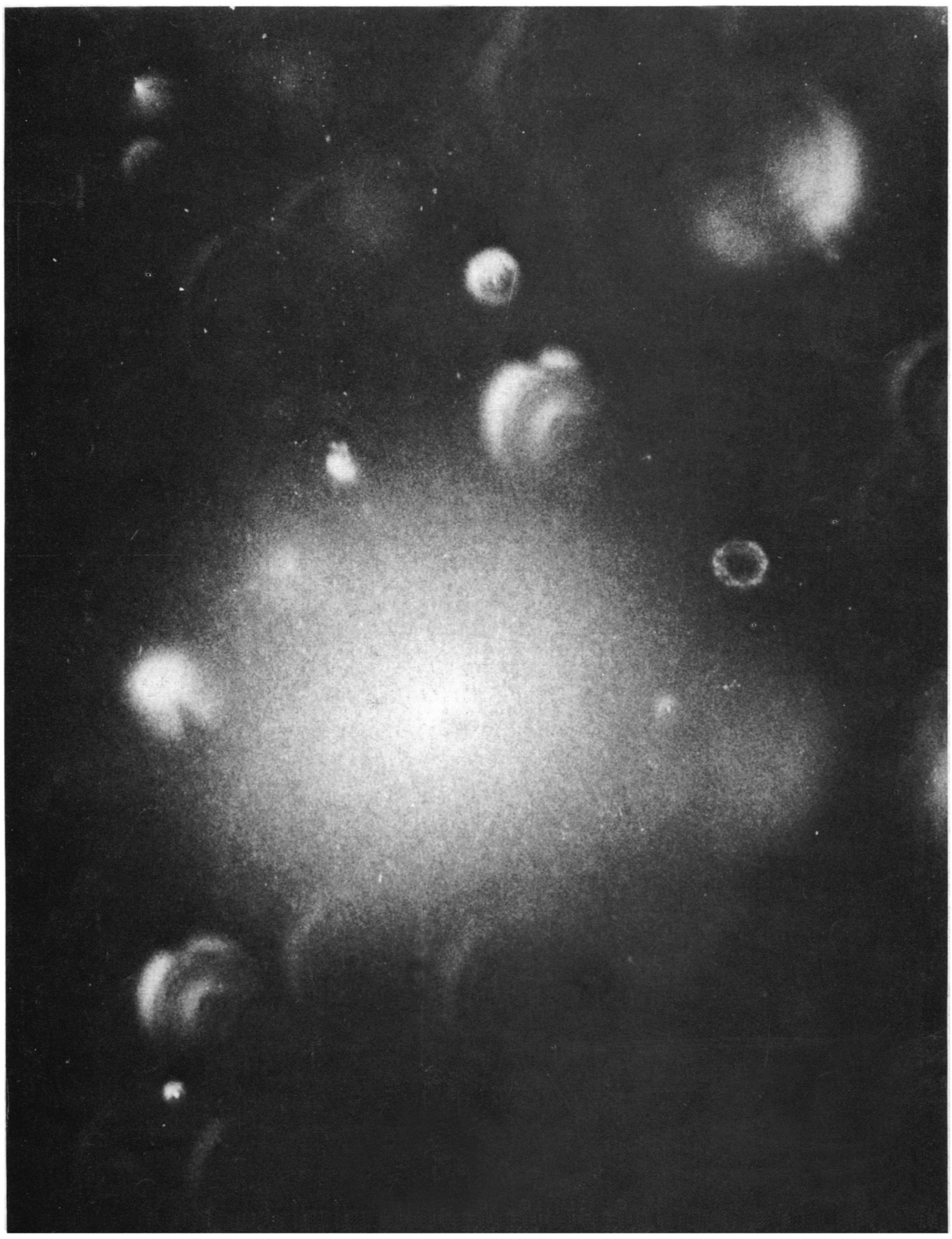
SCIENCE

25 April 1975

Vol. 188, No. 4186

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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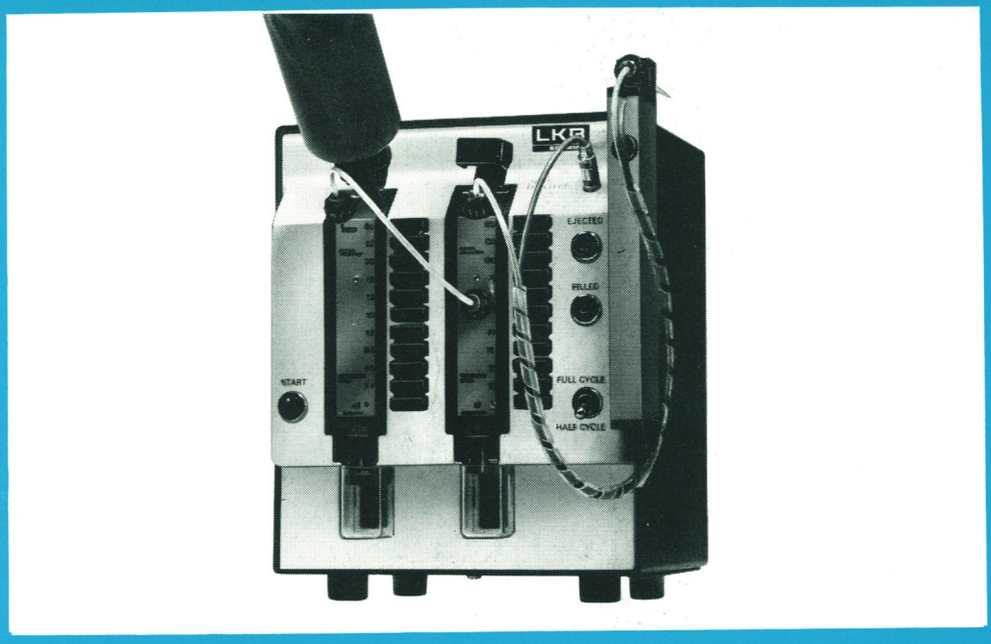

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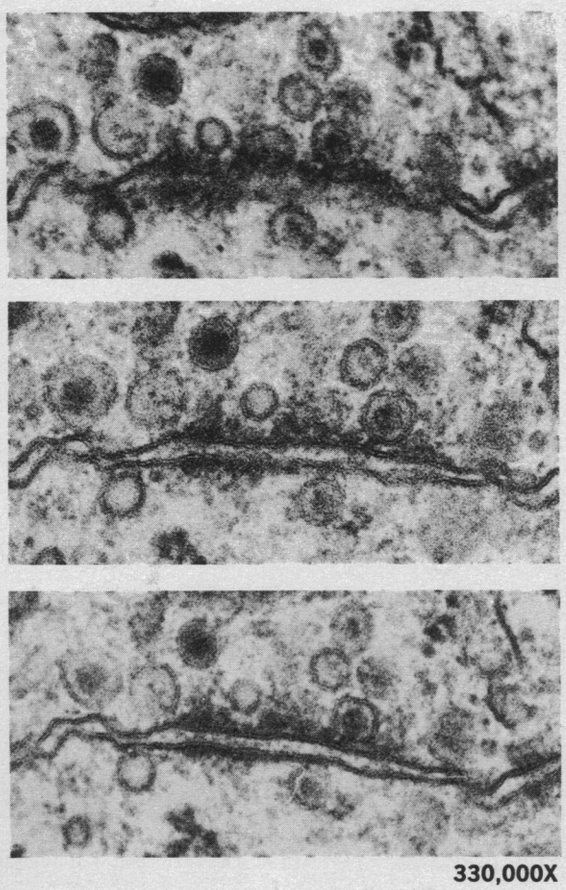

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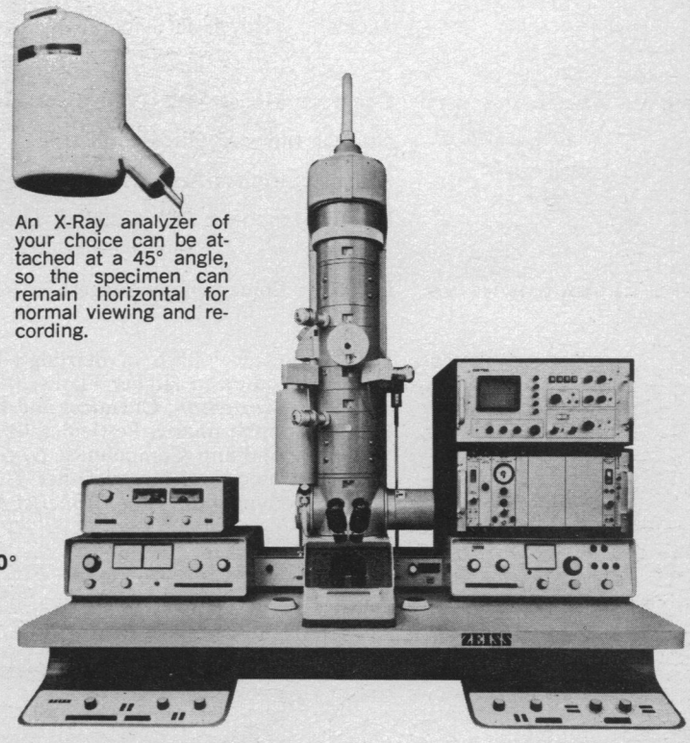

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25 April 1975

Volume 188, No. 4186

SCIENCE

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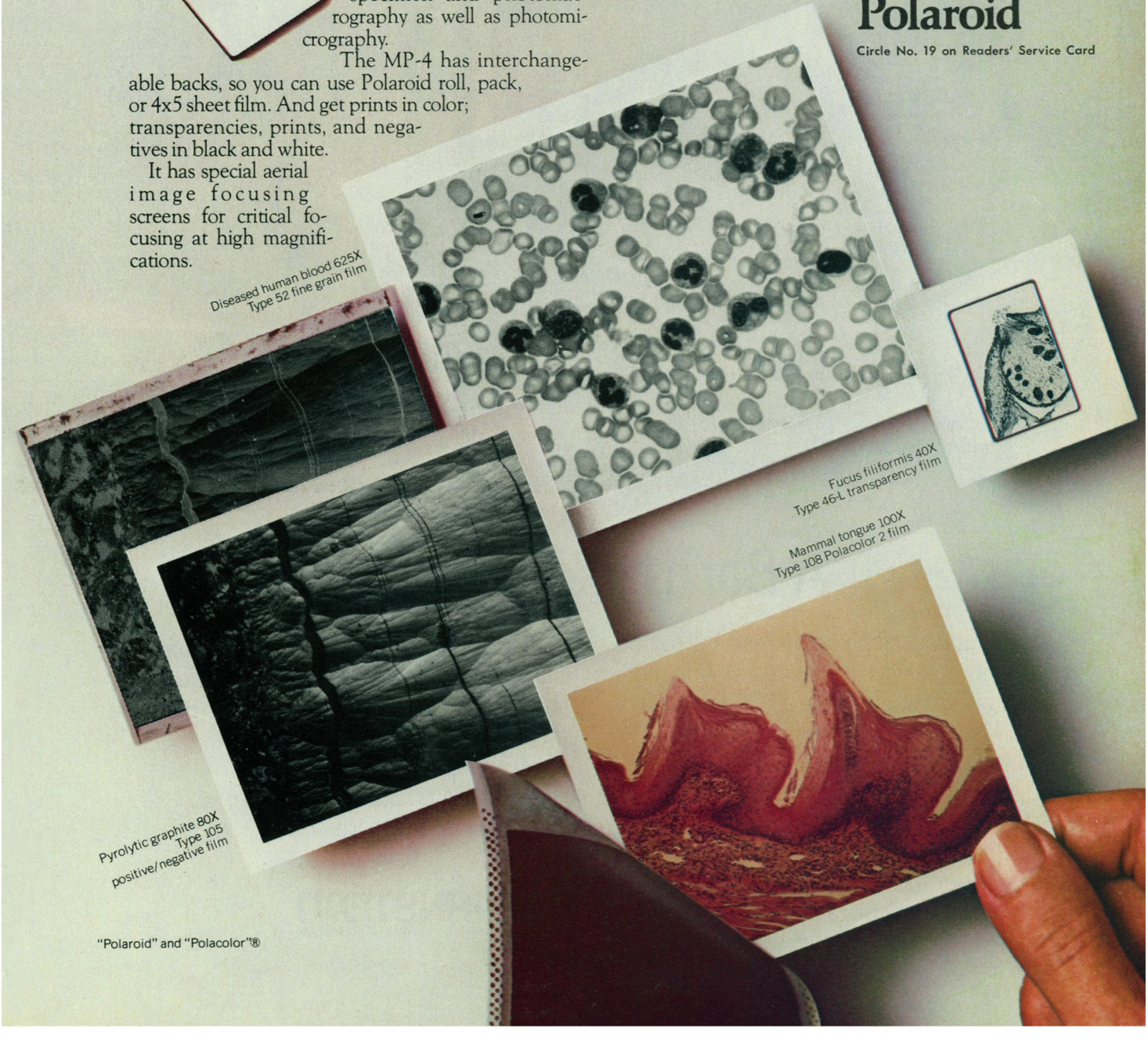

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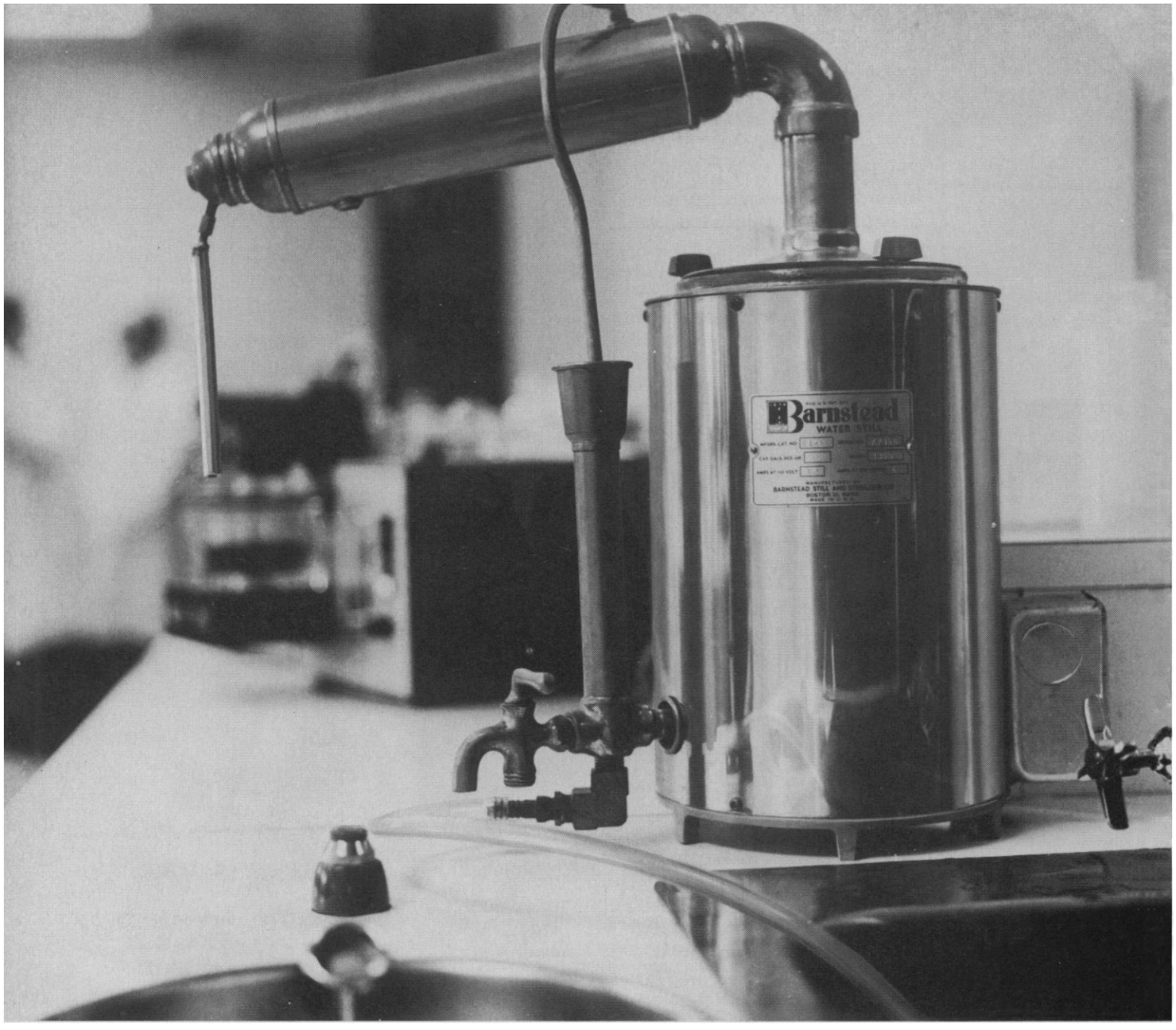

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tions and Hardy's "productivity index," and it would seem superfluous to point out that correlation does not imply causation. Hardy mentions, but does not further deal with the lack of control for differences between the academic aptitude of the student bodies of the various denominational institutions. Also mentioned, but not further incorporated into the analysis, is the fact that the adult religious affiliation of the scholar served as a basis of comparison in the study by Lehman and Witty (*1*), without reference to family of origin affiliation. The fact that the same study reported a listing of religious affiliation of any kind only half as often for scientists as for nonscientists in the 1926 to 1927 edition of *Who's Who in America* would seem to deserve notice in any attempt to forge a causal link between religious belief and choice of a scholarly career. That denominational schools "present to the student a campus culture which reflects the value system of the denomination, and . . . generally attract students who are sympathetic toward that system even when they are not actively affiliated with the denomination" remains an unsubstantiated assertion on Hardy's part.

In his attempt to attribute differences in subpopulational scholar productivity to cultural value variables, Hardy ignores one variable fairly well correlated with academic success, namely IQ. This becomes particularly noteworthy in view of the evidence from Army tests of regional differences within the United States in mean IQ, the correlation between IQ and social class, and the correlation between social class and denominational membership in the United States.

Hardy's failure to adequately treat potentially relevant variables and possible sources of error weakens his interpretation of the data.

BJÖRN MERKER
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1. H. Lehman and P. Witty, *Sci. Mon.* **33**, 544 (1931).

Hardy asks whether scientists and scholars "come disproportionately from selected segments of the citizenry." It is important to note that his analysis considered only religious and regional "segments of the citizenry." He omits at least two factors—time and extent of urbanization—which could account for his finding high correlations between region and religious affiliation and productivity. Hardy's index of productivity does not take into account certain variations over time, such as the proportion of Ph.D.'s produced relative to the size of the general population. Price (*1*) has pointed out that the exponential growth of Ph.D.'s is rapidly overtaking that of the general population, resulting in a saturation period. Hardy's correlations could conceivably stem, not from some actual relationship between religious affiliation or regional location and productivity of Ph.D.'s, but from a spurious relationship of both these factors with the time of founding of the various schools. Thus, the more productive northern states and Protestant schools are older and have therefore produced more Ph.D.'s than the less productive and younger southern and Catholic schools. Similarly, the role of urbanization could account for the apparent correlations between the arts and professions and the older regions of the nation. Professionals and artists find employment, stimulation, and patronage of their work primarily in the urban context. And, like universities, cities do not grow overnight.

In addition, Hardy fails to validate his religious categories empirically. He says that, although all persons attending a denominationally sponsored school do not subscribe "to the faith of the controlling denomination," they will presumably be similarly affected by the "campus culture which reflects the value system of the denomination." Hardy does not operationalize "campus culture" or the "value system[s] of the denomination[s]." Rather he relies solely on the formal religious doctrines of the various religions as presumably valid indicators of their respective "campus cultures." Hardy assumes that "campus cultures" somehow reflect these doctrines, as they probably do, but this reflection needs to be empirically demonstrated.

Hardy suggests that "there is a set of cultural values that promote scientific and scholarly activity and that these are found most clearly in those groups highest in the production of scientists and scholars," but his article does not indicate what these "values" might be. His theoretical conclusions and analyses have little to do with his empirical research. Hardy did

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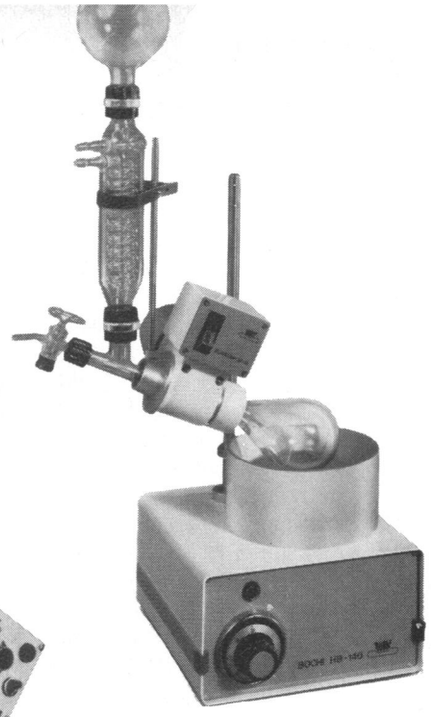

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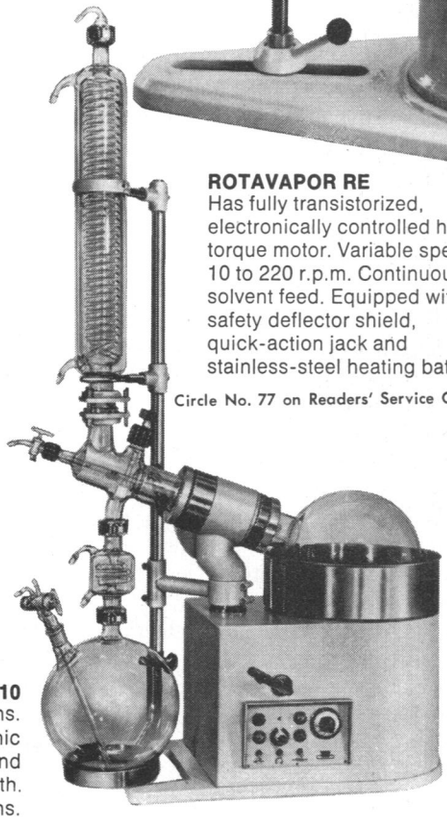

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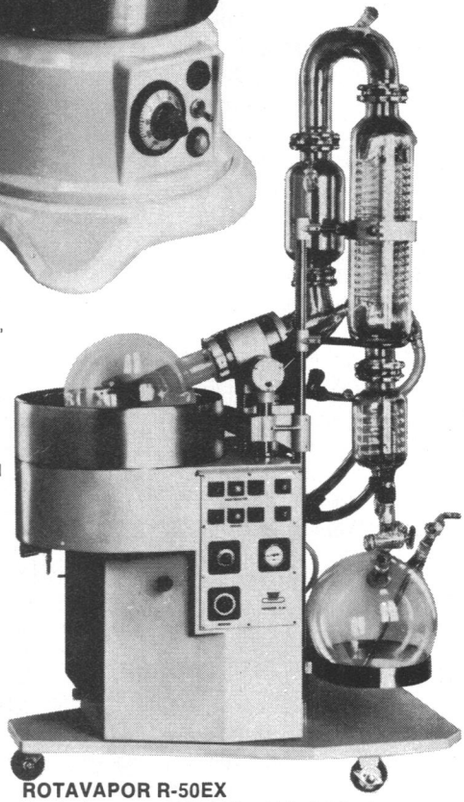

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not do a study on the "values" of scientists and scholars; instead he did a demographic study of regions and religious affiliations of universities and their productivity of Ph.D.'s. Ex post facto he applied his own distillation of scientific and scholarly cultural values to the correlations he found.

Hardy's final suggestion is cause for some concern. He says that "to the extent that scientific-scholarly pursuits are valuable to a society, then that society should provide the conditions which promote such pursuits." This statement completely overlooks the important work of science policy analysts (*2*) that demonstrates a Ph.D. glut. More seriously, given the religious and regional variables which Hardy exclusively uses, it implies that some social support should be given to specific religious or regional groups so that they would presumably produce even more Ph.D.'s. Hardy also implies that science has some value, sui generis. Recent human power projections (*3*) indicate the need for fewer Ph.D.'s, not more, in many fields. Hardy's tacit endorsement of increased Ph.D. productivity does not reflect this need. Science is but one sector of the economy whose role has too often been overestimated.

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2. A. Cartter, *Science* **172**, 132 (1971).
3. *Manpower Report to the President* (Government Printing Office, Washington, D.C., 1973).

Hardy states that "Care must be taken in evaluating the comparisons that follow. Some denominations (for example, Unitarian, Episcopal) are not represented because they do not operate colleges."

Listed below are three Episcopalian colleges, their locations, and the dates of their founding.

1) University of the South, Sewannee, Tennessee, 1857.

2) Kenyon College, Gambier, Ohio, 1824.

3) Hobart College, Geneva, New York, 1822.

FLORENCE N. GREVILLE
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First of all, let me note an error in the printing of the formula for the productivity index (see my article, p. 500). The error lies in the misplacement of the parentheses in the denominator. As published, it reads

$$PI_S = \frac{N_{tt} \text{ from } S \times 10^3}{(M_t + F_t) \times W_{tt}}$$

The formula should have read

$$PI_S \frac{N_{tt} \text{ from } S \times 10^3}{M_t + (F_t \times W_{tt})}$$

Hirsch is correct in that my analysis covers only the period from about 1920 to 1960. A number of correspondents have criticized my article because it does not "account for more recent trends."

The article does not purport to cover the last 15 years; and in my last paragraph, I specifically call attention to the fact that contemporary social changes may have affected productivity rates. It would be most regrettable for my research to be perceived as discouraging or ignoring concerted efforts in recent years to stimulate the contribution of Catholic institutions to the fields investigated here. My data, rather, may serve as a baseline from which changes in productivity can be measured. As doctorate output data become available, research should be done which might link temporal changes to the conditions which may have produced them, for example, value shifts resulting from Vatican II.

Merker and Davis ask whence came the cultural value categories which I used. They derive in part from the previous research of Weber (*1*), Merton (*2*), and Knapp and Goodrich (*3*), all of whom discuss the "Protestant ethic" (see my article, p. 498). Since my research indicates that portions of the Jewish community are high producers and suggests, as well, that there are great differences within the Protestant groups, I tried to redefine and extend the list of cultural factors considered by these investigators to include those which cut across the "high producing" groups and which differentiate them from the "low producing" groups. This identification was facilitated by Strodtbeck's analysis (*4*) of value differences between Jewish and Southern Italian immigrants, by geographical variations (South and non-South) even within the same religious denomination (Presbyterian, Methodist, Baptist), as well as the more formal statements of the

religious ethos of the sects involved. Also, interview data (*5*) and questionnaire responses (*6*) from scientists themselves provided some of the basis for the value set. I make no brief that I have "proved" a causal connection between the particular set of values mentioned and the production of scholars; I have only inferred one. The set simply represents my best effort, for the moment, to identify the factors common to the high producers as contrasted with those of the low producing groups.

Merker raises the question of IQ differences between regions, social classes, and denominations. The nature and stability of whatever it is that IQ tests measure is a well-known and controversial question. However, it should be noted that my productivity index is a (modified) ratio of doctorate scholars to baccalaureate degree recipients. In other words, college graduates are the base from which the index is derived. This means that we are dealing with a restricted range of "intelligence," thus mitigating the influence of this variable in producing the effects studied in my article.

Davis suggests two factors—time and extent of urbanization—which need to be considered. The time variable (time since the founding of the various schools) she feels is important because, in her opinion, the southern and Catholic schools may be younger and haven't had a chance to produce as many Ph.D.'s. My study of colleges was based *only* on baccalaureate institutions which had been sources for 100 or more doctorates granted during the period 1920 to 1961. Within this group of colleges, differences in productivity were based on the relative proportion of baccalaureate recipients who later earned the doctorate, and not upon the absolute number of baccalaureate degrees granted. If we consider these facts, and the time period covered by my study, the time of founding is probably irrelevant.

I agree with Davis that urbanization or something associated with it (a cultured gentility) may be associated with scholarly choice within the arts and professions, but this may be the only one of the five broad fields studied for which that association exists. Knapp and Goodrich (*3*), for example, stressed the *rural* lower middle class as a major source for scientists from the highly productive colleges in their study. Thorndike's high producing states were certainly not highly urbanized (*7*). Neither do my data give support to urbanization per se as an important factor.

Although I alluded to social class (or socioeconomic) differences several times in the article, I did not give this factor sufficient weight, in the view of a number of readers. Social class has been a most impressive empirical variable in sociology, as it correlates with many things. I feel it is inadequate to account for certain data. For example, it is very difficult to explain the scientific-scholarly productivity (and other accomplishments) of American Jews by reference to social class, since the immigrant generation came here impoverished (by and large), yet within two generations their families had exceeded the average socioeconomic status of Americans generally (*4*).

I believe that certain value orientations must be invoked to account for the explanation of this phenomenon. It was not, I feel, "middle-class" values which produced their achievements, but a set of values which propelled them to the education, hard work, and persistent striving which resulted in their becoming, largely, members of the middle class or lower upper class. In other words, they did not prosper because they were middle class. They became middle class because they studied, worked hard, and prospered, and this occurred because of their achievement ethic and the other aspects of their value system. I believe that a similar analysis is applicable to Unitarians, Quakers, Mormons, and perhaps others. In short, I think that it is preferable to look beyond social class to the particular values, opportunities, life orientation, and so forth, which this construct may represent.

Regarding Greville's question concerning Episcopal colleges, in defining denominational control, I relied on information (supplied by the institutions themselves) in the 1957–58 edition of the *Education Directory* published by the U.S. Office of Education. There were no institutions in my study which were listed as controlled by the Episcopal church. An authoritative Episcopal source (*8*) reveals that there is, in fact, one college, the University of the South (not included in my study) which is controlled by that faith. Financial support is given to a number of colleges, but the Episcopal church is chary of sectarian control. In this regard, I believe it is generally safe to assume that those faiths which have retained active control of colleges have sufficient involvement so as to ensure that the cam-

pus culture does reflect the value orientation of that faith, a question raised by both Merker and Davis.

Davis and others express some concerns centering around the overproduction of scientists, the granting of special support to certain religious and regional groups, and overvaluation of science. I do not believe that we should necessarily have more scientists. Neither do I believe that scientists are better than other people. Nor do I believe that producing scientists-scholars is the only index or necessarily the best index of the value of a school or a religious group. My study dealt only with the origins of these particular persons and is not meant to imply that others are inferior or unworthy. I personally value science and believe that a good and viable society must have a solid scientific-scholarly community (as well as many other things). But it is up to the community-at-large to decide what role science is to have within it.

I did suggest an "if . . . then" proposition: If society does value science, then it must provide the conditions which will nurture and sustain science. My research was not fundamentally concerned with colleges, religious groups, or geographical regions as such. I studied all of these in an effort to identify some of the conditions which lead to the career choice of science or scholarship; and I was led to the conclusion that a set of cultural values may well undergird the selection of such a vocational pathway. In this regard, I am somewhat sympathetic to Hirsch's comment that the democratization and secularization of American science may mean that scientists today are less committed to the ethos of science and are drawn to its ranks more for prestige and money. To the extent that this is the case, it may be that the quality of scientific work suffers while the quantity increases. Many would maintain that the knowledge explosion is not all knowledge, but that much of it, produced under "publish or perish" and other incentives, will have little lasting value. Perhaps the changing values and motives to which Hirsch alludes, as secularization progresses, are indeed changing the appeal and character of science-scholarship as a life pathway from that of a zealous cognitive quest toward satisfaction of the needs Hirsch suggests.

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History of "Ecology"

The history of ecology is certainly largely unstudied, but please correct the hoary myth perpetuated by M. W. Rossiter (Book Reviews, 20 Sept. 1974, p. 1040) that E. H. P. A. Haeckel founded ecology. He was one of the early publishers of the word (7 years earlier than Rossiter claims), but he made little use of it and should not even be credited as having coined the term.

Hans Reiter published a book with "Oekologie" in the title (*Die Consolidation der Physiognomik als Versuch einer Oekologie der Gewaechse*) as early as 1885, and Conway MacMillan published the term in North America in 1897 in his studies of the vegetation of Minnesota. The earliest use of the term "ecology" so far discovered was in the United States in 1858 by none other than Henry David Thoreau (*1*). Reiter, MacMillan, Thoreau, and Haeckel all used the word almost in passing, which suggests it was in wide use.

A much stronger case can be made for proposing J. E. B. Warming as the founder of ecology, since he published a whole text (*Plantesamfund. Grundtrak af den Økologiske Plantegeografi*) on the subject in 1895. It is curious that neither the Ecological Society of America nor the British Ecological Society are enthusiastic in according recognition to Warming, who died 50 years ago last year.

R. GOODLAND
Cary Arboretum, New York
Botanical Garden, Millbrook 12545

Notes

1. H. D. Thoreau, letter, New Year's Day 1858. "Mr. Hoar is still in Concord, attending to Botany, Ecology, &c. with a view to making his future residence in foreign parts more truly profitable to him."

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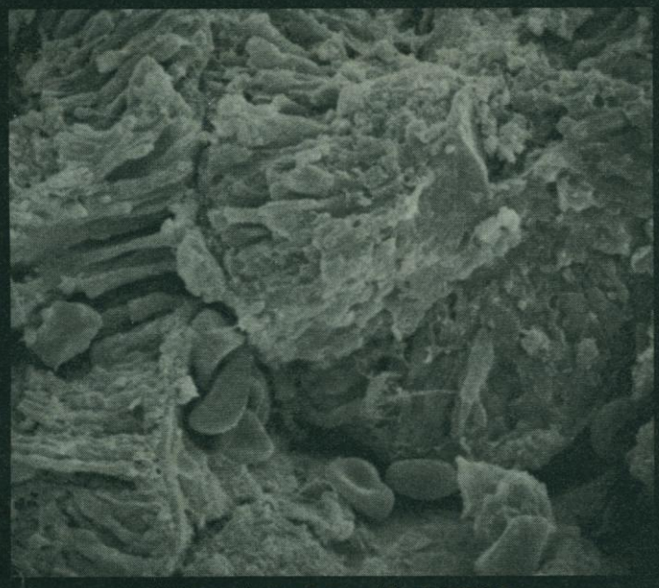

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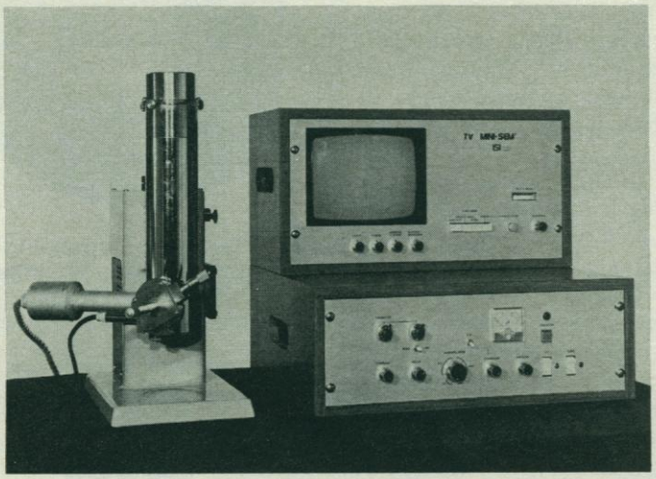

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25 April 1975, Volume 188, Number 4186 **SCIENCE**

Academy Forum: Science and Its Critics

On 18 and 19 February, the National Academy of Sciences convened an Academy Forum on Experiments and Research with Humans: Values in Conflict. Few conclusions were reached at the forum, which was not surprising. What was surprising was the adversarial tone of the forum and the level of the discussion. More may be learned from these than was learned at the conference itself.

The social benefits of science in general, and medical science in particular, are well known. But it is also a matter of record that scientifically useful but morally unacceptable experimentation has occurred. Both statements should be beyond debate, but sadly the dialogue at the forum consisted largely of their reiteration. Distinguished scientists emphasized the value of medical progress as if concern with possible abuses was an overreaction by a few malcontents. Critics of science, on the other hand, often seemed nostalgic for a past that never existed, ignorant of the harsh conditions of suffering and disease in prescientific society, and insensitive to the fact that progress typically involves risk and pain. Wanting were a sense of shared humility and a willingness to confront the facts honestly. Solutions to problems concerning the essential elements of the human conditions are never perfect but always involve compromise, resulting in frustration and heartbreak for some.

Scientists are naturally defensive before critics who seem indifferent to the grandeur of the scientific achievement. But critics of science can be expected to be hostile toward those who seem to believe that science is a self-vindicating enterprise, not accountable to the public. Science survives at the pleasure of the public, which supports it, and if it is coming under even closer public scrutiny, this is as much a result of its success as of its failings. It is the tremendous new potential of biological technology—the fact that medicine has moved from its old role of providing care and comfort and has become the savior, extender, and modifier of human life and the human condition—that has captured the public's attention and aroused its fears.

To question what science should do and how science should do it is not to be against science. Such questioning is at the heart of scientific methodology. When it is simplistic and rhetorical, however, it serves neither science nor the public.

There is no turning back from science and technology. Man is driven by his nature to modify the conditions of his existence. He will not return by choice to early death and unnecessary suffering. But if science is to flourish, it must enjoy public understanding. It must make its case to those who are unconvinced, either because they are not aware of the issues or because they are not yet satisfied with the arguments they have heard. The attitude of paternalism which is characteristic of the doctor-patient relationship may be acceptable or even inevitable in a clinical setting, but it is wholly inappropriate in institutional settings and statements about scientific research.

Scientists and their critics must not merely state their positions, they must come to understand each other's point of view. At the Academy Forum, it might have been better to hear from lawyers and legislators concerned about the possible ill effects of overregulating science, while members of the scientific community discussed the abuses that might result from unregulated scientific activity.—WILLARD GAYLIN, *President of the Institute of Society, Ethics and the Life Sciences, Hastings-on-Hudson, New York 10706*, and SAMUEL GOROVITZ, *Department of Philosophy, University of Maryland, College Park 20742*

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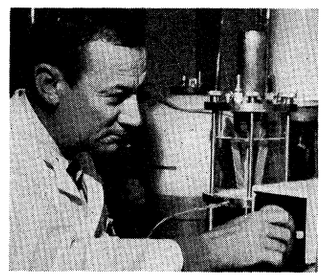
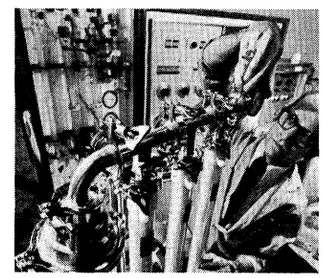
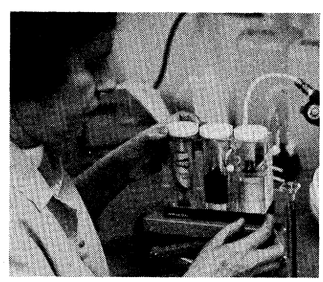


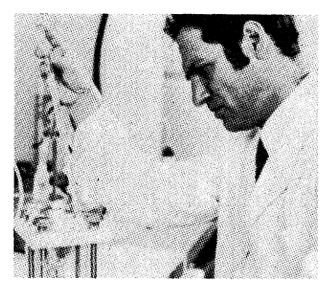
Research chemist adjusts speed control on Amicon high-flow stirred cell in preparation for reconcentration of an antiserum purified by column chromatography.



Pharmacologist checks inlet pressure on Amicon high-yield hollow fiber dialyzer/concentrator during vaccine production run.



Senior technician controls stirring of Amicon micro-ultrafiltration system during protein binding study.



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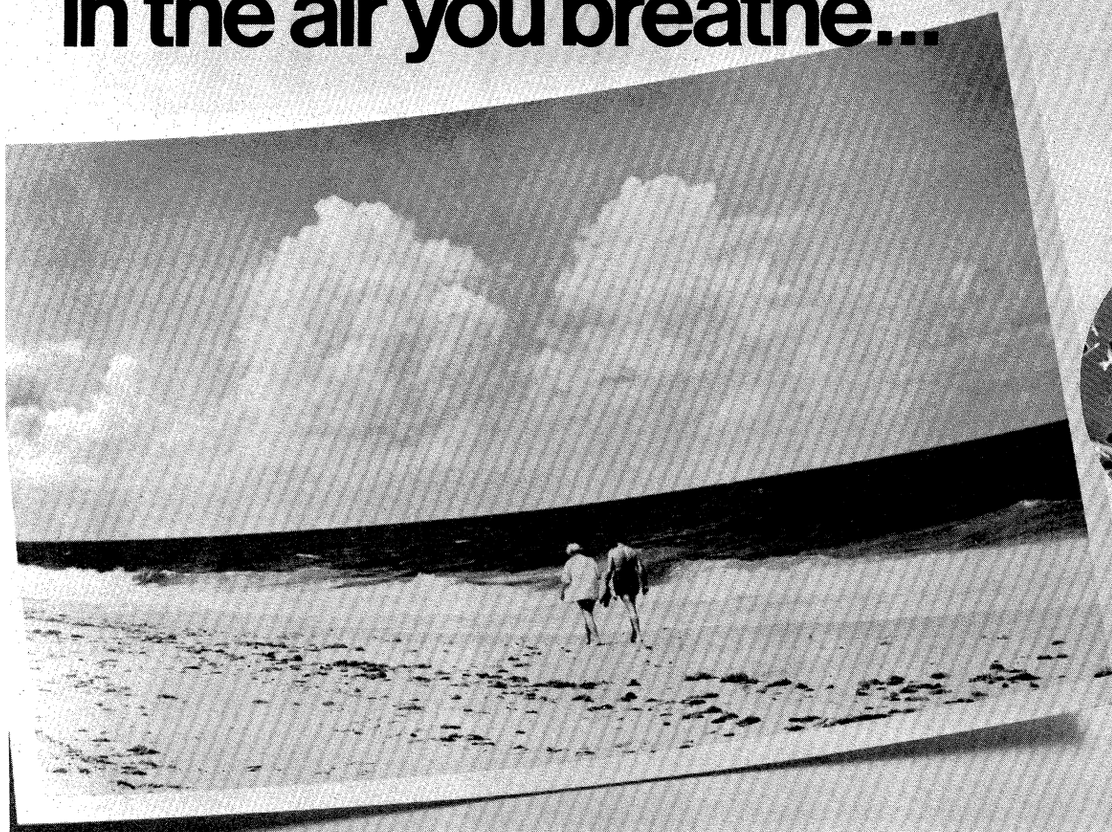

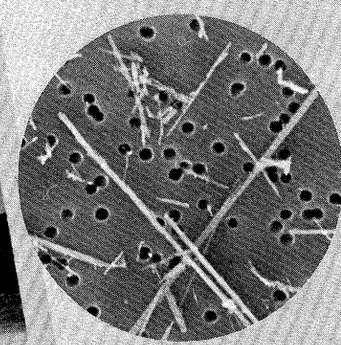

A new filtration method uses two Nuclepore membranes in series to separate asbestos fibers from other pollutants. The results showed fiber levels much higher than people thought. (PHOTO: K. R. Spurny & E. R. Ackerman, National Center for Atmospheric Research.)

and in the work you do.

Thanks to the unique properties of Nuclepore membranes, we're learning a lot more about what's in our air. That's important if we're going to clean it up. In the research cited above, only Nuclepore membranes had the necessary characteristics — uniform, precisely-sized, straight-through pores; and a smooth, flat surface that's ideal for microscopy.

These unusual properties, plus many others, are already making big differences in a wide variety of fields. Perhaps the following applications will spark an idea about how you can use the unique traits of Nuclepore membranes to your advantage.

For example, in analyzing very fine seawater particulate, many of our customers find that the physical uniformity of Nuclepore membranes eliminates the need for matched weight or control filters.

In a totally different field — virology — another exclusive Nuclepore membrane trait, very low adsorption, has increased virus yields in the filtrate by 95 percent.

Nuclepore membranes also yield more consistent, more reproducible results in chemotactic investigations because of their unique pore structure and uniformity, and zero leaching of offensive surfactants. (Hopefully, this will speed the arrival of mass screening for diseases, even earlier cancer detection.)

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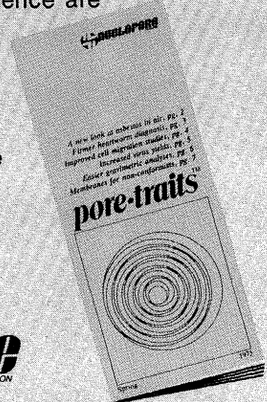
In addition, Nuclepore membranes are easily "customized" for special uses. This is already paying off for several manufacturers. In one case, a Nuclepore membrane, with a custom pore size and density, is regulating bi-directional gas flow between two chambers in response to changes in differential pressure.

These examples, and others, of how Nuclepore membranes are making a big difference are amplified in our case history booklet — PoreTraits™. It's yours for the asking. We also welcome your specific inquiries. Just call or write.



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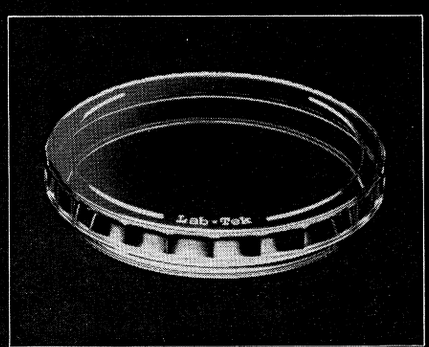

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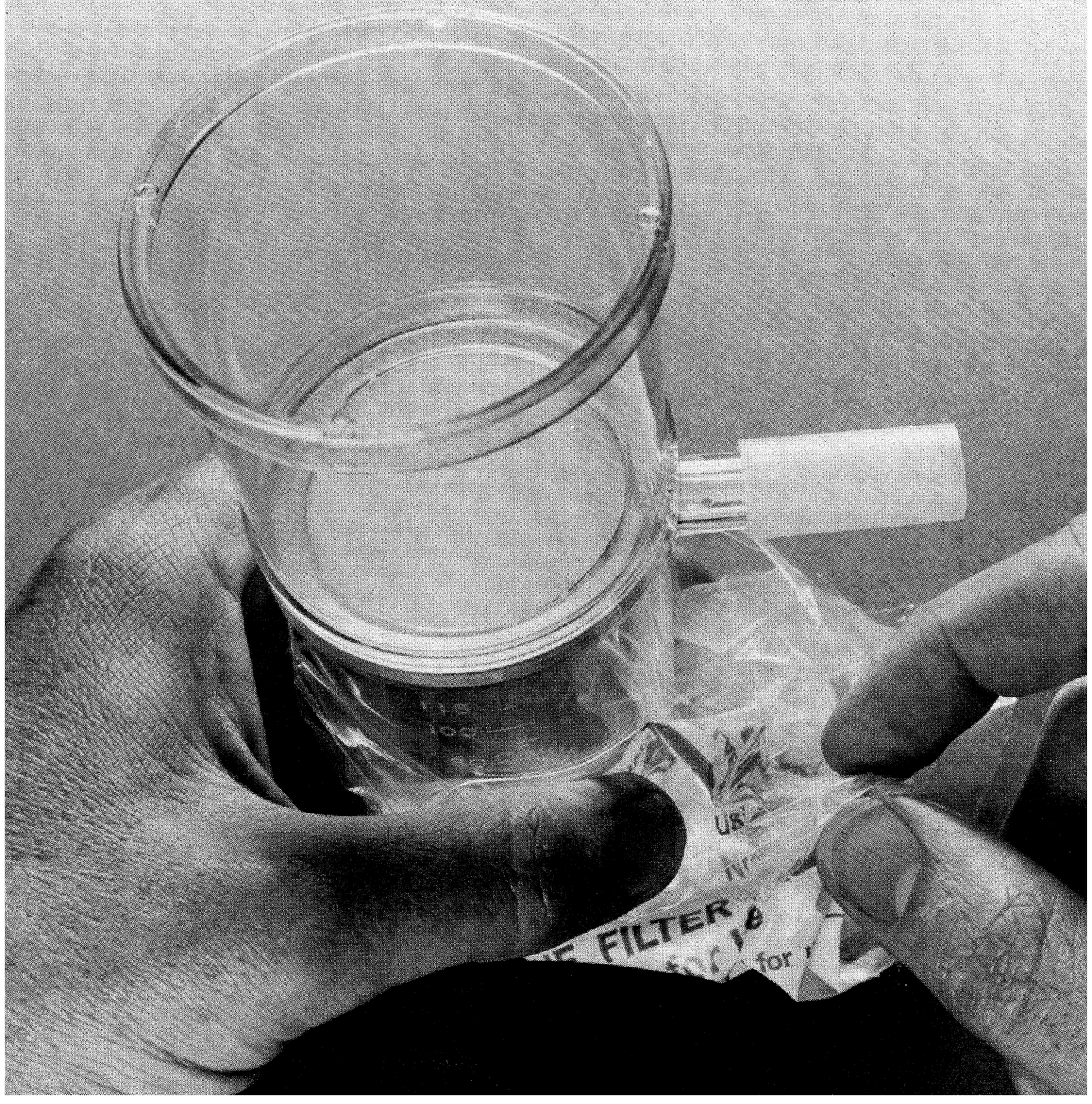

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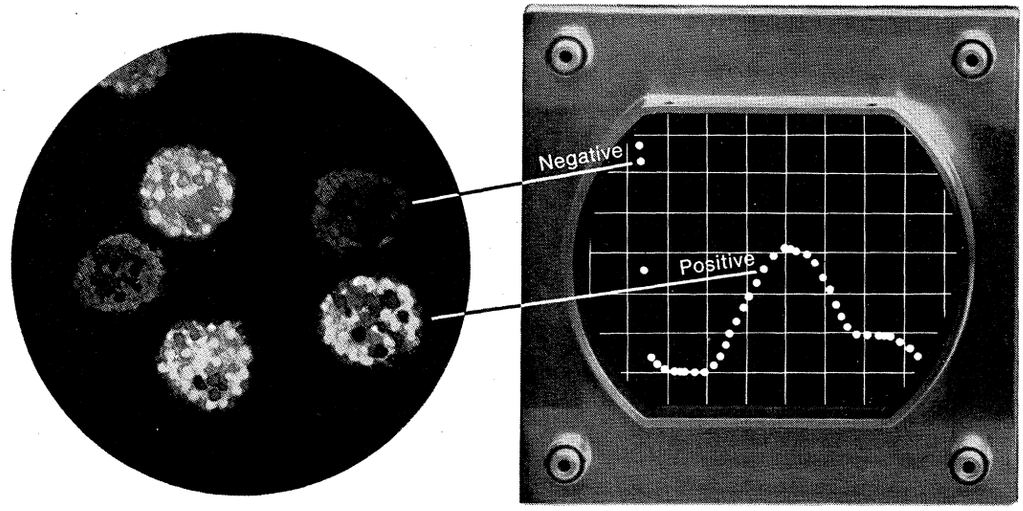
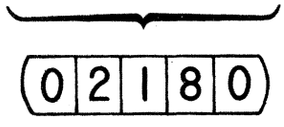


Figure above depicts a fluorescent antibody test sample as seen through a microscope (left) and as presented by the Cytofluorograf (histogram at right). Typically, the instrument measures the fluorescence of 10,000 cells in seconds; and the number of positive (fluorescing) cells is then obtained by pushing a button.



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Electron Microscopy In Pathology

by George Bridges and J. H. Martin, Baylor University Medical Center, Dallas, Texas

Introduction

Electron microscopy has become a useful diagnostic tool of the pathologist. Although its use on every specimen is impractical and, in fact, wasteful at our present level of knowledge and technical capability, the electron microscopic examination of selected surgical specimens and autopsy specimens is every bit as practical and useful as many of the "special" stains routinely employed in many pathology laboratories.

The principal developments allowing for the increased current application of electron microscopy in diagnostic pathology as we see them are: (1) the collection of specimens in a dual purpose aldehyde fixative allowing for both light and later electron microscopy on the same biopsy specimen, (2) rapid, simplified and reliable dehydration, embedding, staining and photographic techniques making the results of electron microscopy available within twenty four hours of receiving the specimen, (3) wide-spread usage of the "adjacent" or "thick" 0.5 micron epoxy embedded and cover slipped sections for light microscopy as a selective device and bridge between conventional paraffin embedding techniques and electron microscopy and (4) the relatively recent development of excellent, reliable ultramicrotomes and high-quality, simplified electron microscopes opening the door to technologists as operators rather than highly skilled artisans.

The purpose of this paper is to outline briefly some of these viewpoints on methodology, instrumentation, and current applications of electron microscopy in diagnostic pathology.

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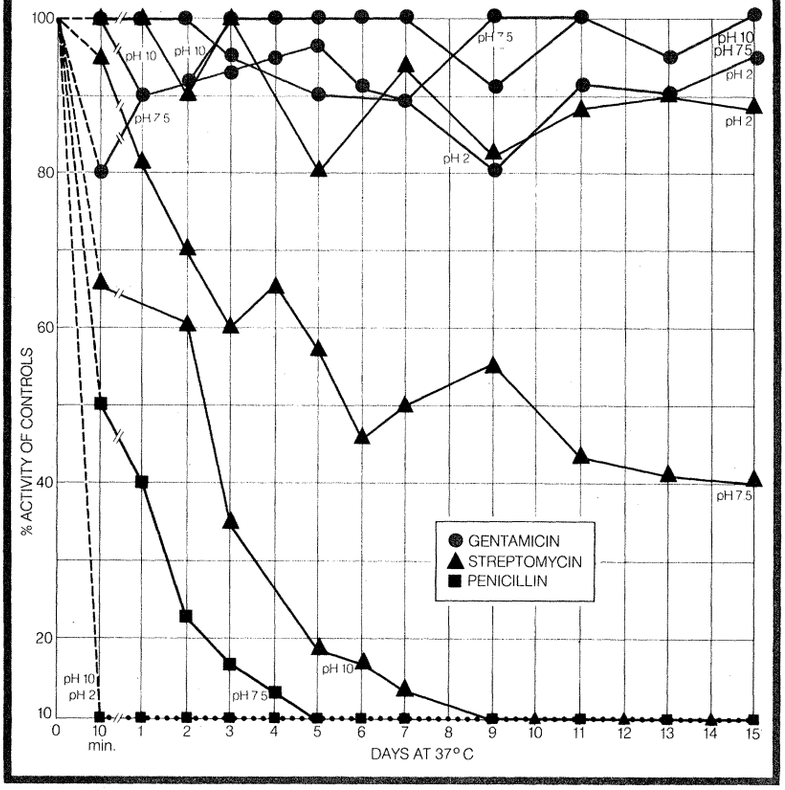
Gentamicin is completely stable at pH 2-10 at 37° C for at least 15 days[3] (see chart); stable to autoclaving and not affected by serum. Opposite this, pen-strep activity is significantly reduced under one or more such conditions. Combined advantages of stability, no effects on replication of viruses, and no influence on detection or synthesis of interferon make Gentamicin uniquely useful for long-term tissue culture experiments, virus studies, and shipment of clinical specimens and tissue cultures.

References: 1. Rudin, A., *et al.:* Appl. Microbiol. *20*:989-990, 1970. **2.** Casemore, D. P.: J. Clin. Pathol. *20*:298-299, 1967. **3.** Schafer, T. W., *et al.:* Appl. Microbiol. *23*:565-570, 1972.

Gentamicin stability superior to penicillin-streptomycin at all pH levels[3]



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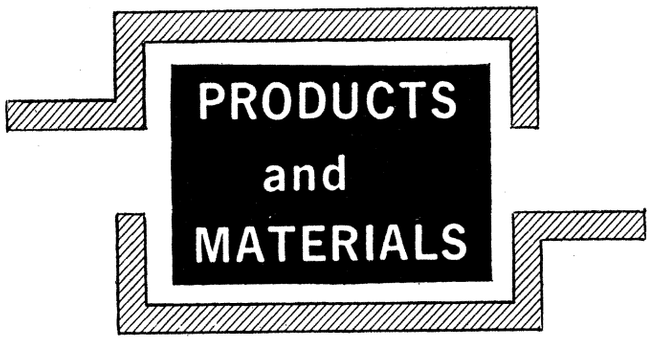

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A new CPK method provides a wide usable range, up to four to six times normal value, and an improved calibration procedure. This colorimetric method uses a stable solution of INT dye instead of control serums. The test is read at 500 nanometers on any spectrophotometer. The kits are packaged in 5.5-milliliter vials in sets of ten. Each vial is adequate to perform ten tests. P-L Biochemicals, Incorporated. Circle 704.

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The CRU-5000 accepts all standard accessories from previous models plus special items such as a 4-liter blood bank rotor, high speed adaptors, basket rotors, and linear tube tray rotors. Automatic acceleration at a controlled current is maintained regardless of line fluctuations. A brush-wear indicator warns when only 20 to 50 hours of operation remain on motor brushes. Controls are grouped on a modular panel. A safety interlock prevents opening until the rotor stops or operation when the cover is not secure. Capacity is up to 168 13- by 100-millimeter serum tubes. Damon/IEC Division. Circle 711.

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Cortisol (hydrocortisone, compound F) may be analyzed in serum and plasma in a rapid sensitive procedure. The method involves liquid scintillation counting rather than competitive protein binding assays and requires no solvent extraction or chromatography to isolate circulating cortisol prior to assay. Cross reactivity with other naturally occurring steroids is very low. The operator rapidly determines a standard curve (a linear logit-log plot) and a single dilution of the patient sample is sufficient to determine the patient's cortisol concentration in relation to the standard. Diagnostic Products Corporation. Circle 709.

Radioimmunoassay Gamma Counter

A 1260-sample capacity in a unit that occupies less than 12 square feet of floor space is one feature of this new counter. The samples are contained in up to seven trays, each capable of holding up to 180 tubes. Tube diameters from 10 to 16 millimeters and tube lengths from 50 to 100 millimeters are accommodated. The counter is cassette based and the casettes are compatible with autopipettes and centrifuges. Elscint, Incorporated. Circle 713.

Radioassay Controls

The DATA-tope system provides three materials based on human serum for quality control in assay of digoxin, insulin, and T-4. Digoxin values represent subtherapeutic, therapeutic, and toxic concentrations; insulin values are three concentrations within the range of clinical interest; T-4 values are equivalent to hypothyroid, euthyroid, and hyperthyroid conditions. The products are stable up to 7 days after reconstitution if properly stored and the consistency allows a maximum variation of ± 1 percent by weight from vial to vial. Assigned values are stated as means of

Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Readers' Service Card (see pages 314A and 378C) and placing it in the mailbox. Postage is free.—RICHARD G SOMMER

replicate analysis by several analysts for each method. Dade Division, American Hospital Supply Corporation. Circle 705.

Dilutor-Dispenser

Micro Pipetter MC 100 features linear selection with thumb wheel or pushbuttons, automatic timed delivery intervals, numeric volume display, variable flow rate, and reproducibility. This fluid handling system is designed for clinical procedures and especially for use in radioimmunoassay. Systems are available from 1 microliter to 10 milliliters and with from 1 to 20 channels. Alphamedics Manufacturing Corporation. Circle 706.

Special Purpose Test Tubes

Three additional types of disposable test tubes are now available. One measures 75 by 12 millimeters and is ideally suited for radioassay tests. The second is conical and measures 110 by 17 millimeters; it is suited for centrifugation. The third is 100 by 13 millimeters. All three are available in polypropylene or polystyrene versions and come with color coded closures. Walter Sarstedt, Incorporated. Circle 707.

Blood Slide Spinner

The LARC spinner simplifies differential counting of white blood cells. Monolayers of blood are produced on the slides. An optical system detects cell separation and automatically stops the spin. The device will work with drops as small as 0.2 milliliter. The design discourages aerosol formation and traps airborne particles. Corning Glass Works. Circle 708.

Literature

Software for Laboratory and Scientific Applications is a 40-page compilation of programming packages for many forms of scientific data processing. Digital Equipment Corporation. Circle 714.

Transducer Products Catalog features photographs, descriptions, and specifications of a line of pressure transducers, signal conditioners and controllers, and analog and digital meters. Tyco Instrument Division, Tyco Laboratories, Incorporated. Circle 715.

Flowmeters describes models available, principles of operation, and applications. Aalborg Instruments & Controls Incorporated. Circle 716.

Med-Log, a newsletter, has articles and product descriptions and information in a brochure format. London Company. Circle 717.

Continuous Dynode Electron Multiplier contains a general description, applications, performance graphs and schematic diagrams of these devices. Galileo Electro Optics Corporation. Circle 718.

Synthetic LRH and TRH Uses is a 16-page bibliography that cites more than 460 references to research with these synthetic peptides. Beckman Instruments, Incorporated. Circle 719.

Low Light Level Television Adaption to Electron Microscopes tells how these special cameras may be used to extend the capability and versatility of electron microscopes. Westinghouse Electric Corporation. Circle 720.

Solvents are available for residue analysis, precision measurements, and all types of chromatography and spectroscopy. They are described in bulletin BJ-25. Burdick & Jackson Laboratories Incorporated. Circle 721.

Calculators is devoted to programmable desk models plus the interfaces and peripherals available for them. Tektronix, Incorporated. Circle 722.

Instruments Worldwide describes a line of mass spectrometers, biomedical instruments, chromatographs, and other devices for research applications. DuPont Instrument Division. Circle 723.

Liquid Vortex Flowmeter is the subject of a 12-page brochure. Design features and principles of operation are detailed and illustrated. Fischer & Porter Company. Circle 724.

Fossil Fuels—Analysis by Liquid Chromatography is treated in a 12-page bulletin that is illustrated with several diagrams and graphs. Waters Associates, Incorporated. Circle 725.

Miniature Tilt Sensors that resolve angle changes as small as 0.1 second of arc are described in a technical bulletin. Schaevitz Engineering. Circle 726.

Assembled Instruments Catalog introduces new oscilloscopes, multimeters, and probe meters among other instruments. Heath/Schlumberger Instruments. Circle 727.

Selectagram is a bimonthly newsletter devoted to the sciences of separation. Schleicher & Schuell, Incorporated. Circle 728.

Advanced Materials Catalog describes more than 1000 materials for research and thin film production. Materials Research Corporation. Circle 729.

BOOKS RECEIVED

(Continued from page 356)

$53.30. Handbook of Sensory Physiology, vol. 3/2.

Naked Nomads. Unmarried Men in America. George Gilder. Quadrangle (New York Times), New York, 1974. xii, 180 pp. $7.95.

Paper Houses. Roger Sheppard, Richard Threadgill, and John Holmes. Schocken, New York, 1974. x, 134 pp., illus. Cloth, $10; paper, $6.95.

Parasitic Zoonoses. Clinical and Experimental Studies. Proceedings of a conference, Vienna, Sept. 1973. E. J. L. Soulsby, Ed. Academic Press, New York, 1974. xx, 402 pp., illus. $19.50.

The Peripheral Nervous System. John I. Hubbard, Ed. Plenum, New York, 1974. xviii, 530 pp., illus. $32.50.

Perspectives in Primate Biology. A NATO Advanced Study Institute, Turin, Italy, June 1972. A. B. Chiarelli, Ed. Plenum, New York, 1974. x, 324 pp., illus. $19.50. Advances in Behavioral Biology, vol. 9.

Perspectives on Social Power. Papers from two symposia, Albany, N.Y., Oct. 1971 and Oct. 1972. James T. Tedeschi, Ed. Aldine, Chicago, 1974. xiv, 430 pp. $14.75. Aldine Treatises in Social Psychology.

Pharmacology and Pharmacokinetics. Proceedings of a conference, Bethesda, Md., Oct. 1972. Torsten Teorell, Robert L. Dedrick, and Peter G. Condliffe, Eds. Plenum, New York, 1974. xii, 388 pp., illus. $24.50. Fogarty International Center Proceedings No. 20.

Photometry and Radiometry for Engineers. Allen Stimson. Wiley-Interscience, New York, 1974. xvi, 446 pp. illus. $19.95.

Photosynthesis Bibliography. Vol. 1, 1966/1970. References No. 5621–9087/ NAA-ZWE. Z. Sesták and J. Catsky, Eds. Junk, The Hague, 1974. iv, pp. 305–600. Paper, Dfl. 80.

Physical Chemistry. An Advanced Treatise. Vol. 6A, Kinetics of Gas Reactions. Wilhelm Jost, Ed. Academic Press, New York, 1974. xx, 508 pp., illus. $43.

Physical Volcanology. L. Civetta, P. Gasparini, Luongo, and A. Rapolla, Eds. Elsevier, New York, 1974. xvi, 334 pp., illus. $34.75. Developments in Solid Earth Geophysics, 6.

Plant Disease. Russell B. Stevens. Ronald Press, New York, 1974. viii, 460 pp., illus. $11.95.

Poly(ADP-Ribose). Proceedings of a symposium, Bethesda, Md., June 1973. Maureen Harris, Ed. National Institutes of Health, Bethesda, Md., 1974 (available from the Superintendent of Documents, Washington, D.C.). x, 338 pp., illus. $5.65. Fogarty International Center Proceedings No. 26. DHEW Publication No. (NIH) 74-477.

Population and the New Biology. Proceedings of a symposium, London, 1973. Bernard Benjamin, Peter R. Cox, and John Peel, Eds. Academic Press, New York, 1974. x, 188 pp., illus. $10.

A Primer of Linear Algebra. Gerald L. Bradley. Prentice-Hall, Englewood Cliffs, N.J., 1975. xviii, 382 pp., illus. $11.95.

The Productive Society. 1973 Benjamin F. Fairless Memorial Lectures. Patrick E. Haggerty. Carnegie Press, Pittsburgh, 1974 (distributor, Columbia University Press, New York). 174 pp., illus. $8.95.

Reflections on Science and Human Affairs. Hudson Hoagland. Schenkman, Cambridge, Mass., 1973. iv, 92 pp. $4.50.

Relationship Counseling and Psychotherapy. C. H. Patterson. Harper and Row, New York, 1974. xiv, 208 pp. $8.95.

Research on Methods and Programs of Drug Education. Proceedings of a symposium, Toronto, Oct. 1973. Michael Goodstadt, Ed. Alcoholism and Drug Addiction Research Foundation, Toronto, 1974. viii, 192 pp. Paper, C$6.25.

Reviews of Neuroscience. Vol. 1. Seymour Ehrenpreis and Irwin J. Kopin, Eds. Raven, New York, 1974. x, 352 pp., illus. $25.

Roentgen Diagnosis of the Craniovertebral Region. A. Wackenheim. Springer-Verlag, New York, 1974. xxii, 602 pp., illus. $150.90.

The Roots of Psychology. A Sourcebook in the History of Ideas. Solomon Diamond, Ed. Basic Books, New York, 1974. xviii, 782 pp., illus. $24.95.

Science, Technology, and Culture. Proceedings of four symposia, Burlington, Vt., 1972. Henry John Steffens and H. N. Muller, III, Eds. AMS Press, New York, 1974. viii, 204 pp. $10.

The Spectroscope. K. I. Tarasov. Translated from the Russian edition (Moscow, 1968) by J. H. Dixon. Halsted (Wiley), New York, 1974. xx, 378 pp., illus. $48.50.

Statewide Computing Systems. Coordinating Academic Computer Planning. Charles Mosmann, Ed. Dekker, New York, 1974. xii, 202 pp. $14.75. Books in Library and Information Science, vol. 10.

Statistical Mechanics and Spectroscopy. G. Allen and H. O. Pritchard. Halsted (Wiley), New York, 1974. x, 140 pp., illus. Paper, $5.95.

Statistical Thermodynamics. Vol. 2. Arnold Münster. Translated from the German edition (Berlin, 1956) by Veronica Hall. Springer-Verlag, New York, and Academic Press, New York, 1974. viii, 842 pp., illus. $75.

Systems Approach to Air Pollution Control. Robert J. Bibbero and Irving G. Young. Wiley-Interscience, New York, 1974. xii, 532 pp., illus. $24.95.

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Thermodynamic Data for Inorganic Sulphides, Selenides and Tellurides. K. C. Mills. Butterworths, London, 1974 (U.S. distributor, Halsted [Wiley], New York). x, 846 pp., illus. $65.

Topology. A First Course. James R. Munkres. Prentice-Hall, Englewood Cliffs, N.J., 1975. xviii, 414 pp., illus. $15.95.

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The Universities and the Gay Experience. Proceedings of a conference, New York, Nov. 1973. Gay Academic Union, New York, 1974. 106 pp. Paper, $2.

Using the Chemical Literature. A Practical Guide. Henry M. Woodburn. Dekker, New York, 1974. viii, 302 pp. Paper, $14.50. Books in Library and Information Science, vol. 11.

Valley of the Spirits. The Upper Skagit Indians of Western Washington. June McCormick Collins. University of Washington Press, Seattle, 1974. xiv, 268 pp. + plates. $9.50. American Ethological Society Monograph 56.

Vertebrate Hard Tissues. L. B. Halstead. Wykeham, London, and Springer-Verlag, New York, 1974. xii, 180 pp., illus. Paper, $7.80. The Wykeham Science Series.

Viruses, Evolution and Cancer. Basic Considerations. Proceedings of a conference, Montreal, Aug. 1973. Edouard Kurstak and Karl Maramorosch, Eds. Academic Press, New York, 1974. xxxii, 814 pp., illus. $48.50.

Water Plants of the World. A Manual for the Identification of the Genera of Freshwater Macrophytes. Christopher D. K. Cook, Bernardo J. Gut, E. Martyn Rix, Jakob Schneller, and Marta Seitz. Junk, The Hague, 1974. viii, 562 pp., illus. Dfl. 120.

White Cells in Inflammation. Papers from meetings of the Inflammation Research Association. C. Gordon Van Arman, Ed. Thomas, Springfield, Ill., 1974. xii, 148 pp., illus. $14.50.