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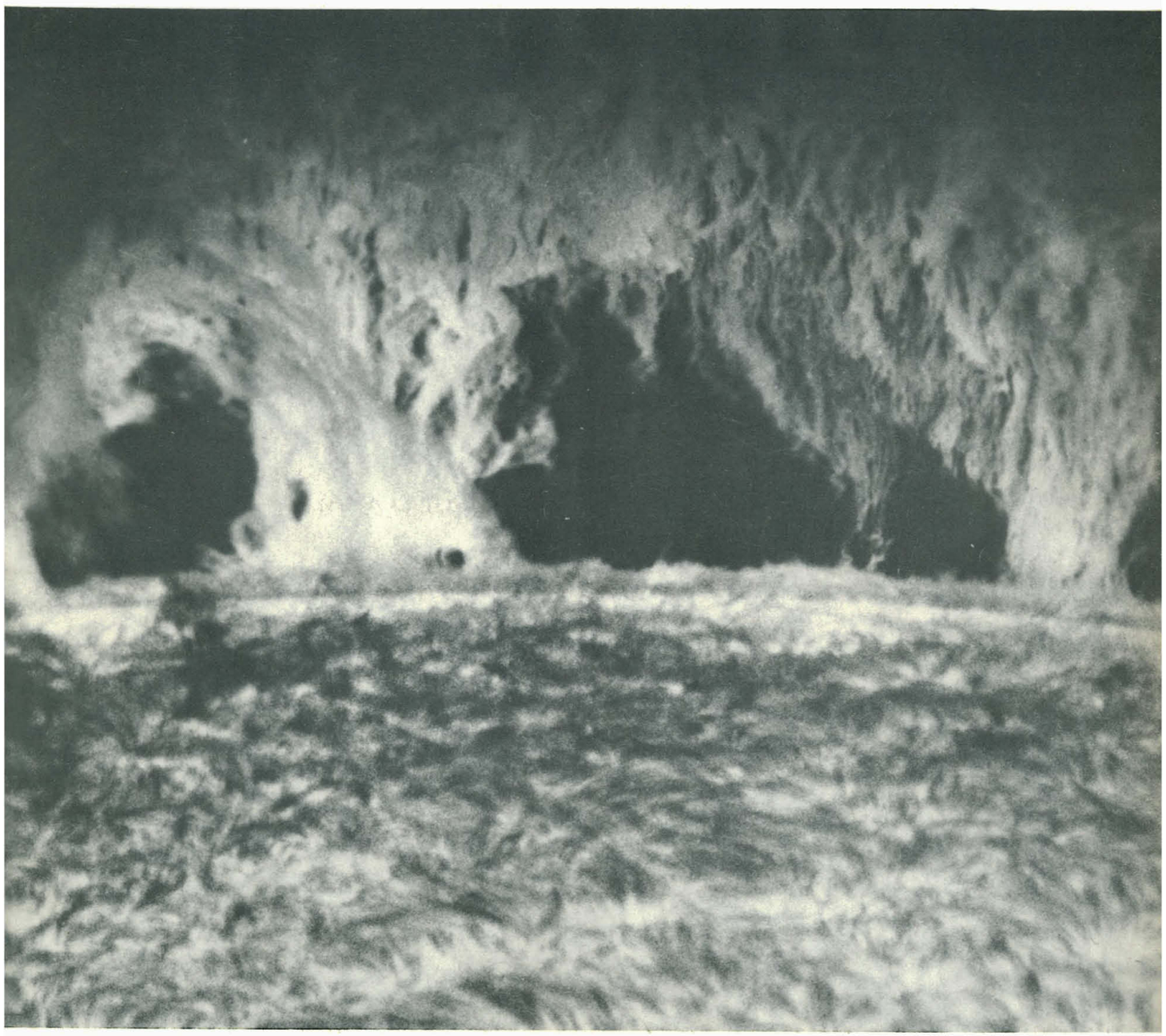
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Index Issue

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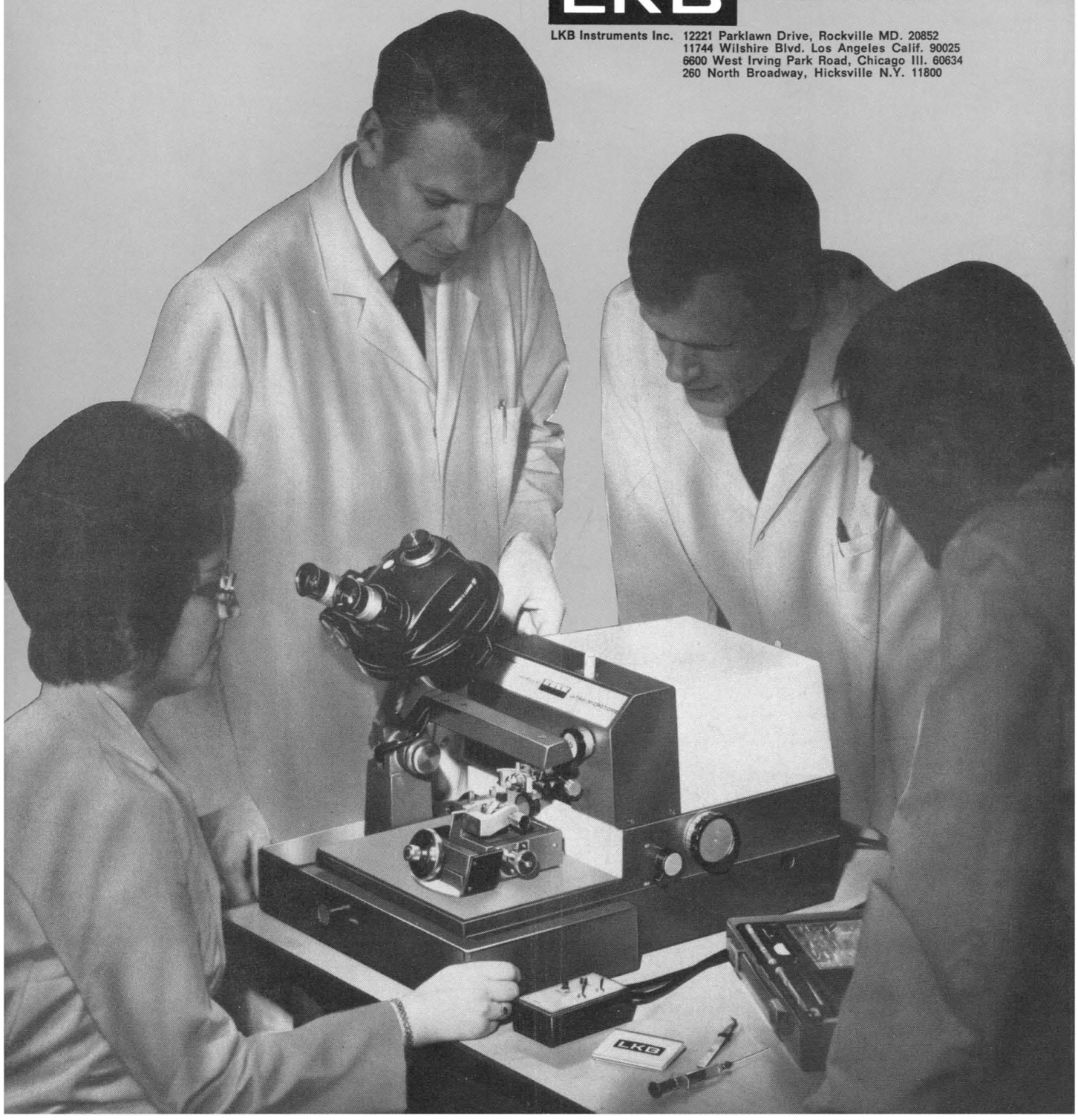

Hasselblad's idea of a Hasselblad may be different than your idea of a Hasselblad.

When you walk into a camera store and ask to see a Hasselblad, you'll be shown the 500 CM single lens reflex, pictured above.

It has an 80mm Carl Zeiss lens, so sharp that NASA chose it to take to the moon.

It has a 12-exposure film magazine that produces 2¼" x 2¼" photographs, big enough to see details without needing a magnifying glass.

It has a waist-level viewing hood with pop-up magnifier that opens onto a big, bright interchangeable ground glass screen.

And it has a film wind that automatically cocks the shutter and positions the reflex mirror as it advances the film.

The 500 CM is Hasselblad's idea of an all-around Hasselblad.

But that doesn't mean it has to be your idea of an all-around Hasselblad.

Maybe you need a Hasselblad that can take wide pictures in narrow rooms. Or close-ups from far away. In that case you can interchange the 80mm Carl Zeiss lens with any of nine other Carl Zeiss lenses from 40mm super wide angle to 500mm telephoto. Each lens has a built-in Compur shutter synchronized for flash and strobe at all speeds (instead of a limited focal plane shutter).

Maybe you'll be shooting action, where you don't want to have to re-load after the 12th shot and chance missing a great picture. If so, you can interchange the 12-exposure magazine back with one that will give you 16, 24, or even 70 exposures at a clip.

Maybe you want to project your Hasselblad slides on a regular 35mm projector. There's even a film magazine that lets you make such slides. Only now they're called "superslides" because they give you 50% more film area than ordinary slides, and completely fill your square screen.

While you're at it you can replace the viewing hood with five other viewers, from prismatic to sports finder.

You can replace the film advance knob with a rapid advance crank, or a knob with a built-in exposure meter.

You can even replace the camera body with an electrically-driven body, or a body with a super wide angle 38mm lens attached.

And you haven't even reached the accessories yet.

By the time you get finished, you might even wind up with the camera shown below. Which is great for shooting a moving lizard in changeable lighting, hand held.

It's a far cry from the Hasselblad we started out with, but it's a Hasselblad just the same.

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The System

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COVER

Solar prominence extending several tens of thousands of kilometers above the solar limb. Smallest features have sizes of about 1000 kilometers. See page 1157. [Big Bear Solar Observatory, Big Bear, California; courtesy of H. Zirin]

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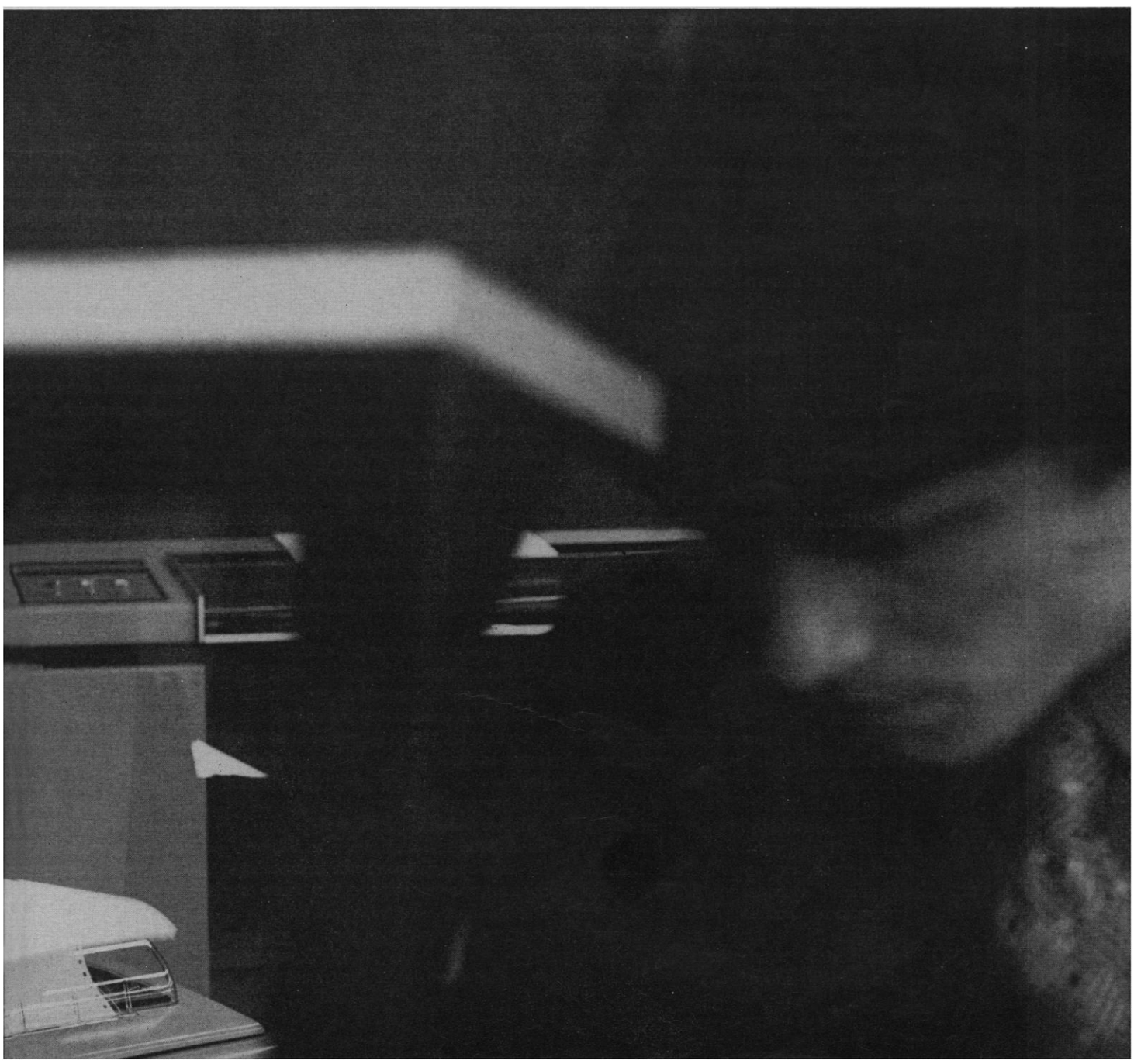

LETTERS

Vitamin C

The report "Academy turns down a Pauling paper" (News and Comment, 4 Aug., p. 409) contains the following incorrect and misleading statement: "Pauling himself, for example, has published in the PNAS [*Proceedings of the National Academy of Sciences*] on vitamin C twice in the last 2 years. Even though his papers were accepted with what Edsall terms 'extreme mental reservations,' the overriding feeling was that Pauling had a right to express his views, in spite of the fact that most other NAS members took issue with their scientific validity."

In the first of these two papers, "Evolution and the need for ascorbic acid," I presented a new argument, based on the nature of the evolutionary process, about the optimum intake of vitamin C for the best health. Not one paper taking issue with the scientific validity of this article has been published, and not a single member of NAS has taken issue with me about its scientific validity.

In the second paper, "The significance of the evidence about ascorbic acid and the common cold," I reported a statistical analysis of all published double-blind studies of the effect of ascorbic acid, regularly ingested in daily amounts of more than 100 milligrams, as compared with that of a placebo, in decreasing the incidence and integrated morbidity of the common cold for subjects exposed to cold viruses in the ordinary way and without colds when the test period began. No paper taking issue with the scientific validity of this article has been published, and no NAS member has taken issue with me about its scientific validity.

I doubt that *Science* questioned most of the 900 NAS members. I am sure that the statement that most NAS members took issue with the scientific validity of these papers is false. The statement made by *Science* is derogatory to me; I attribute its publication to carelessness on the part of *Science* rather than to malice.

In 1913 the NAS as a whole set the policy for PNAS that papers by members would not be refereed. I feel that no one but the NAS as a whole has the right to refuse publication of a paper by a member.

LINUS PAULING
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Narcotic Antagonists

Some of the conclusions in Thomas Maugh's report on narcotic antagonists (Research News, 21 July, p. 249) are based on inaccurate assumptions. Maugh states that "Most important, perhaps, it has recently been shown that one of the antagonists exhibits great potential for preventing abuse of such drugs as methadone and paregoric" because naloxone blocks the effects of methadone when taken intravenously, but not when taken orally. He concludes that "Addition of naloxone to methadone could thus conceivably curb all the intravenous abuse of methadone in maintenance programs." The problem, however, is not intravenous abuse, but oral abuse. In New York City, where there are the greatest number of narcotic addicts and addicts in methadone treatment in the country, and considerable diversion of methadone, virtually all methadone abuse is oral, not intravenous—all 98 methadone overdose deaths in 1971 resulted from oral consumption. Intravenous paregoric abuse is a problem of minimal significance.

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Biological Effects of Chemical Agents

Dinman's article (4 Feb., p. 495) was a welcome approach to pollution toxicity on a more quantitative and microscopic level than is common in these somewhat frenetic times. However he neglected to mention a point which is the very one most central to the problem. For most and quite possibly all substances (including carbon monoxide) in the natural environment (but probably

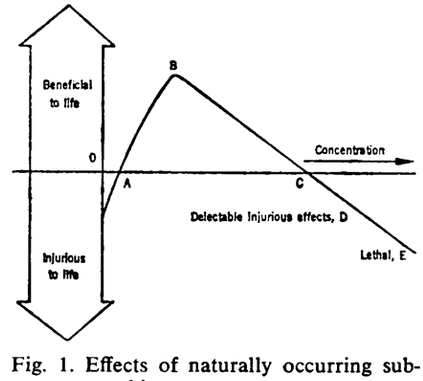

Fig. 1. Effects of naturally occurring substances on biosystems.

not for certain man-made pollutants alien to the environment), far from being linear, the curves representing the effects on biosystems are complex, as in Fig. 1. While large concentrations are injurious, trace concentrations can be necessary for life. The "toxic" heavy metals, vanadium, iron, manganese, cobalt, nickel, copper, zinc, and perhaps arsenic, tin, and lead are all necessary for life. Another highly publicized example is fluoride ion—small amounts reduce tooth decay (point B on the curve), larger amounts cause tooth mottling (point D), and in massive amounts it is the major ingredient of some rodent poisons (point E). Concentrations corresponding to points E and D are known for a few substances for a few organisms, including man, but the really important concentration level, point C, is known for none. Certainly it is not at the origin, that is, at zero concentration. Rather than none or even one threshold, there are at least three (points A, C, and D). Much more attention should be devoted to defining these curves for various substances (and types of radiation). We must be careful in "cleaning-up" environmental situations, for we may precipitate more biological and ecological damage by removing a vital "pollutant" below a critical level than might result from a moderate excess of the same pollutant.

R. A. HORNE
JBF Scientific Corporation, Burlington, Massachusetts 01803

Dinman's criticism of the "non-concept" of "no-threshold" for environmental pollutants totally ignores the fact that this concept has been put forth not as an absolute, literal, and totally verified biochemical truth, but as a prudent assumption for establishing pollution standards and policies in the absence of thorough information. I have never heard any environmentalist claim that one "foreign" molecule entering a cell necessarily has a harmful effect. Dinman's invocation of stochastic structure-function models to bolster his statement that there "may not" be any harm done leaves only one unanswered question: So what?

Dinman criticizes proponents of the no-threshold concept for not reasoning quantitatively. Yet his own "quantitative" estimate of a threshold—about 10^4 molecules per cell—in practice is indistinguishable from the no-threshold view. For the case he discusses at length (mercury in a liver

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Two Cooks for the Same Kitchen?

There is reason to assume that the differences between religious doctrine and scientific thought in the matter of biological origins were resolved by the Huxley-Wilberforce debates of a hundred years ago, or most certainly by the Supreme Court's 1968 action in overruling a long-standing Arkansas statute against the teaching of evolution. However, the matter has not been settled, and recent events in California warrant the serious attention of every citizen—scientist, theologian, or otherwise.

In the fall of 1969 the State Advisory Committee on Science Education, after several years of work and with the approval of the Curriculum Development and Special Materials Commission, presented a new *Science Framework** for kindergarten through the secondary school levels to the State Board of Education. During the Board's consideration of this document, objection was raised that in dealing with the origins of life, the Committee did not so much as allude to creationism; following subsequent discussions, the *Framework*, modified to include creation theory as a complement to evolutionary theory, was adopted. The Committee vigorously protested the change, but to no avail. Subsequent statements from the Board strongly suggest that it will require that all science textbooks to be considered for adoption in California include a serious treatment of creation theory.

The implications of these actions are several and serious:

First, what is "good" for California is likely to become "good" for the rest of the nation, since California purchases 10 percent of all textbooks sold in the United States. Unless publishers are prepared to produce special California editions—and they probably are not—the standards set for California will, willy-nilly, become the standards for many other states.

Second, success in this first step will make a second, third, or fourth step toward politicizing the classroom that much easier, for if the state can dictate the content of a science, it makes little difference that its motivation is religious rather than political. The consequences will be the same. Many will recall the condition of Russian genetics during the heyday of Lysenko when Russian biologists defended an erroneous theory on the grounds that it must be true because it was Marxist.

Third, the Board's action is testimony once again that scientists have failed in their communications about science to the nonscientific public. We have taught the substance of science without communicating the approach, the methods, or the rationale of science. The essential requirement of scientific theory is that, in principle, it is capable of contradiction by empirical data. It is perfectible and it stands only as long as it has not been contradicted. It is in the process of becoming. Thus classical (Darwinian) evolutionary theory has been significantly transformed and enriched not only by the discoveries but also by the thinking of Mendel, and later of Weissman, and, most recently, of Wilkins and of Watson and Crick. Creationism is a theory of primordial history and, as such, it responds to different rules of discourse. It is not subject to empirical test, nor does it allow of improvement. Certainly it is not a logical complement of evolution theory.

The action of the Board with regard to textbooks will be a matter of record sometime this fall. Advocates of creationism are bringing pressure for the use of creationist materials in the schools both of California and of other states as well. Meanwhile, the National Association of Biology Teachers, stimulated by the California events, has established a Fund for Freedom in Science Teaching aimed at preserving sound science education whenever it appears in jeopardy.

—WILLIAM BEVAN

* California State Department of Education, *Science Framework for California Public Schools, Kindergarten-Grades One through Twelve* (State Printing Office, Sacramento, 1970), xii + 1948 pp.