SCIENCE

28 March 1975

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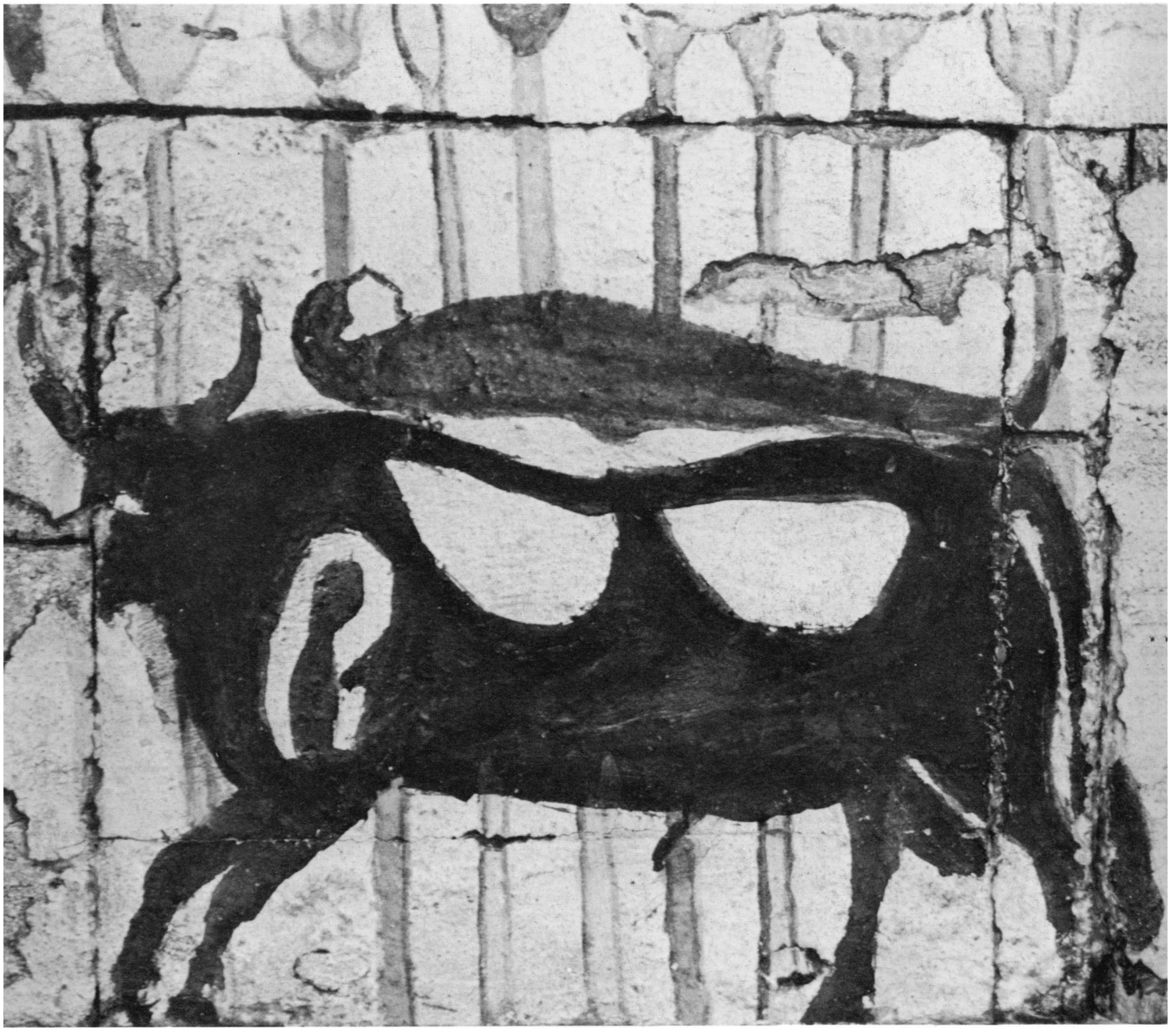
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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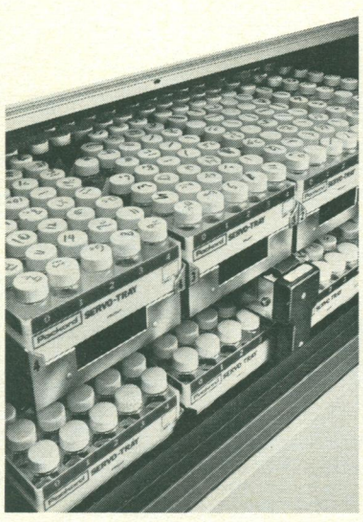

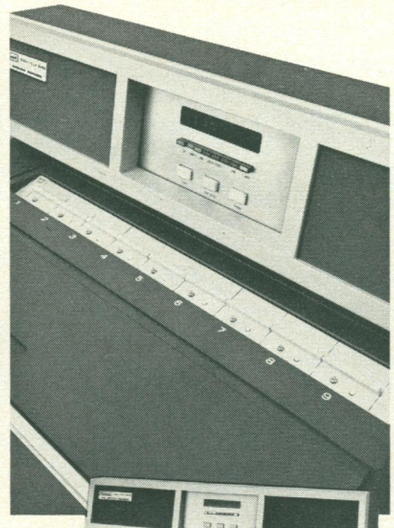

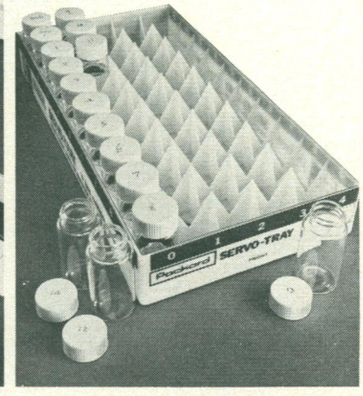

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28 March 1975

Volume 187, No. 4182

SCIENCE

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COVER

Apis bull carrying dead man. See page 1153. [J. Lawrence Angel, Smithsonian Institution]

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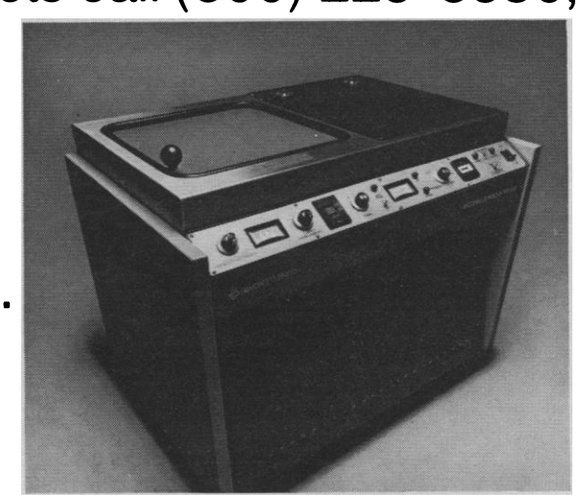

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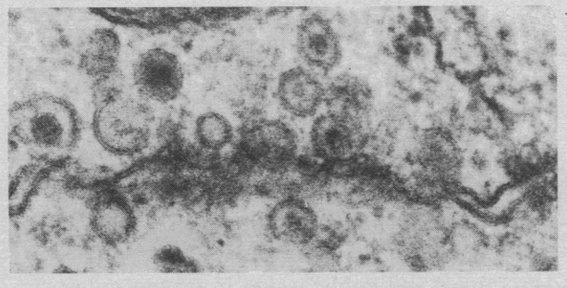


+40°

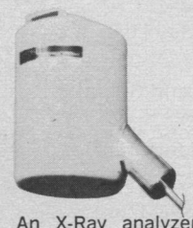
0°

−40°

330,000X

Synapse between two glomus cells of the rat carotid body at various angles of tilt. Without tilt the pre- and postsynaptic membranes are indistinct, because the plane of the section is tangential to the plane of the synapse. At −40°, the synapse appears as if cut in cross-section. At + 40° a view of the synapse is obtained nearly orthogonal to that of 0° tilt. Taken with the EM-10 by Dr. Donald McDonald, Cardiovascular Research Institute, University of California, San Francisco.

(Since publication printing cannot show the incredible detail, send for full size glossies.)



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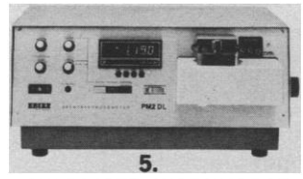

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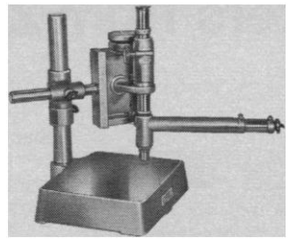

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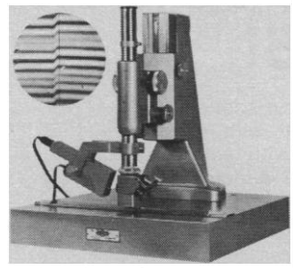
Methods of measurement. The *draw tube scale* is the simplest. The scale is engraved on the draw tube, with a vernier attached to the microscope body. It reads to 0.005", or 0.1mm. For some applications you might prefer a *dial gage*, actuated by a contact linked with the draw tube, and reading to about 0.0001". For greater range and accuracy, you can have your microscope mounted in a *micrometer slide* with its axis parallel to the slide's precision micrometer screw. Gaertner offers a variety of micrometer slides to solve many measuring problems, plus an extensive selection of accessories for special needs. One example: A *Parfocal Illuminator,* particularly useful where the surface to be focused is difficult to "zero in" on because of roughness.

Applications. Depth measuring microscopes are most effectively used where accuracy in the general range of 0.005" to 0.0001" is required. Typical applications include measurements of hole depth, depth of slots, coating thickness, thickness of transparent materials, thickness of TV tube faces, and etching depth. With a parfocal illuminator, microscopes are ideal for measuring the radii of curvature of lens surfaces and other spherical reflecting objects.

For complete information on Gaertner Measuring Microscopes and accessories, write for Bulletin 161-72.■

Need finer unit measurements?



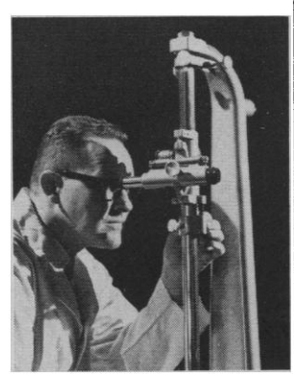
Microinterferometer

Gaertner also makes a Microinterferometer for highly precise, non-contacting measuring of surface configuration and thickness of coatings and deposits. This instrument is simple to operate. It uses the principle of interference of light to optically measure in terms of the wavelength of light—measurements to about 1/5th of a wavelength or 2 millionths of an inch. **Ask for Bulletin 209-73.■**

Ellipsometers

For measurement of ultra-thin films or study of surface phenomena requiring even smaller unit measurements, or for many chemical, biological and biomedical research studies, you'll find a Gaertner Ellipsometer does the job. It uses plane polarized light to achieve readings to a few angstroms. **Ask for Bulletin 203-73.■**

How to measure vertical distances or displacements... remotely, precisely, without contact.



Cathetometers

You can measure the height of objects not accessible to measurement by other means, with a cathetometer. Measure things you can't touch, like the height of liquids in a tube. Or the deflection of a quartz spring. Or the vertical extension of material under stress—all without physical contact.

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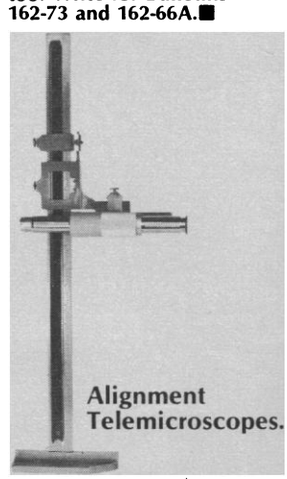

Gaertner also offers alignment telemicroscopes which, when used with precision height gages, provide a means of measuring heights without mechanical scriber blade; or for accurately checking alignment of points, apertures, etc., along an axis. **Write for Bulletin 161-73F2.■**

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The sample of human blood plasma shown in the chart clearly shows sharp protein peaks at points A and C, and indicates additional proteins at points B and D . . . peaks not normally visible with ultracentrifugation.

These data were obtained in our laboratory. They are readily obtainable in any lab which has an OTD-2.

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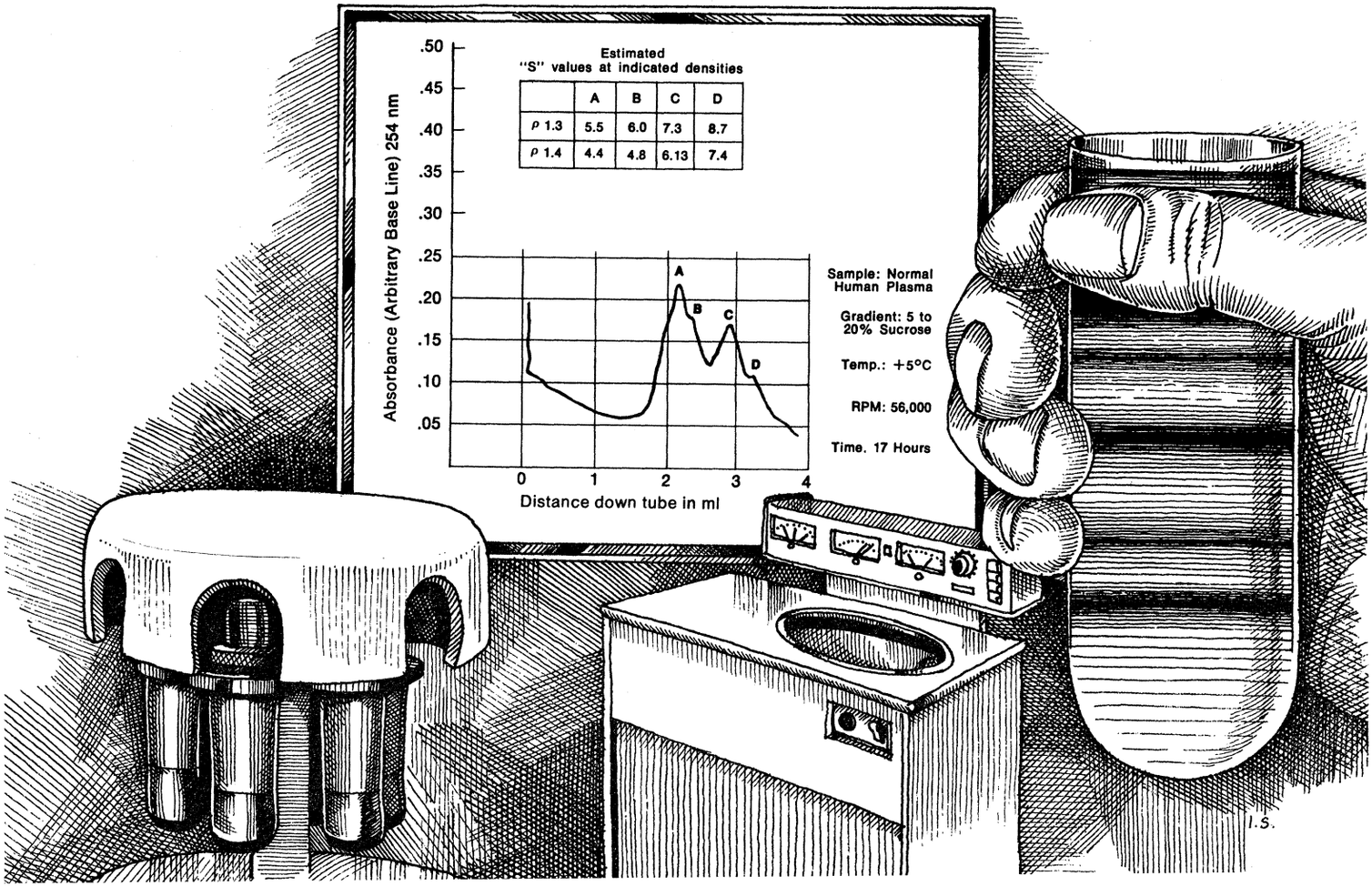


LETTERS

The SST and Ozone Depletion

As president of the Solar Planetary Relations Section of the American Geophysical Union (AGU), I agreed last year, in cooperation with the American Meteorological Society, to sanction, in the name of the AGU, a scientific review of draft monographs 1, 3, and 4 yet to be published by CIAP (Climatic Impact Assessment Program). I not only suggested names of referees but, upon request, participated in the process myself. The Executive Summary of the Report of Findings by CIAP (*1*), in my opinion, conceals the logical conclusions of the study as they were presented in the monographs we saw and criticized: it introduces new concepts concerning ultimate SST (supersonic transport) fleet sizes, flight times, and emission standards without candidly stating the ultimate effect on the stratosphere of such fleets by the early 21st century; and it, together with uncorrected stories based on it and press interviews accompanying its release, have caused a serious loss of credibility to atmospheric scientists. Because of these considerations, I realize that I made a serious mistake in allowing the AGU to be associated with this exercise and I wish to apologize. It was certainly a violation of sound editorial standards to review documents clearly labeled as drafts, preliminary, and subject to arbitrary change after the review process was completed. Having done so, we find it difficult not to *seem* to have endorsed the summary of the Report of Findings unless we explicitly disclaim that endorsement. The principal public result of this report so far has been to cast doubt on the serious nature of the questions now being raised by atmospheric scientists concerning threats to the stratosphere by anthropogenic pollutants other than nitrogen oxide (NO_x) emissions from SST's.

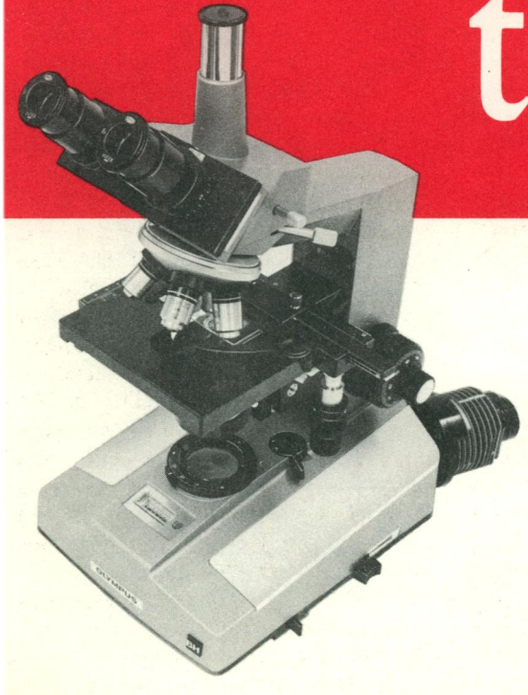
The Associated Press (AP) wire story resulting from CIAP manager Alan J. Grobecker's news conference and the tone of the document released at that time had the effect of concealing, and even negating, the fact that CIAP actually supported the predictions made by McDonald (*2*), Crutzen (*3*), and Johnston (*4*) in the early 1970's of the effects that would be produced by 500 Boeing SST's flying 7 to 10 hours each day over the airlanes of the Northern Hemisphere. A valid first conclusion of the study should have read as follows: "If 500 Boeing SST's had been built as planned and equipped with the engines they were expected to use before this study was undertaken, and if each had flown an average of between 7 and 10 hours per day at an altitude of 20 kilometers as planned, their effect would very probably have been to reduce the average global content of the ozone layer by between 10 and 20 percent with most of the effect occurring in the Northern Hemisphere. The result of this ozone reduction would have been an increase in erythemal solar ultraviolet radiation by approximately 20 to 40 percent and consequently a serious threat to the biosphere in the worst case, or an extremely great increase (by about 20 percent per year) in effects such as incidence of skin cancer among the Caucasian population of the world."

The summary report might have concluded also "that the future fleet of SST's predicted for the year 2020 (5000 large SST's) would have reduced ozone by more than a factor of 3; and that a reduction in NO_x emissions per engine by a factor of 60 would have been required to hold the reduction in the Northern Hemisphere to 5 percent."

No such clearly stated specific conclusions are found in the Report of Findings, although they can be deduced by someone familiar with the history of the study or a perceptive person who goes to the trouble of reading fine print, footnotes to tables, or who pursues some of the statements in the report to their logical ends. Grobecker has twice refused my appeal to correct the impression created by the AP wire story. This impression was that the originally planned SST fleet would not have seriously depleted the ozone shield and that alarm created by fears of such an effect was an important consideration in causing cancellation of U.S. plans to build an SST fleet. Thus those who raised the alarm have been effectively discredited and stand accused of providing damaging counsel to this country. I hope that this letter will repair a little bit of the damage that has been done.

THOMAS M. DONAHUE
Department of Atmospheric and Oceanic Science, University of Michigan, Ann Arbor 48105

"I want Michelangelo to demonstrate the new Olympus BH Microscope to me."



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References

1. A. J. Grobecker, S. C. Coroniti, R. H. Cannon, Jr., *The Effects of Stratospheric Pollution by Aircraft. Report of Findings. Executive Summary* (National Technical Information Service, Springfield, Va., 1974).
2. J. E. McDonald, "Assessment of possible SST effects on the incidence of skin cancer" (paper presented at an informal meeting of the Conference on the Climatic Impact of Supersonic Aviation, National Center for Atmospheric Research, Boulder, Colo., 1971).
3. P. J. Crutzen, *J. Geophys. Res.* **76**, 7311 (1971).
4. H. S. Johnston, *Science* **173**, 517 (1971).

I would like to correct some of the statements made by Thomas M. Donahue in his letter concerning the Report of Findings of the Department of Transportation Climatic Impact Assessment Program (CIAP).

The impact of 500 Boeing SST's is implicit in a comparison presented in table 15 (*1*) of the Report of Findings. That table gives Boeing SST emissions as they were estimated in 1970; Boeing SST emissions as they are presently estimated (1974); and Concorde emissions as they are presently estimated (1974). The pollution effect of a 1971 Boeing SST, which flies at 21 kilometers is about six times that of a single Concorde, which flies at 16.5 km. The reader can use this comparison to give the ratio of Boeing SST effects to Concorde effects and then get the effect of 500 Boeing SST's by scaling the effects estimated for 100 Concorde aircraft in table 1 of the Executive Summary (see below). Similarly, the effect of 5000 "large SST's" can be computed by scaling the effects estimated for 100 "advanced SST's" in the same table.

In response to Donahue's appeal, the impression created by the Associated Press story of 15 January—that the originally planned SST fleet would not have depleted the ozone shield—was publicly corrected before an international audience of more than 350 persons in Cambridge, Massachusetts, on 4 February. The correction was given wide coverage in the press and on television.

I regret that a scientist as important to atmospheric science as Donahue should believe that the public result of the CIAP program has been to cast doubt on the serious nature of the questions being raised now by atmospheric scientists concerning threats to the stratosphere by anthropogenic pollutants other than NO_x emissions from SST's. These questions are as serious as the questions of stratospheric pollution by aircraft. They deserve serious worldwide attention and the use of advanced technology so that undesirable consequences may be avoided.

The alarm in 1971 created by fears of such an effect was an important consideration in causing cancellation of U.S. plans to build an SST fleet and has had a useful result in stimulating stratospheric and other researches necessary for such avoidance.

ALAN J. GROBECKER

Climatic Impact Assessment Program, Department of Transportation, Washington, D.C. 20590

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1. A. J. Grobecker, S. C. Coroniti, R. H. Cannon, Jr., *The Effects of Stratospheric Pollution by Aircraft. Report of Findings* (National Technical Information Service, Springfield, Va., 1974), p. 101.
2. ———, *The Effects of Stratospheric Pollution by Aircraft. Report of Findings. Executive Summary* (National Technical Information Service, Springfield, Va., 1974), p. xvi.

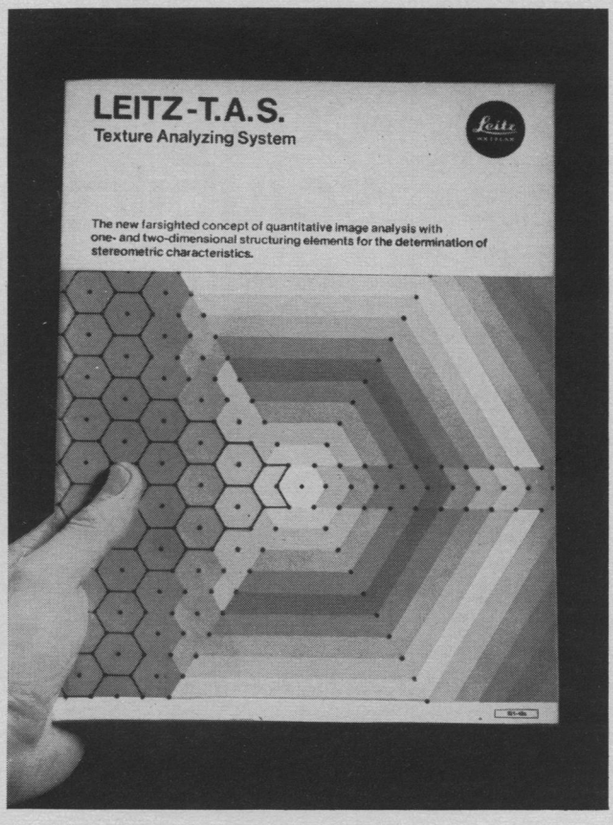
I am very pleased to read this reply to my letter. My complaint was certainly not directed at CIAP itself, for I believe that it produced very significant results. It is important that what it accomplished be clearly understood. Its director's letter goes a long way toward achieving that goal.

—THOMAS M. DONAHUE

Table 1. Estimated percent ozone reduction per 100 aircraft. [Adapted from table 1 in (*2*)]

Aircraft type	Fuel burned per year* (kg/year)	Altitude (km)	NO_x emission index (EI) without controls (g/kg fuel)	Percentage of ozone reduction in Northern Hemisphere		
				Without controls	EI controls	
					1/6 today	1/60 today
Subsonic†	1×10^9	11	6	0.0034	0.00070	0.000070
707/DC-8	1.5×10^9	11	15	0.010	0.0020	0.00020
DC-10/L-1011	2.0×10^9	11	15	0.014	0.0025	0.00025
747	2.0×10^9	13.5	15	0.079	0.014	0.0014
747-SP	4×10^9	13.5				
Supersonic	3×10^9	16.5	18	0.39	0.068	0.0068
Concorde/TU-144	3×10^9	16.5				
Advanced SST	6×10^9	19.5	18	1.74	0.32	0.032

* Subsonics assumed to operate at high altitude, 5.4 hours per day, 365 days per year. Supersonics assumed to operate at high altitude, 4.4 hours per day, 365 days per year. † The present subsonic fleet consists of 1217 707/DC-8's, 232 DC-10/L-1011's, and 232 747's flying at a mean altitude of 11 km and is estimated to cause a 0.1 percent ozone reduction.



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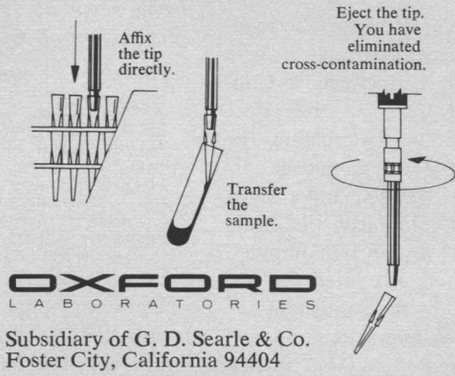

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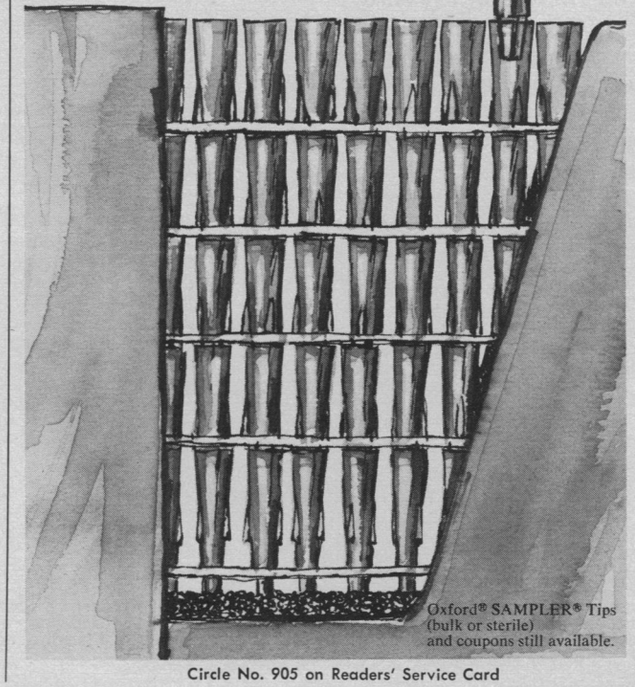

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Mass, Force, and Weight

R. J. Temple's comment (Letters, 21 Feb., p. 598) that the SI (International System of Units) is illogical because "in the SI . . . , weight is measured in kilograms."

The facts are, that, in the SI, mass is measured in kilograms, and force in newtons. Weight is a general word that is widely used for both force and mass, but as a force it can be defined precisely only for the special case of bodies at rest on the surface of a heavenly body. The dual usage of the term weight has led to a National Bureau of Standards editorial guideline statement (*1*):

> Considerable confusion exists in the use of the term weight as a quantity to mean either force or mass. In commercial and everyday use, the term weight nearly always means mass. . . . Because of the dual use of the term weight as a quantity, this term should be avoided in technical practice except under circumstances in which its meaning is completely clear.

CHESTER H. PAGE
Institute for Basic Standards,
National Bureau of Standards,
Washington, D.C. 20234

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Merit and Discrimination

Brewster C. Denny's editorial (6 Dec. 1974, p. 875) rightly stresses the importance to society of rewarding merit. Unfortunately, a presently popular ideology opposes rewarding superior performance and penalizing bad performance. This leads to policies that maximize the *short-term* comfort of the populace, but also slowly cause all social systems to sink into a slumber of inefficiency and sloppy performance. In fact, the fundamental thermodynamic principle of strictly egalitarian systems states that, "In the long run, all men and all institutions sink into a state of uniform dynamic incompetence." In the words of Kenneth Boulding, "Radical egalitarianism may be a good way of legalizing stagnation" (*1*). The canonical example of dynamic incompetence is the U.S. Postal Service.

C. A. DESOER
2589 Hilgard Avenue,
Berkeley, California 94709

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1. K. Boulding, "Economics of the 21st century," lecture delivered at the University of California, Berkeley, 29 July 1971.

Denny's editorial asserts that there has been a decline in the use of merit as a principle for selection, promotion, and reward. Frankena, in a discussion (*1*) of moral and nonmoral virtue as possible criteria of merit, concludes:

> . . . before virtue can reasonably be adopted as a basis of distribution, there must be prior *equal* distribution of the conditions for achieving virtue, at least insofar as this is within the control of human society.

If there has been discrimination and if the condition of equality is necessary for the distribution of rewards according to merit to exist, then a reward system based primarily on merit has not existed during the time when discrimination was present. The people employed, promoted, and rewarded before 1968 were drawn from a favored 30 to 40 percent of the population. This group cannot claim that they are the most virtuous or meritorious members of their generation: they will never know if they are, since most of the population (minority and female members) were excluded before the selection for recognition began.

Following this line of reasoning one can conclude that the employment, promotion, and reward systems of the past favored "mediocrity." The so-called merit system of the past was "hollow mockery," and those who wish to use a "crowbar" to further discrimination are using the words "merit" and "mediocrity" for this purpose. (The word excellence is used in this way also.)

The leadership of the academic community was not actively promoting equality of opportunity before the civil rights legislation of the late 1960's. Faculty composition reflects this discrimination. The civil disturbances in 1967 led to the legislation that has promoted equal employment opportunities, not only for minorities, but also for women. There is little evidence that university officials have willingly made many of the changes required by law. The civil rights agencies are swamped with complaints.

I realize that it requires some humility for the members of the academic community to admit the possibility that they could not be judged meritorious in a meaningful way, but humility

will be necessary if there is to be a change from the mediocrity of a situation that condones racial and sexual discrimination. If changes are not made, the type of instruction given in the sixth grade is of little consequence. Under a pattern of discrimination the daughters of the majority, and the sons and daughters of minority members of the population will not be allowed to contribute fully to society.

DOROTHY MCMEEKIN
Department of Natural Science,
Michigan State University,
East Lansing 48824

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1. W. K. Frankena, *Ethics* (Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1973), p. 50.

I read Brewster Denny's thoughts on the decline of merit with fear and respect. I too feel that we need an abundance of excellence for our very survival. But I fear his call for merit because I sense in his editorial a demand that merit be judged in a very classical and incestuous manner, one which comes from a white, male perspective and which asserts that "[b]rains and sound quality performance will be the basis of whatever success our society has. . . ." Brains and performance are good, but alone they are not good enough. Alone they have gotten us where we are today, and that doesn't feel like a very good place to me. A "brains and performance" orientation has helped us relate to the physical world. But in today's world of decreasing technological options and increasing interpersonal tensions, we have a major, if not a primary need to understand and relate well to ourselves and to each other. Those white males concerned with brains and performance have not done well in personal and interpersonal understanding. Their definitions of merit cannot be expected to evaluate dimensions they themselves do not seem to understand. In fact, definitions of merit based on brains and performance might be expected to exclude from decision-making levels many of those people whose experiences and training might add, in addition to their brains, needed new dimensions—compassion, warmth, and emotion—to the solutions of our problems. This is not a suggestion that women and minorities lack brains. Nor is this a patronizing call for acceptance of any woman or any minority group member into the upper echelons. It is simply a recognition that white, male concern exclu-

sively with brains and performance may be valuable in developing technology, but the new problems of today require new definitions of excellence and new people to make the judgments.

Furthermore there is a concern that, even using classical definitions, merit systems have worked and will continue to work against excellence. Most of us are aware that "merit" systems have been used in the past to exclude women and minorities, especially some of the most able ones who seemed the most threatening to our stereotypes. Under so-called merit systems, we in academe for years have hired not the most qualified people, but rather friends and friends of friends. We never heard about rigidly enforced merit decisions in those days. Even now, the merit issue is only raised when we are talking about women and minorities.

It seems strange to argue with the notion of merit. But merit, as it has been defined and applied, has had the effect of limiting the range of solutions available for our problems. We can't afford this luxury any longer. I doubt that we ever could.

SIDNEY ROTH

Department of Psychology, California State University, Los Angeles 90032

McMeekin and Roth correctly point out that discrimination, favoritism, mediocrity, and just plain bad judgment have historically hidden behind personnel processes called merit systems, often incorrectly. In fact, despite the many instances of blatant, overt, racial, religious, and sexual discrimination in our society, the majority of such discriminations, particularly in this century, have probably occurred covertly in the name of rules and procedures giving the appearance of fairness, like seniority, or the appearance of scientifically determined merit, like civil service examinations with their exquisitely precise scores based on unvalidated test instruments. Affirmative action rather than a status quo neutrality is needed for precisely this reason, since the work forces of our society now in place are neither fully representative of the society nor determined wholly on merit. I agree fully with Roth's insistence that merit must include much more than brains and regret and retract any implication to the contrary in my brief editorial. Merit includes all those qualities which enable and inspire a person to do an outstanding job and which assure a moral and humane perform-

ance as well. Jefferson advocated public higher education for those who had the "interest, competence, and *character*," to profit from it—a standard closely tied to his view of public service. While qualities of intellect may be easier to judge than qualities of character, both judgments are essential to the determination of merit.

BREWSTER C. DENNY
Graduate School of Public Affairs, University of Washington, Seattle 98105

Green Revolution: Just or Unjust?

Nicholas Wade's report on high-yielding varieties of rice and wheat "Green revolution (I): A just technology, often unjust in use" (News and Comment, 20 Dec. 1974, p. 1093), while it can hardly be called biased, can't be called balanced either. I suppose every one of the thousands of new technological innovations in agriculture that have occurred since man emerged from his hunting status in the forest has tended to favor those who already have in hand the most capital to make the innovations. To argue on these grounds that the innovations should not be made leads to the absurd conclusion that *Homo sapiens* should never have evolved, for technological innovation is what distinguishes man as a species.

Of course the distribution of income is a major problem. But perhaps social scientists need to give more attention to solving that problem and less to lamenting the social-justice consequences of increasing productivity. The problem has been around a long time; it's not unique to the green revolution. I haven't run a poll, but I doubt if very many economists would agree that the green revolution is bad.

DEAN F. PETERSON
Division of Research, Utah State University, Logan 84322

U.S. Grain Production

Although I am not a vegetarian, it seems to me that the crux of the problem of protein production is in the growing taste of the affluent nations for meat (U.S. annual meat consumption increased from 55 to 115 pounds

per person between 1940 and 1970), rather than where Horst Kehl (Letters, 31 Jan., p. 299) puts it. His whole argument that the amount of grain grown on an acre of land will feed more cattle than an acre of grass is irrelevant, since proponents of cutting down on feedlots are advocating that this grain be used for people, not that it be replaced by grass. Cattle would be grazed on nonarable land, and if this implies a somewhat reduced meat production, public education as to health needs would help reduce the demand. That raising cattle on grass "would result in . . . animal protein that would be of poorer quality" is an ambiguous statement. The nutritional quality of the protein would not be changed; the meat would have a higher percentage of protein and a lower percentage of saturated fats.

I doubt the validity of the statement that "agriculture in the United States has proved to be the most efficient in the world." Britain and Japan have higher yields of cereal grain per acre, and if we consider the amount of energy expended, we are very inefficient (*1*). Attempts should not be made to implant U.S. agricultural methods throughout the world. Some of the real failures in connection with the green revolution occurred where the need for labor-intensive farming with the right expertise and equipment was overlooked.

It is a plain fact that humans certainly can obtain the amino acids they need by very simple combinations of cereals and legumes. As to the affirmation "[o]nly by producing sufficient animal protein can the world standard of living be raised and adequate nutrition supplied," if all people consumed a diet similar to that of present-day Americans, world food production would have to be increased almost eight times. If a reduced consumption of meat in countries such as the United States reverted grain to nations in need, it would serve to improve the nutritional status of these populations. Paradoxically, it would serve also to improve the health of Americans by lessening a diet factor which is probably conducive to heart disease.

THERESE DRUMMOND
Division of Nutritional Sciences,
Cornell University,
Ithaca, New York 14850

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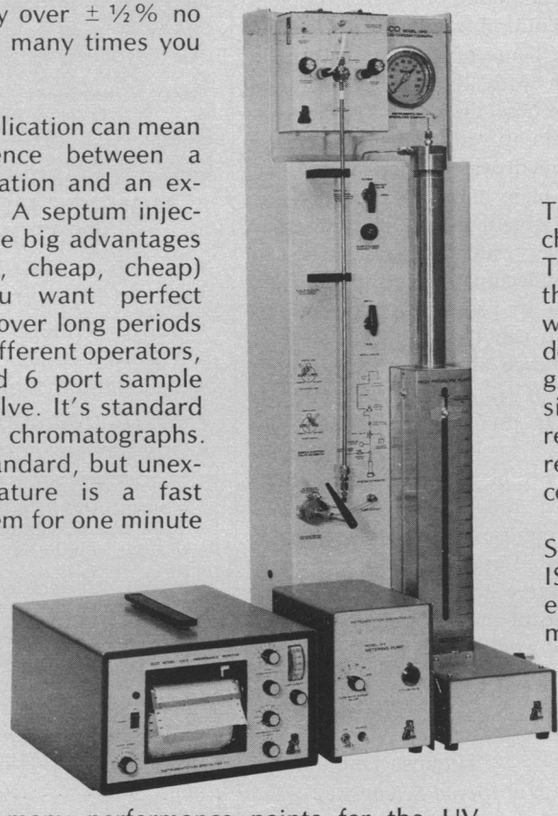

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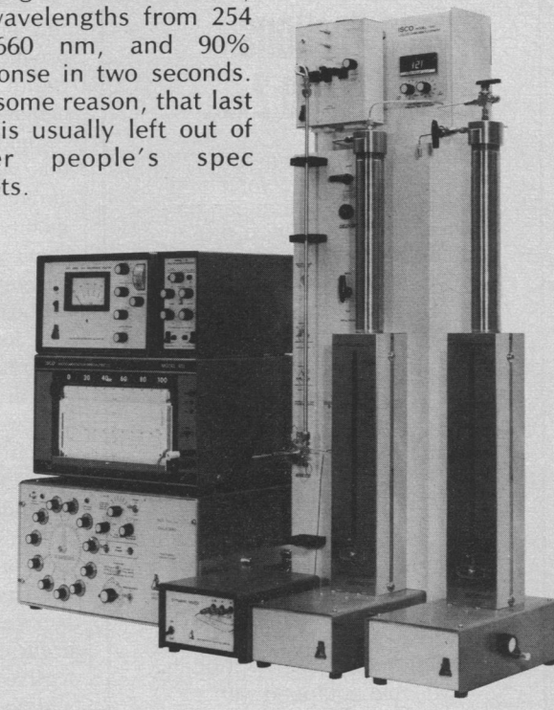

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28 March 1975, Volume 187, Number 4182 **SCIENCE**

Casting About for a President

Everyone seems to believe, in private, that the presidency of a college or university is an impossible job to fill. The usual search committee can agree on the job description, but at the same time they are convinced that (i) whoever they pick will be unworthy of the institution and (ii) they do not want anyone who will ever appear on campus.

Typically, the job description does not acknowledge what everyone knows: no one connected with the institution wants a president to do the job described. The faculty does not want a leader in curriculum reform; the trustees do not want better management if it threatens such pet programs as intercollegiate athletics; and the students do not want to be straightened out by the president—which is what the alumni want him to do.

The characteristics mentioned in the typical job description divide into two clusters, those that would qualify the candidate for canonization and those that would make him a multimillionaire in the business world. However, if no one wants the president to appear on campus except for occasional visits, the second cluster of qualities, the management skills, are irrelevant to the job. That leaves as the crucial qualities required of a new president the humane gifts—sensitivity, awareness, appreciation, flexibility—that make for an effective spokesperson for higher education but have no practical consequence for the day-to-day running of an institution. We may go further and argue that even these qualities are not important for the presidency; here we can follow the advice of Machiavelli that "a prince . . . need not necessarily have all the good qualities . . . but he should certainly appear to have them."

A search committee that accepts the logic of this argument has its job immeasurably simplified: hire an actor as president. The job description might read something like this: "Wanted, character actor with wide experience playing professorial roles. Should be six feet or taller, have slim athletic build, look good in tweeds and casual sport clothes. Some skill in tennis, squash, skiing helpful. Must be able to read aloud with understated deep conviction, memorize parts quickly, have good memory for names, faces, quotations from Shakespeare, enjoy touring. Some possibility of improvisational and ad lib performances after first year."

There are drawbacks to the plan. One is that with so clear a job description for the president, it would be harder to blame him for the inadequacies of the faculty, administration, and student body and harder to keep him happy in uncongenial working conditions. A good actor with a strong script could move from the provinces to the big time very easily.

Also, some colleges might actually recognize that they *need* leadership from a president, that their need is vision rather than appearance. If an institution looking for a president should come to the conclusion that it needs more than a persuasive front man, it will have to eschew the beauties of this plan and try to find someone who genuinely has vision, energy, drive, and capacity to lead. And to persuade such a person to be president, the college will have to explain why anyone with all the required qualities should think of wasting them on a presidency. To demand all those management skills, the institution will have to demonstrate that it is willing and able to be managed; to expect all those good, humane qualities, it will have to demonstrate that it knows how to treat its leaders humanely, that its faculty, students, trustees, and alumni have a modicum of that sensitivity, openness, and understanding being demanded of the new president. And before being able to make demands of the new president, the institution's members will have to answer his question, "What's in it for me?"

On balance, it is probably easier to hire an actor.—PAUL A. LACEY, *Provost, Earlham College, Richmond, Indiana 47374*

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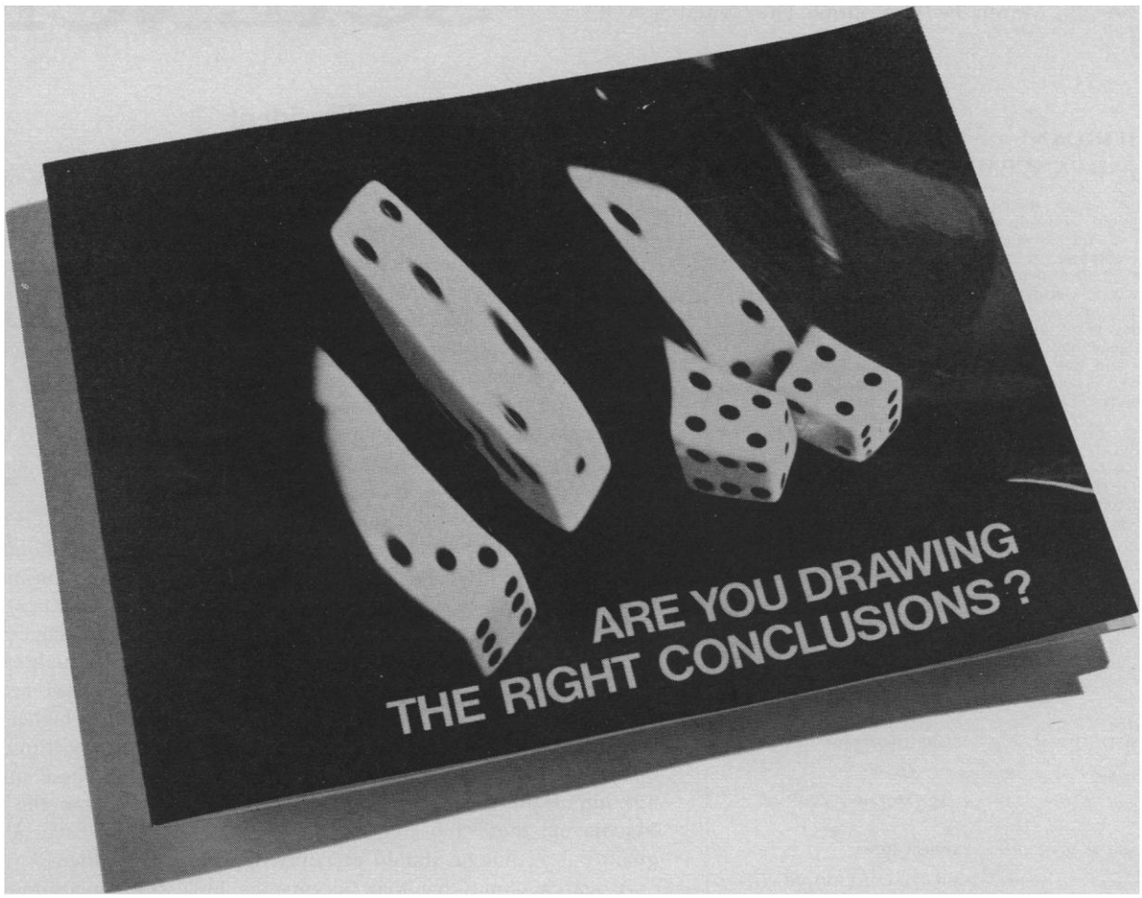

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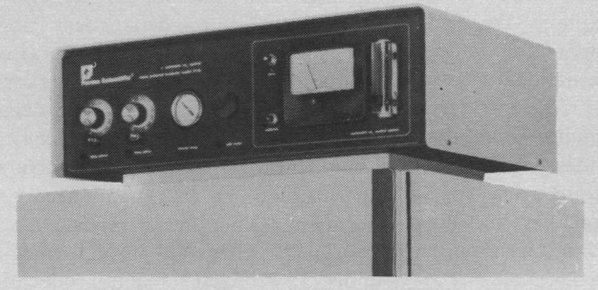

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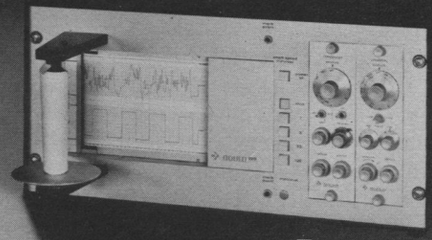

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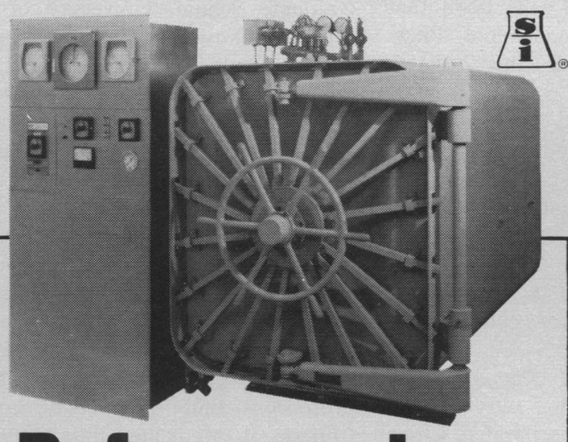

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Perfuser two/ten is designed for perfusion of isolated animal organs. Pump flow rates of up to 150 milliliters of perfusate per minute are possible. In addition to pumping and oxygenation, the device provides heating by water bath, an efficient filter and bubble trap, sampling ports on venous and arterial sides, and reversible pumping to facilitate cleaning. The Perfuser two/ten is adaptable to a sealed atmosphere to permit insertion of components into the oxygenated perfusate. MX International, Incorporated. Circle 876.

Long Cell for Infrared Spectroscopy

A 120-meter gas cell is available for adaptation to many popular spectrophotometers. The three-mirror, multiple, reflection, long path cell features a path length that is externally adjustable in 8-meter steps from a minimum path of 4 meters to a nominal maximum of 132 meters. The cell is vertically mounted; it is 10 inches in diameter, 90 inches high, and weighs 55 pounds. It may be pressurized to 10 atmospheres or evacuated to 10^{-5} torr. Wilks Scientific Corporation. Circle 879.

pH Meter

The Digital Mini-*p*H-Meter gives readings over the 0 to 14 range with a resolution of 0.1 unit. The readings are displayed by light-emitting diodes 5/16-inch high for ease of reading in the laboratory or in the field in full sunlight or darkness. Accuracy exceeds 0.15 *p*H unit within 3 units of the standardization point and 0.2 unit over the full range. Reproducibility is ± 0.05 *p*H unit. Meter controls include a manual 0° to 100°C temperature compensator, calibration adjuster, and battery test switch. L. G. Nester Company. Circle 877.

Literature

Catalog 1275 features biochemical products for chromatography, immunochemistry, molecular biochemistry, enzymology, and blood studies. Miles Laboratories, Research Products Division. Circle 850.

HP-55 Mathematics Programs and *HP-55 Statistics Programs* each cost $10. They feature 74 and 53 programs, respectively, for the HP-55 programmable pocket calculator. Hewlett-Packard Corporation. Circle 856.

ReUse Catalog lists used scientific instruments of all types for sale. It is a brokerage-type operation where sellers may list and from which buyers may select items. ReUse Company. Circle 852.

Using Low-Temperature Plasmas for Ashing Analytical Samples is a technical bulletin that explains the technique and its advantages and outlines some applications. International Plasma Corporation. Circle 853.

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Affinity Chromatography—Principles and Methods is a 72-page book that also discusses some applications. Pharmacia Fine Chemicals Incorporated. Circle 866.

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Salt Removal and Exchange by Diafiltration describes an ultrafiltration technique. Amicon Incorporated. Circle 869.

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Laboratory Light Sources and Instrumentation for Photometry and Radiometry is a 20-page pamphlet devoted to fiber optics, spectral sources, photometers, optical filters, and other accessories. PBL International, Incorporated. Circle 888.

NEWS AND COMMENT

(Continued from page 1180)

man, mathematics department, Ohio State University. . . . **Samuel Bullock**, associate professor of psychiatry, Hahnemann Medical Center, to chairman, psychiatry department, Howard University. . . . **Charles A. White, Jr.**, professor of medicine, University of Iowa, to chairman, obstetrics-gynecology department, West Virginia University. . . . **Dale D. Lindholm**, professor of medicine, Tulane University, to chairman, nephrology department, West Virginia University. . . . **Eugene H. Bishop**, chairman, mechanical engineering department, Montana State University, to chairman, mechanical engineering department, Clemson University. . . . **Thomas F. McHugh**, assistant professor of education, Washington College, to chairman, education department, Vassar College. . . . **Donald R. Bennett**, associate professor of medicine, University of Utah, to chairman, neurology department at the university. . . . **Larry C. Carey**, professor of surgery, University of Pittsburgh, to chairman, surgery department, Ohio State University. . . . **Laurine E. Fitzgerald**, professor of administration and higher education, Michigan State University, to dean, Graduate School, University of Wisconsin–Oshkosh. . . . **Thomas E. Jordan**, professor of behavioral studies and research, University of Missouri, St. Louis, to dean, Graduate School at the university. . . . **John J. Sciarra**, assistant dean, College of Pharmacy, St. John's University, to dean, College of Pharmacy, Long Island University. . . . **Duane L. Aldous**, associate professor of pharmaceutical chemistry, Xavier University, to dean, College of Pharmacy at the university. . . . **Robert E. Jewett**, professor of allied health professions, Emory University, to dean, College of Medicine, East Tennessee State University. . . . **Charles E. Olson, Jr.**, professor of natural resources, University of Michigan, to dean, School of Natural Resources at the university. . . . **Edward W. Hawthorne**, chairman of physiology and biophysics, Howard University, to dean, Graduate School at the university. . . . **William M. Sangster**, professor of civil engineering, Georgia Institute of Technology, to dean, College of Engineering at the institute. . . . **J. Edward Simpkins**, director, Center for Black Studies, Wayne State University, to dean, College of Education at the university. . . . **Nat E. Smith**, associate dean for student af-