The Landau Theory

Until the current excitement about icosahedral "quasicrystals" or textures, crystallographers have been surprisingly unaware of the Landau theory of the stability of crystals, which might have been supposed to have been the foundation of their craft. As condensed by David R. Nelson and Bertrand I. Halperin (Article, 19 July 1985, p. 233), in the Landau theory (*1*) a crystal is regarded as a superposition of density waves, and the free energy is expanded as a series of terms involving the amplitudes and phases of these waves.

The first of these terms is related to the power of the wave (corresponding to Parseval's Law), but the second is the product of the amplitudes of those sets of three waves whose wave vectors sum to zero. This will be familiar to crystallographers as the Hauptman-Karle relationship (*2*). The next term is the next higher invariant involving quadruplets of phases, and so on. Thus, it is not surprising that the solution of minimum free energy is indeed that structure to which crystal structure analysis would lead one.

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2. H. Hauptman and J. Karle, *Solution of the Phase Problem* I: *The Centrosymmetric Crystal* (American Crystallographic Association Monograph 3, Polycrystal Book Service, Western Springs, IL, 1953).

AIDS Control

I would like to applaud the message delivered in the recent editorial "Scientists' roles in AIDS control" by David Jenness (22 Aug., p. 825). The recognition that social scientists can play a crucial, in fact life-saving, role in controlling the AIDS epidemic is a concept that is overdue.

There is still considerable denial about the extent of social upheaval that the AIDS epidemic might ultimately cause worldwide. A part of the denial process is the belief that "science" will rescue those afflicted by providing a cure and protect those not yet afflicted by developing a safe vaccine. These beliefs are continuously reinforced by reports in the lay press and scientific literature that seem to promise such solutions to the problem. In fact, it is difficult for the average clinician or scientist without a molecular biology orientation to determine the actual pace of AIDS-related basic research and have an understanding of when practical applications of the new knowledge might benefit patients.

The history of infectious diseases has shown that the public health response has often played a larger role in minimizing the damage of a new scourge than have the efforts of clinicians and scientists (*1*). Since the timetable for the availability of "curative" AIDS therapy and vaccination is not set, the efforts of responsible scientists should also be directed toward education. I look forward to the contributions of *Science* in providing such education while chronicling the efforts of scientists to solve the increasing number of questions the biology of the AIDS saga has posed.

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1. H. F. Dowling, Ed., *Fighting Infection, Conquests of the Twentieth Century* (Harvard Univ. Press, Cambridge, MA, 1977).

Reporting of Biotechnology Allegations

As have many other publications, *Science* published an article (News & Comment, 4 Apr., p. 15) reporting that Advanced Genetic Sciences (AGS) scientists "falsified" data in an Experimental Use Permit (EUP) application to the Environmental Protection Agency (EPA). The administrative complaint brought by EPA against AGS included charges of falsification, but the published reports, even in *Science*, treated these allegations as fact. Recently, EPA withdrew all charges of knowing falsification, inadequacy of experimental design, and deliberate violation of the EPA notification guidelines for environmental release of experimental microbial pesticides from its final findings. Although now cleared of these serious charges, AGS scientists may suffer a diminished reputation brought by inaccurate reporting of the incident.

If we are to learn something from this experience it is that a respected journal such as *Science*, noted for its balanced reporting of scientific issues, should not leave unreported the source and nature of such allegations. The scientific community should be made aware that certain critics of biotechnology are willing to promote and distribute fallacious allegations regardless of the harm done to scientists' reputations.

In the AGS case, Jeremy Rifkin has publicly acknowledged his primary role (*1*) in distributing the material (consisting of an unsigned document and a photograph of a tree canker obtained from a former AGS employee) which resulted in the initial charges and proposed fines against AGS reported in the 4 April article. A complete scientific audit of AGS conducted by EPA, summarized in the final audit report and settlement, discredited these allegations. Further, the EPA audit report states clearly that the photograph distributed to a congressional subcommittee could not have been part of the AGS tree test and "shows a lesion that does not resemble a pseudomonad-induced canker."

The scientific and science policy-making communities must be made aware of the seriousness of the potential for irreversible damages to a scientist and institution if false allegations can be put forward with impunity under the guise of "whistle-blowing." Rifkin and his supporters are free to question and challenge the advance of biotechnology, but they should be held accountable for the accuracy of their claims, at least in the scientific literature. Charges of scientific fraud must not be treated in such a cavalier manner.

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1. J. Rifkin, *Gen. Eng. News* **6**, 4 (June 1986).

Response: My article correctly reported that EPA initially charged AGS with conducting an unauthorized experiment and falsifying data. The charge was based on the findings of an investigation conducted by EPA. Although the investigation was prompted by Rifkin's allegations, the charges stemmed from EPA's finding that the company conducted tests on the roof of a building rather than in a greenhouse. Because Rifkin's unsubstantiated allegations were not the sole basis of EPA's charges, I saw no reason to report them.

As I reported in a second article (News & Comment, 20 June, p. 1495), EPA later dropped the charge of falsifying data and instead faulted the company for "inadequate reporting" of the experiment.

—MARJORIE SUN

Erratum: In the briefing "Heavy water: Where did India obtain it" by Mark Crawford (News & Comment, 12 Sept., p. 1148), the journal *Foreign Affairs* was incorrectly cited as the publisher of an article by Gary Milhollin of the Natural Resources Defense Council. Milhollin's analysis appears in the fall issue of *Foreign Policy*, Suite 900, 11 Dupont Circle, NW, Washington, D.C.