to be interpreted far too broadly. Given the nature of scientific inquiry and the possibilities for bias, such results cannot be expected to answer immediately and definitively a politically charged question. And any policy decisions will include all the usual subjective factors.

Politicians lament the absence of scientists who "think" with one arm. They want a researcher who will be unable to say, "On the other hand...." Such a person, however, would not make a good scientist.

—Julie Ann Miller

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