cieties they represent to serve as task force members. For task force members from disciplines not represented in CAST, Black consults the presidents of other scientific societies. When it comes to people on task forces he says, "if they are biased, it is because of the recommendations of the presidents of societies." In selecting subjects for reports CAST gives priority to requests from Congress and agencies like EPA and does a few reports on its own when the board feels a subject merits it.

Critics of CAST note as significant that the organization's reports do not carry minority views. Witt in his statement pointed out that it is CAST policy to exclude from task forces persons known to have extreme views on an issue "because they impede the progress of the task force." "This leads," writes Witt, "to a CAST viewpoint that spokesmen for minority viewpoints cannot expect to be represented because the report should reflect the majority view of the organization."

A major count on which CAST has been faulted is the concentration on pesticide questions in its recent reports and the rarity of comment favorable to environmentalist views in these reports. Black says that the board thinks too big a percentage of CAST reports has been devoted to pesticides lately, but notes that the organization is responding to outside requests and that pesticides is where the heat is. CAST reports do not include recommendations, but CAST officials acknowledge that none of the reports on pesticides could be regarded as friendly to environmentalist stands.

The Environmental Defense Fund (EDF), itself an advocacy group on the environmentalist side, sees CAST as an adversary on pesticide issues. An EDF spokesman characterized CAST as "an organization made up largely of agricultural scientists far overreaching themselves by making statements on carcinogenicity" related to pesticides.

Black, whose specialty is soil fertility and chemistry and who has a reputation as a capable editor, provides straightforward answers about the CAST policies and operations. He is candid in saying that many agricultural scientists have reservations about environmentalists' actions and that CAST reflects these views. "Frankly, as agricultural scientists see it," says Black, "environmentalists are not sound. They're overlooking too many things. We point out the things they've overlooked."

Black rejects the suggestion that CAST is an advocacy group because it represents a particular point of view. For agricultural scientists, says Black, "It's what they understand as facts, not a point of view."

For ESA, as the current president Ray Smith of Berkeley sees it, the question posed by the vote is "how do you handle advocacy within a scientific society," when the membership is divided on the issue.

Most scientific societies do not have any broad doctrinal consensus and maintain unity by avoiding policy issues likely to test it. One of the interesting things about the ESA ballot on CAST is that it raises just such an issue.—JOHN WALSH

# NAS Committee on Asbestos: Discovery of a Special Relationship

A cache of documents brought to light in a quite different context has produced evidence of the attempt by a large asbestos producer, the Reserve Mining Company, to gain access to the deliberations of a National Academy of Sciences committee studying the health effects of asbestos in the nation's drinking water. The committee member associated with the attempt resigned last month, at the academy's encouragement, after the documents had been brought by the government to the academy's attention.

The surrendered documents are evidence that a special interest had gained access to the committee's deliberations, received at least some written and verbal reports not available to the public at large, and planned to evaluate the material it acquired, possibly with a view to injecting its criticisms back into the committee. As for the academy, the episode indicates that, whatever the theoretical adequacy of its present procedures for bias screening, those procedures did not in this instance operate as intended.

The documents are memoranda written by an attorney in the Reserve Mining Company's law firm to his superior. They were delivered to the Department of Justice in response to a court order arising from the protracted litigation between Reserve Mining and the government over the pollution of the waters of Lake Superior. The Department of Justice passed the memos to its client, the Environmental Protection Agency, which in turn presented them to the academy.

The memos, written by the company's attorney Raymond L. Erickson, report conversations with Paul Gross of Naples, Florida, a member of the Subcommittee on Particulate Contaminants of the academy's Safe Drinking Water Committee and a nonretainered consultant to Reserve Mining. The memos record that, at his superior's request, Erickson "conferred with Dr. Paul Gross on May 5 and May 8, 1976, with respect to his participation in the subcommittee. . . . Dr. Gross will be providing us with more information as to each of the individuals on the subcommittee in addition to copies of their draft reports which are identified and described generally in the attached two outlines [of the subcommittee's proposed report]. . . ."

According to another passage in the same document, "Dr. Gross will be providing us with the draft reports to be submitted by the remainder of the subcommittee members and we should have some opportunity to assist Dr. Gross in evaluating the contents of those reports." One possible interpretation of this passage is that Erickson planned to have the company's other consultants review the draft reports, so that Gross could channel their criticisms back into the subcommittee with a view to influencing its deliberations. Both Reserve Mining and the government are under order to advise the court of studies on the long term health hazards of asbestos in drinking water, and the academy's report will presumably carry some weight in the court's decision.

Both Erickson and Gross deny that there was any such plan, although their explanations of the passage do not exactly tally. Erickson told *Science* that the assistance to be rendered to Gross in evaluating the contents of the other members' reports was only his own comments

as a layman. Gross, on the other hand, said that he does not recollect making any such agreement and that in any case he doesn't see how Erickson, as an attorney, could assist him in evaluating scientific papers.

Gross's explanation of the agreement to turn over draft reports is that he did not realize before the May meeting in Key Biscayne* that the committee's proceedings were meant to be confidential. In fact he asked an academy staff member if Erickson, who just happened to be vacationing in Key Biscayne at the time, could attend the meeting of the subcommittee which was convened there in mid-May. When he was told no, he realized for the first time that the committee's deliberations were not open to the public. He thereupon told Erickson that he could not supply any draft reports. (Gross had already supplied before the meeting copies of his own draft and of certain committee documents.)

The memos confirm that Gross telephoned Erickson after the May meeting to say that he could not, after all, supply the draft reports because he had discovered they were confidential. Nonetheless, "Dr Gross felt that he could read to me the draft conclusions pertaining to the health aspects of the subcommittee's report," Erickson told his superior. From the synopsis given in the memo it appears that Gross read out the conclusions of his own report (which he says he had every right to do since it summarized his own published observations), together with the conclusions reached by another member, E. Cuyler Hammond, the American Cancer Society's statistician.

Gross, a pathologist by background, believes strongly that the presence of short asbestos fibers in drinking water does not present any hazard to human health. This is a point on which there appears to be a range of scientific opinion, with the centrist position being that one

*The choice of Key Biscayne as a meeting place seems somewhat eclectic, insofar as two of the subcommittee's members live in Denver, Colorado, and the others in Ontario, North Carolina, Michigan, Virginia, Ohio, and New York. Gross, the only Floridian, lives a hundred miles to the northwest, in Naples. Asked why Key Biscayne was chosen as the meeting place, a staff member of the subcommittee explained that Gross had offered to be the host: "It's nice to have a local representative to handle arrangements and Gross fulfilled that requirement by inviting us to come to Florida." Another academy official provided this explanation for the choice of the sun-drenched resort: "It was suggested that they find a quiet retreat, which they attempted to do at Denver but failed."

# Air Force Bestows on National

The National Archives has recently come into possession of the Air Force's files for Project Blue Book, the two-decade-long investigation conducted to determine whether unidentified flying objects were for real. The project was closed in 1969 after the government decided that none of the 12,618 cases in the file indicated the existence of extraterrestrial vehicles.

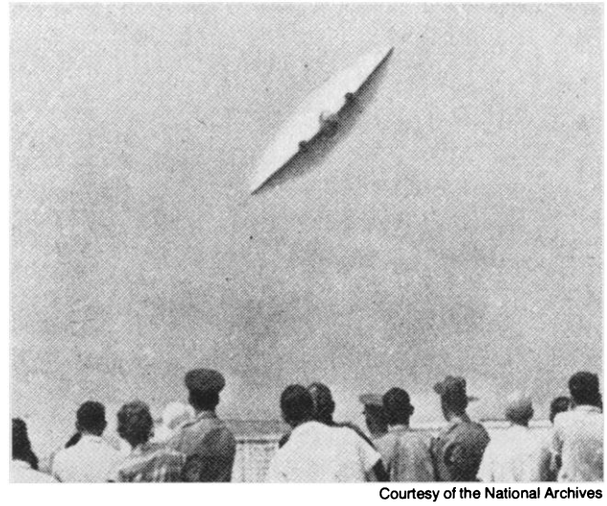
The collection has been available for perusal by scholars willing to make the trip to Maxwell Field in Alabama. Now, at the Archives, anyone will be able to walk in and see for himself the tangible residue of all the excitement that began with the "first" UFO sighting, over Mt. Rainier, in 1947—newspaper clippings, scrawled letters, technical papers, drawings, blurred photographs, and bits of junk collected from purported landing sites.

The material consists of about 42 cubic feet of written materials, photographs, a few dozen artifacts, a number of sound recordings, and 39 films. Everything but the tapes, films, and artifacts has been put on microfilm. The Air Force has blacked out all the names of the people who contributed materials; otherwise, the files have been transferred unabridged.

It is an assortment, judging from the brief sampling *Science* took, that only a hardened UFO buff could love.

The artifacts, only a few dozen in all, have all been identified by scientists as being quite earthly: some tiny filaments identified as radar chaff, a couple of small strange-shaped lumps of nylon residue, a strange large bullet-shaped mass that turned out to be a pipe cleaning anode, a piece of volcanic rock, a few grains of charred dirt, an arrowhead said by the sender to have been bent when he let fly an arrow at an extraterrestrial visitor, a mysterious cloudy little ball identified as a part from a roll-on deodorant.

Then there are hundreds of photographs, of lights in the sky, blurry objects, saucer-shaped objects, cigar-shaped objects (many of them obvious hoaxes, such as that with a black blob that had clearly been inked over the picture), the blurred outlines of what could have been a pith helmet. There are photos showing how other photos could have been manufactured by the double exposure of a lighted shape over a dark sky, and a picture of an indentation on the ground where a purported saucer landed. Flying saucer photographs never seem to be clear. In the film collection are two network documentaries made in the mid-1960's and a slew of short 8-millimeter home movies—one, for example, shows two moving lights in a night sky, then a batch of moving lights (fireflies?), and a butterfly or bird flying by.



Courtesy of the National Archives

*From the Blue Book file: this is an airplane at an air show flying through a fogbank.*

The microfilmed material contains thousands of newspaper clippings, illegibly scrawled letters, drawings, and diagrams, and many filled-in copies of the "Official U.S. Air Force UFO Form," a seven-page form wherein the writer is invited to describe all the physical circumstances of the sighting. One question says, "Compare brightness with some common object," and one respondent wrote, "Darker than Mars and brighter dark orange color." Another

cannot yet tell one way or the other. Gross's view, at any rate, seems to be scientifically tenable, and he is not in a minority of one in holding it. It is also the position of the Reserve Mining Company, but Gross strongly denies that he advocated the company's or any views but his own in the subcommittee's deliberations. Other members confirm this to be true. One of them, James R. Kramer of McMaster University, Ontario, testified on the opposite side to Gross during the Reserve Mining trial in 1974. According to Kramer, Gross spoke very objectively on the subcommittee, and the arguments between him and Hammond "were probably the most objective and straightforward types of discussion that I have ever witnessed."

However objective Gross's conduct may have been, the academy has devised an elaborate series of bias screening procedures to bring to light, and if necessary to counter, the kind of relationship that the discovered memos reveal. How well did the academy's procedures work in this case?

"This is probably a textbook example of a case in which, long before the die was cast [in the form of a final report], the trouble was detected and put right," says an academy staff member. Yet in fact the "trouble" might never have been detected through the academy's procedures which, even if adequate in theory, seem to have malfunctioned or been ignored in practice.

The academy's first safeguard against bias, say its officials, comes in the screening process by which scientists are selected for service on a committee. An academy staffer told *Science* that Gross's connections with Reserve Mining "didn't come out in the screening process." Yet it is common knowledge among people in the field that Gross had testified on behalf of Reserve Mining. Although not on a regular retainer, Gross is considered by the company's attorneys as one of their consultants, and his name was included on a list of consultants which the company recently filed in court.

The apparent failure of the academy's screening process to detect such a relationship is significant because the screening is the only step that precedes the invitation to a scientist to become a member of an academy committee. A "bias statement" is sent out at the same time

# Archives a Trove for Ufologists

contributor wrote that his UFO was "cigar shape with lights turning on its axe." To another question about whether the object moved behind something, a writer replied that it moved behind "where it was." Had it been seen before? "The same spot lower about a year ago."

It is easy to imagine the Air Force tearing its collective hair out trying to make some order from this sort of testimony, but no doubt there are enough nuggets to keep UFO fans pawing through the assemblage for years to come. Those who seek to uncover a new angle to the phenomenon will find the research a challenge because the material is only filed chronologically, with no cross-indexing according to the type of sighting, experiences, identity of the witnesses, timing, location, and so forth.

The records include material from 12,618 cases, 701 of which remain unexplained. The biggest year for sightings was 1952, with 1501 reports. There were more than 1000 sightings in 1957 and 1966. Only 146 were reported for 1969, the last year of the project, and only one of the objects sighted that year remains unidentified.

According to officials at the Archives the collection has drawn quite a few visitors since the files were opened on 14 July. At any given time there may be a dozen people eagerly grinding UFO data through the microfilm readers. Their number includes quite a few high school kids defying their usual reputation for intellectual torpor, and one very serious science teacher from South Carolina who is planning a book on "the morphology of UFO's."

The national preoccupation with UFO's is cyclical and currently seems to be at a low ebb. There are perhaps a half-dozen organizations around the country dedicated to investigating the phenomenon and none has a membership of more than around 5000. The number of people believing in "flying saucers" remains at about 6 percent of the adult population, according to Gallup polls.

Although the Air Force concentrated almost exclusively on whether UFO's were an external reality, it is likely that the most promising investigations would be in the behavioral, or subjective, aspects of the UFO-sighting phenomenon.

Donald I. Warren, for example, a sociologist at the University of Michigan, has a theory that the people who report seeing flying saucers suffer from "status inconsistency"—they are marginal types socially whose lives are not set in a consistent framework and who like the idea of other and better worlds somewhere.

Lester Grinspoon, a psychiatrist at Massachusetts Mental Health Center, has tried his hand at psychoanalytic interpretations. The famous case of Barney and Betty Hill (subject of the book *Unfinished Journey*), in which a couple claimed to have been taken aboard a spaceship, Grinspoon calls a *folie à deux* between a domineering saucer-fanatic wife and her Milquetoast husband. Grinspoon also wrote a paper advancing saucer sightings as manifestations of the "Isakower phenomenon" in which the viewer undergoes a complex regression toward seeing the object as a maternal breast. Most objects, notes Grinspoon, are either cigar (penis) or round (breast) shaped.

In fairness to UFO buffs, it is probably safe to say that most do not cling to the flying saucer theory—they just think there's "something out there" that science has failed to explain. In an effort to bring more rationality to the topic a number of interested people—ranging from UFO skeptic Philip J. Klass, an editor for *Aviation Week and Space Technology*, to astronomer J. Allen Hynek, who believes there's something out there—have formed the Committee to Scientifically Investigate Claims of the Paranormal and Other Phenomena. They plan a "Kiplinger-type" newsletter, says Hynek, called the International UFO Reporter, which is to be a nonbiased source of information to balance off the hot-headed reports from UFO organizations and publications such as the *National Enquirer*. Hynek is also preparing a book on the Blue Book files, mainly on those 701 cases that remain unexplained.

Even if science gets around to clearing up all the mysteries, it looks as though UFO's will always be with us—however well scientists can tack down the corners of reality, they cannot tack down the rovings of the human mind.—C.H.

as the invitation, but it seems that rarely if ever is an invitation canceled on the basis of information brought to light by the bias statement.

The bias statement, the second in line of the academy's safeguards, asks scientists to declare, among other things, their consultancies and whether they have ever taken any public position on matters within the committee's purview. But the bias statement also failed to elicit the information about Gross's relationship with Reserve Mining, and for reasons for which Gross is not entirely to blame. First, the question about consultancy does not define what is meant by a consultant, so that Gross, since he is not on retainer to Reserve Mining, does not consider himself a consultant in this sense, although he agrees that he is a consultant in a more general sense. Second, Gross did not mention that he had given testimony on behalf of Reserve Mining. The question about public positions seems clearly to have called for such a declaration, but Kramer, the subcommittee member who testified on the government side at the same trial, says that he never thought to mention the fact on his bias statement. If Kramer's inadvertence be attributed to innocent oversight, which it clearly was, the same allowance must be made for Gross. For whatever reason, the bias statements failed in this case to elicit the information the academy believed it was getting. The frequency of such failures cannot be determined, because the academy chooses not to make bias statements public.

The third safeguard in line is for the bias statements to be shown to the chairman of the committee. The academy's descriptions of its procedures state, "Each of our committees and other similar bodies is asked to discuss the matter of potential sources of bias at its first meeting and once annually thereafter." In the case of the Subcommittee on Particulate Contaminants, the chairman was not shown the bias statements, and the bias discussion was never held. Had the announced procedure been followed, Gross would presumably have stated explicitly his relationship with Reserve Mining, about which he seems to have made no particular secret, and at least some elements of the present situation might perhaps have been avoided.

A fourth safeguard is that the membership of a committee should be constituted so as to include representatives of both sides of any issue that might be the subject of biased opinions. In the case of the subcommittee and its parent Committee on Safe Drinking Water, an obvious imbalance exists. Not only was Gross the one pathologist on the subcommittee, but the only pathologist (not counting a nutritional pathologist) on the full committee is an employee of an asbestos company, the Johns-Manville company of Denver. The member in question, Paul Kotin, is a former director of the National Institute of Environmental Health Sciences and a distinguished scientist who nobody believes would twist conclusions to fit a company line. But for both the pathologists on the main committee and its subcommittee studying asbestos to have tie-ins with asbestos companies is a situation that raises questions as to how carefully academy committees are structured.

Whether Gross's opinion (if mistaken) about the harmlessness of short asbestos fibers in drinking water would have prevailed in the committee's final report can only be a matter of speculation, and his views may indeed turn out to be correct. As Gross sees it, the subcommittee had come round to accepting his arguments that there is no proof of harm, and Kotin, the only person with similar expertise to his on the full committee, would have agreed with this conclusion. Kotin confirms that he does. Academy officials say that a decision had been taken to send Gross's written contribution out for review before the discovery of the memoranda.

No amount of red tape can assure that a committee is free of bias, but the present episode suggests ways in which the academy's existing procedures might be improved on. There could be no better guarantee that bias statements are assiduously filled out than to publish them. And the chief danger of the type presented by the relationship between Gross and Reserve Mining—that Reserve Mining might have gained an unfair advantage in its access to the subcommittee's deliberations—could be instantly nullified by making all academy committee meetings open to everyone.

—NICHOLAS WADE

## RECENT DEATHS

**Sidney Axelrad**, 63; professor of sociology, Queens College; 1 February.

**Adolph G. Anderson**, 62; president, Hartwick College; 5 April.

**Joseph A. Babor**, 80; former professor of chemistry, City College, City University of New York; 10 February.

**Franz K. Bauer**, 59; former dean, School of Medicine, University of Southern California; 10 February.

**Samuel Belkin**, 64; chancellor, Yeshiva University; 18 April.

**Wiley D. Forbus**, 81; former chairman of pathology, Duke University; 3 March.

**Alexander Haddow**, 69; professor emeritus of experimental pathology, University of London; 21 January.

**John Hastings**, 100; professor emeritus of anthropological and economic geography, City College, City University of New York; 24 January.

**Vivian W. Henderson**, 52; president, Clark College; 30 January.

**Walter R. Hepner**, 84; former president, California State University, San Diego; 13 January.

**Francis W. Kearney**, 63; former president, St. Bonaventure University; 30 January.

**Gennady M. Kosolapoff**, 66; professor of chemistry, Auburn University; 1 January.

**Harold Lamport**, 67; research professor of physiology and biophysics, Mount Sinai School of Medicine, City University of New York; 27 December.

**Roy E. Langfitt**, 81; professor emeritus of education, New York University; 31 January.

**F. S. Kilmer MacMillan**, 47; biochemist and director of concept development, Bristol-Myers Company; 20 January.

**John A. Madigan**, 76; former professor of physics, College of St. Thomas; 5 January.

**Boyd R. McCandless**, 60; professor of psychology, Emory University; 5 December.

**Fred R. McCrumb, Jr.**, 50; special assistant to the director, Fogarty International Center, National Institutes of Health; 5 January.

**Robert F. Mehl**, 77; former professor of metallurgy, Carnegie-Mellon University; 29 January.

**William I. Meyers**, 84; dean emeritus of agricultural economics, Cornell University; 30 January.

**William H. Michener**, 79; former professor of physics, Allegheny College; 10 August 1975.

**Rudolph Minkowski**, 80; professor emeritus of astronomy, University of California, Berkeley; 4 January.

**George H. Whipple**, 97; first dean, School of Medicine and Dentistry, University of Rochester; 1 February.

**Paul A. Witty**, 77; professor emeritus of education, Northwestern University; 11 February.

**James W. Zahnley**, 91; professor emeritus of agronomy, Kansas State University; 21 February.

**Paul D. Zimskind**, 44; professor of urology, Jefferson Medical College; 2 March.