SCIENCE

1 August 1975

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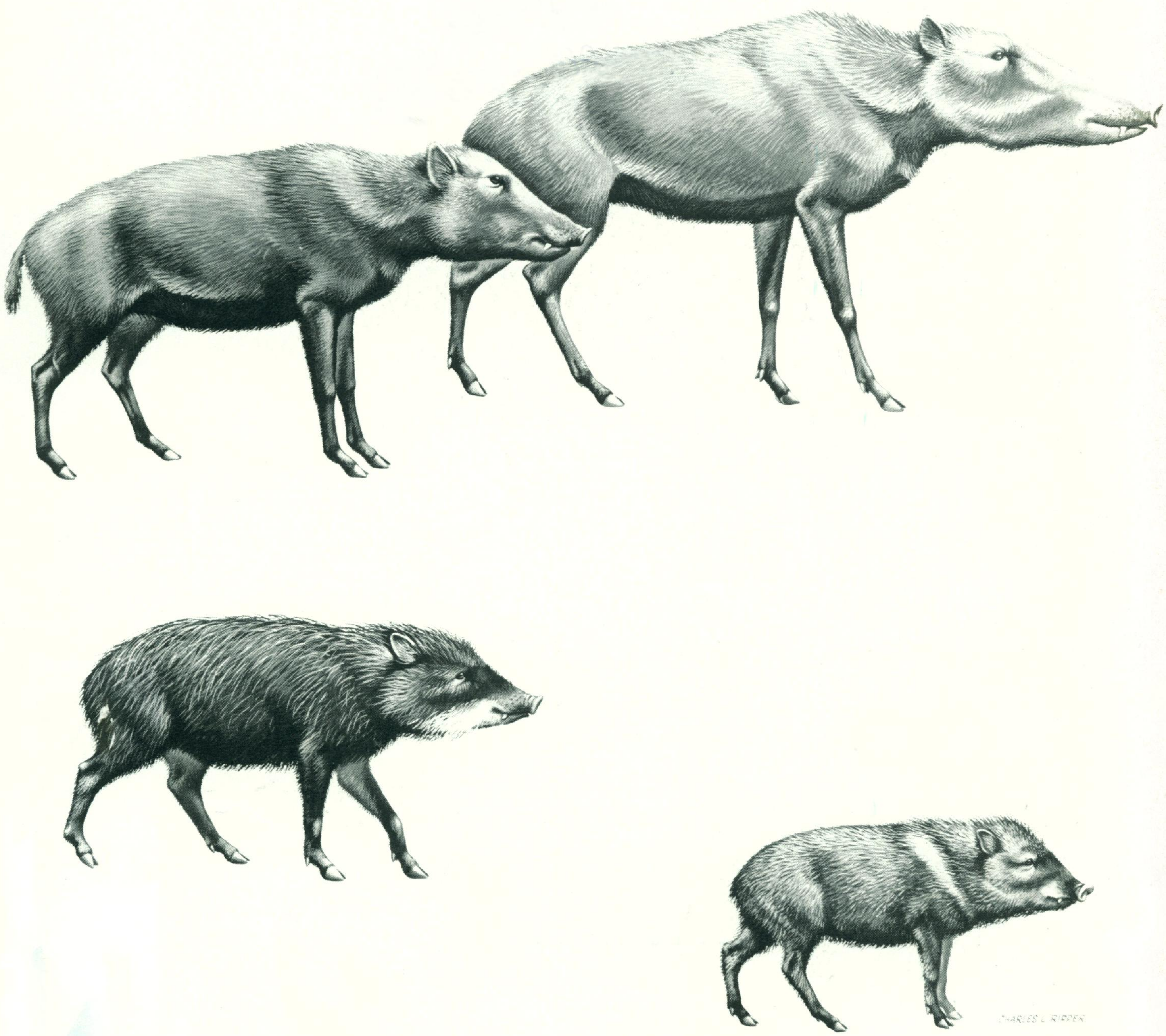
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



You can decide today

LKB Ultrogel for high-speed gel filtration

You can make a decision this morning to separate a protein sample and have your result this afternoon with LKB Ultrogel.

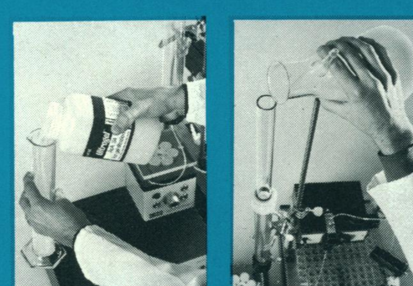
Ultrogel is a *prepared* polyacrylamide/agarose gel medium consisting of small, very rigid and uniform, spherical beads pre-swollen to a controlled particle diameter of 60 to 140 μm.

Ultrogel comes ready-to-use. You only have to choose your fractionation range. No weighing of dry beads, no calculation of buffer volume, no swelling time, no fine particle removal.

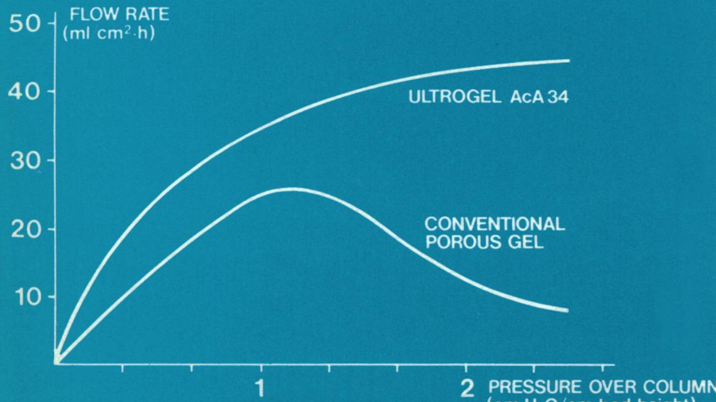
Ultrogel is *unique* because *now* you can have *both* high resolution and high flow rates with low dilution and low sample zone diffusion. And column packing is *easy* and *fast*.

Ultrogel comes in 1 liter bottles of four fractionation ranges from 6000 to 1,000,000 daltons.

For more information on Ultrogel write to us today, or better yet, decide today and order Ultrogel from the types listed in the table below.



In one step, measure out the amount of Ultrogel needed for the gel bed height. Then after deaeration, simply pour this amount of Ultrogel into your column.



Ultrogel type	Max. Flow Rate (ml/cm^2.h)	Fractionation Range* (daltons)
AcA 22	18	60,000 – 1,000,000
AcA 34	40	20,000 – 400,000
AcA 44	45	12,000 – 130,000
AcA 54	50	6000 – 70,000

*for globular proteins

LKB

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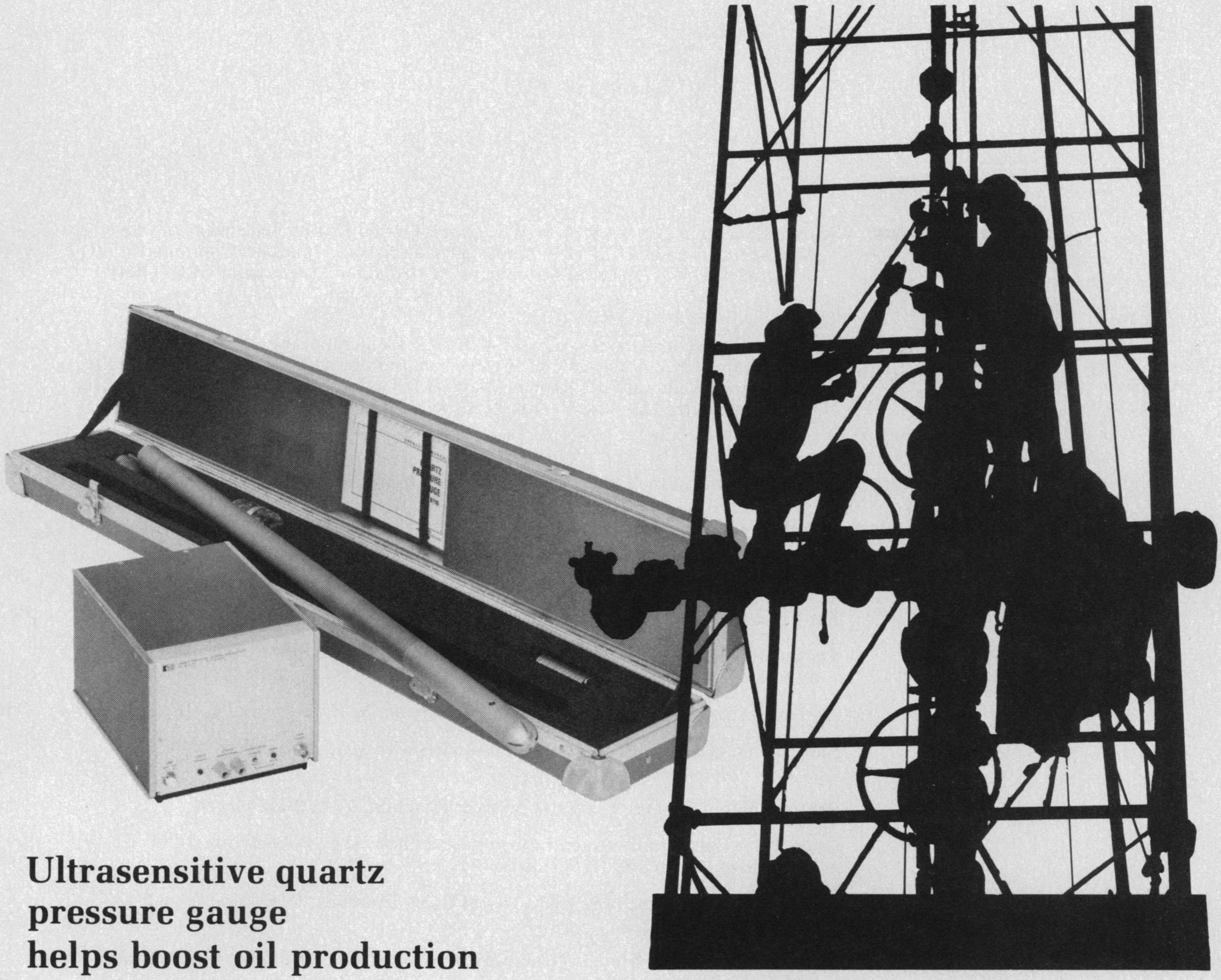
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress. Postmaster: Send Form 3579 to SCIENCE, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005.

COVER

Four genera of peccaries. (Upper right) Extinct, long-nosed peccary (*Mylohyus nasutus*), late Pleistocene, North America; (upper left) extinct, flat-headed peccary (*Platygonus compressus*), late Pleistocene, North America; (lower left) living, white-lipped peccary (*Tayassu pecari*), South and Central America; (lower right) living, collared peccary (*Dicotyles tajacu*), South and Central America north to Arizona. See page 379. [Drawings by Charles L. Ripper; courtesy of Carnegie Museum of Natural History, Pittsburgh, Pennsylvania]



Ultrasensitive quartz pressure gauge helps boost oil production

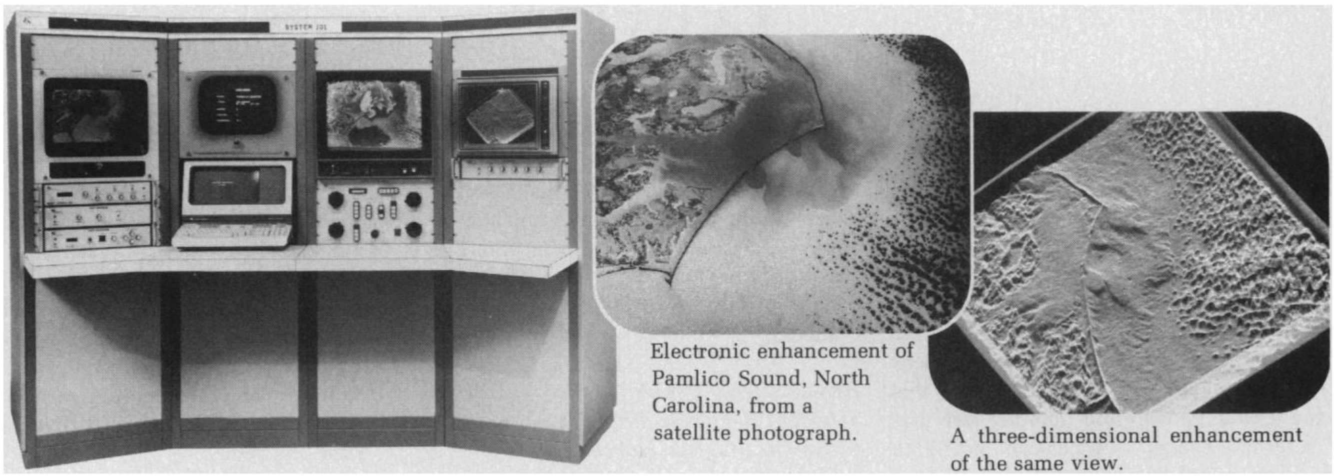
Able to measure a change as small as 0.01 psi at wellbore pressures up to 11,000 psi, the HP 2811B helps engineers evaluate reservoir parameters for optimal oil recovery.

One of the most effective methods of determining the production capacity of an oil reservoir is called pulse testing. By applying a series of pressure changes in a well and measuring the response in an adjacent observation well, engineers can determine the height and drainage characteristics of the underlying reservoir and thus calculate how to optimize its production.

Although pulse testing theory has been thoroughly understood for ten years, it has not been widely used, for want of an adequately sensitive pressure gauge. With ordinary instruments, large pulses have to be applied over long cycle times in order to detect the greatly attenuated response in the observation well. The test therefore takes a long time, typically one or more weeks, and the loss in oil production is considerable since both wells are "shut-in" during the test.

The HP 2811B Quartz Pressure Gauge has changed things dramatically for the better. Because it can accurately measure a change as small as 0.01 psi at any reservoir pressure up to 11,000 psi—compared to 0.5 psi with ordinary instruments—the pressure changes can be much smaller, cycle times much shorter, and the duration of the test cut to a few days, depending on reservoir conditions.

Reservoir engineers find many other reasons to prefer the 2811B as a "bottom hole" pressure gauge for pulse testing. Strip chart recorder and digital printer options provide an instant and direct readout of pressure changes *on the surface*, even when the measuring probe lies 20,000 feet down the hole. The gauge maintains resolution and accuracy at any well pressure to 12,000 psia and any temperature to 300°F. And it holds its calibration for at least a full year despite mechanical vibration and rough handling. Cost of the complete gauge without recording options is $11,375*.



Electronic enhancement of Pamlico Sound, North Carolina, from a satellite photograph.

A three-dimensional enhancement of the same view.

Digital image processing system unlocks earth's secrets from satellite data.

Stanford Technology Corporation chooses HP 3000CX computer system to convert radio signals from the LANDSAT (ERTS) satellites into useful pictures of the earth's resources.

One of NASA's least known spacecraft is well on the way to making some of the most important "civilian" contributions of the space program.

Since 1972, the first Earth Resources Technology Satellite has been looking at the whole earth through a multispectral optical scanner. A second LANDSAT satellite has been in service since January 1975. When properly processed, the digital data transmitted to earth from these satellites provides spectral "signatures" of classes of objects on earth that can be used to inventory many of the world's resources. Agronomists have used the pictures to measure the total acreage of various crops and to project their yields; foresters, to detect timberland insect infestation; planners, to outline land-use patterns and flood-prone areas; geologists, to locate mineral deposits.

The potential usefulness of these pictures in many fields has created a great demand for equipment to interpret them. A new development by Stanford Technology Corporation—the System 101—is being offered to meet this demand.

This powerful new multi-user digital image processing system is configured around the HP 3000CX, chosen by STC engineers as the computer system best suited to the application.

While the HP 3000CX is fast and powerful enough to satisfy the full range of LANDSAT requirements, it is much easier to use than larger computers, especially by nonspecialists. Many scientists can use it at the same time, some processing images on-line while others develop programs. An extremely simple language with a "menu-prompting" mode is provided for inexperienced users, while advanced users can use a high-level language with efficient command lists.

The STC System 101 should go a long way in reducing the LANDSAT image-processing bottleneck. For more information on System 101, write or call Stanford Technology Corporation in Mountain View, California 94043.

System prices for the HP 3000CX start at $99,500*.

For more information on these products, write to us, Hewlett-Packard, 1507 Page Mill Road, Palo Alto, California 94304.

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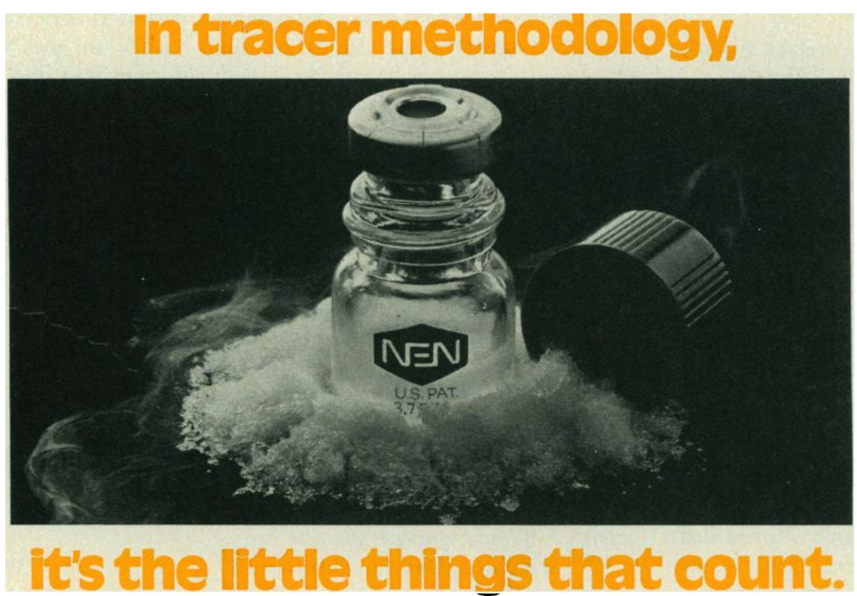
00547

A radioactive compound which must be kept frozen but is delivered thawed is useless. So when dry ice is indicated, we pack in enough to guarantee a frozen product delivered to your receiving department. We expedite shipments in specially designed packaging, too.

Delivery is the last link in the chain of quality at New England Nuclear, where no link is considered unimportant.



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Peer Review Revisited

Has the peer review system performed well or poorly as a method for helping government research administrators to ration research support? What can be said for its reliability and objectivity? Has peer review, over the years, tended to go stale? Have administrators used it so much as a crutch that their own judgment is clouded? Is it enough to know that research has scientific merit but not whether it has social value and merit? Some light may be shed on these and other matters when the Symington subcommittee of the House of Representatives turns its attention to the peer review system.

An odor of sanctity surrounds peer review. Rather too much has been claimed for it, considering how human and potentially fallible it is. Stripped of its elegance, it is simply a sensible arrangement for enlisting volunteer referees to call balls and strikes on proposals pitched to the funding agencies. Its credibility and durability rest on the integrity and responsibility of the referees. That in itself is no small thing, and indeed is the center beam which holds up the house of science. From this standpoint, peer review is a proxy for assaying the standards of the scientific community.

The Congress apparently is troubled as to how sensitive peer review is to considerations of public taste, concern for how public funds are spent, and equitable distribution of research awards. With this goes concern for the public accountability of the peer review machinery, which some think to be an insider system aimed at keeping out the unprivileged. All these questions need to be flushed into the open and answered by the evidence. That is the function of legislative oversight.

When all is said and done, peer review is likely to emerge with good marks. This is not to say that it has been perfect, or that it does not need some new premises. Peer review is a form of insurance on which administrators have relied as one of the stages in making choices. It does not preempt the judgment of administrators; neither should it intimidate them nor excuse them from being accountable. But bureaucratic life, these days, puts a larger burden on peer review than it was ever meant to carry. The sheer volume of proposals constitutes a tidal wave which overwhelms the agencies' reviewing process and brings it close to rote and insensitivity.

Some corrections to the peer review system probably are in order. The views of referees should be a matter of record and shared candidly with the originators of the research proposals, but the identities of the reviewers should be held in confidence. The practice of permitting potential grantees to nominate qualified reviewers for their proposals is understandable up to a point, but it has connotations of conflict of interest. If the selection of "peers" were to include others than field specialists, considerations of the social value of the research might, with profit, be injected into the criteria of choice from the start.

Beyond this, one is troubled to know whether peer review stacks the deck against younger and nonestablishment scientists whose credentials are no match for those of more imposing competitors. If the system shuts out the bright beginners and independents in order to ration scarce support only to scientists whose reputations are already made, we will come to regret it.

Peer review has its advocates and its critics. Its profound merit is that it broadens and diffuses the process through which government makes up its mind. That alone goes far to commend it. If government can learn that the world will not come to a bad end when decision-making is decentralized and made participative, something important will have emerged from peer review. As the Congress takes up the matter, more is at issue than a summary judgment. The real questions go to the vitality, the design, and the right uses of peer review as a bridge over the troubled waters of science and its relations with government.—WILLIAM D. CAREY