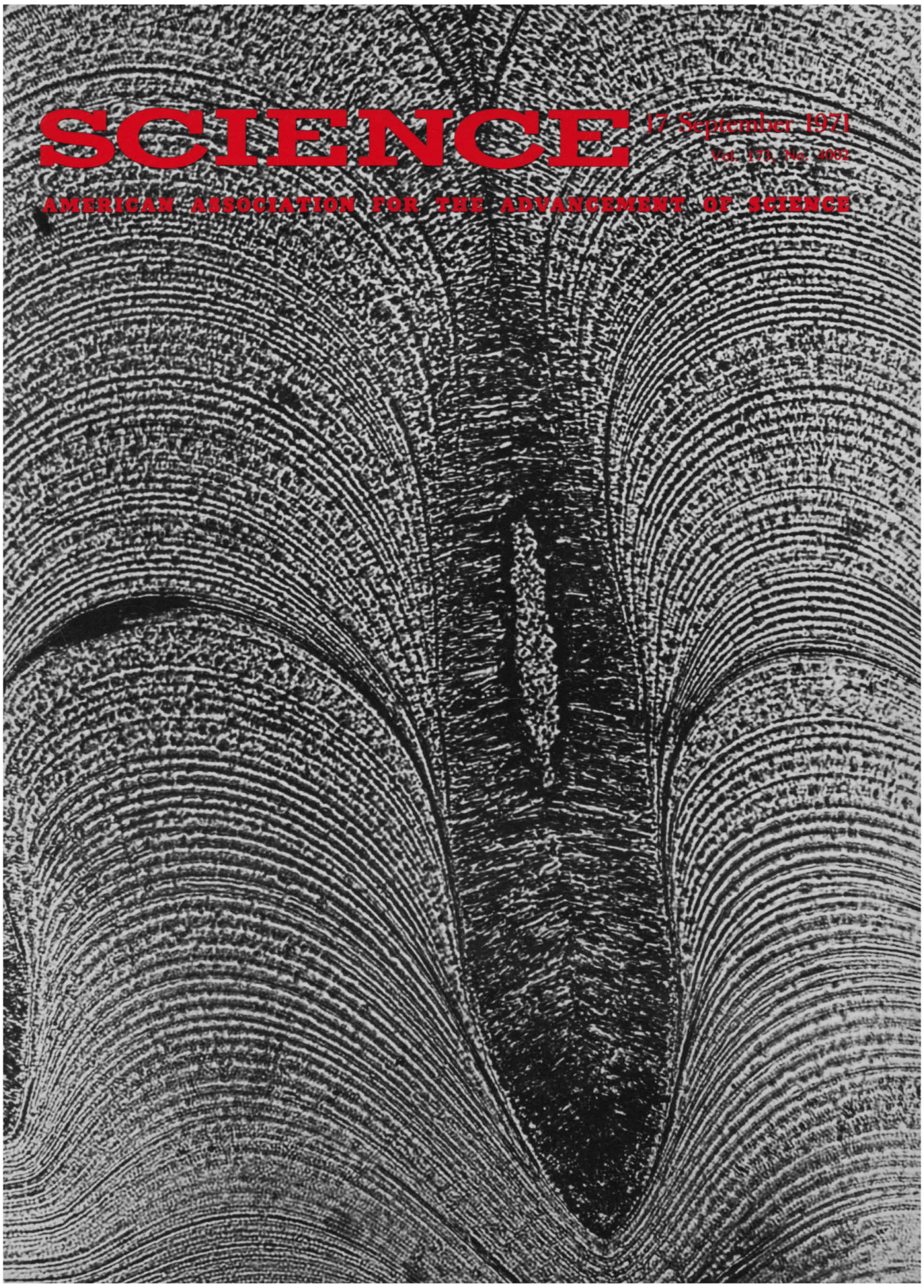
SCIENCE

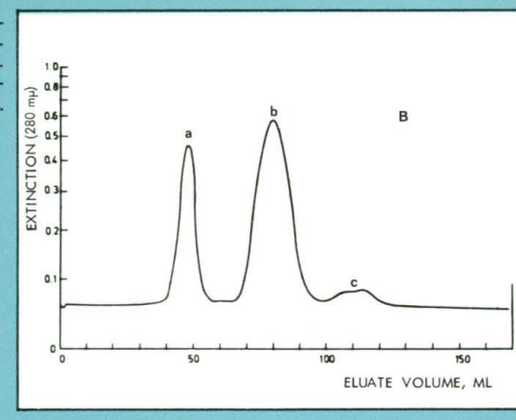
17 September 1971

Vol. 173, No. 4002

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



SEPARATION ON POLYACRYLAMIDE GEL
Column stabilised with 5 % polyacrylamide. Cross circulation of buffer. Continuous elution 10 ml/hr. Temperature 4° C.
SAMPLE: 0.25 ml 20 % albumin solution 0.04-M with respect to acetyltrytophane + 0.75 ml electrode buffer.



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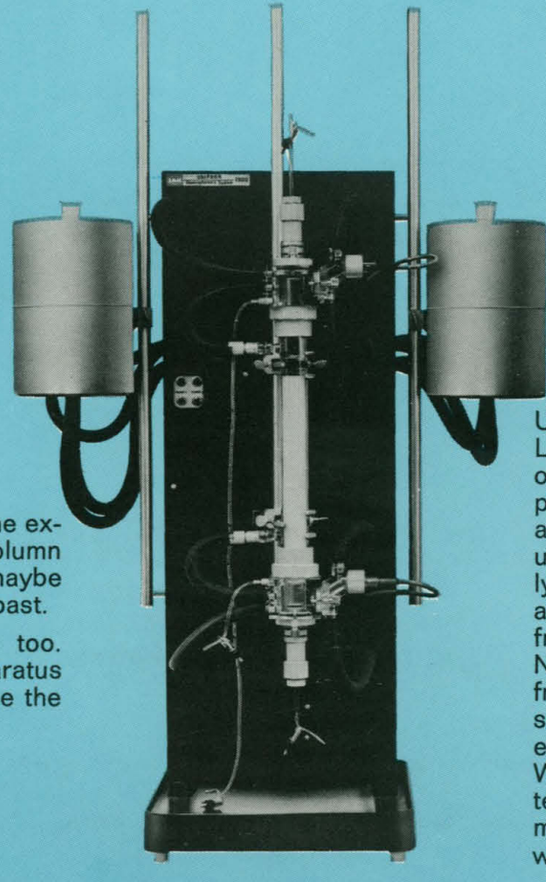

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Consider the convenience too. With one piece of LKB apparatus protein chemists can now use the following techniques:

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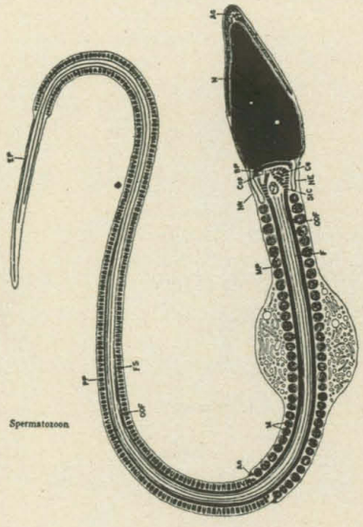
AUTHORITATIVE BOOKS IN ADVANCED BIOLOGY



Lentz: CELL FINE STRUCTURE—New

This new atlas contains nearly 200 magnificently clear full-page diagrams depicting the fine structure of mammalian cell types. Each diagram reproduces an ideal cell containing various cellular components which otherwise could only be observed by examining many electron micrographs. Included are cells of every major organ system, including those that are unusual or that have not been extensively investigated. A full explanation of the cytological structure accompanies every illustration. The diagrams are also available on 35-mm slides.

By Thomas L. Lentz, M.D., Yale University School of Medicine. 437 pages. 184 plates. 8½" x 11". $11.25 (185 slides; $75)

Giese: CELL PHYSIOLOGY—3rd Edition

The new edition of this advanced undergraduate text reflects new discoveries in cell processes and functions. Dr. Giese carefully describes the functional organization, environment, materials exchange, energy and matter conversion, irritability and contractility of single cells. Major problems in cell physiology are fully discussed. A large number of revealing charts, graphs, drawings and electron micrographs vividly demonstrate the principles and techniques described in this introductory text.

By Arthur C. Giese, Ph.D., Stanford University. 671 pages. 375 figures. $11.75. May 1968.

Balinsky: AN INTRODUCTION TO EMBRYOLOGY—3rd Edition

The 3rd Edition of this work covers comparative vertebrate biology at the undergraduate level. Dr. Balinsky defines embryology broadly as the science of ontogenetic development of animals and treats both its descriptive and its experimental physiological aspects. The book integrates the contributions of biochemistry and molecular biology with classic studies of the processes of development. Emphasized are topics like placentation, nuclear-cytoplasmic interactions, and gene activity in the processes of differentiation.

By B. I. Balinsky, Dr. Biol. Sci., Univ. of the Witwatersrand. 725 pages. 457 figs. $10. May 1970.

Barnes: INVERTEBRATE ZOOLOGY—2nd Edition

This widely used text is ideal for a course for students with at least a year of biology or zoology. Each group of invertebrates is correlated with the others phylogenetically. For each phylum, the author discusses anatomy, physiology, taxonomy, and ecology. A taxonomic synopsis of the animal kingdom is provided. This edition includes new chapters on the insects and on animal phylogeny. The various bases of classification are examined, but no single system is espoused. The larger parasitic groups have also been included.

By Robert D. Barnes, Ph.D., Gettysburg College. 743 pages. 581 figures. $10.50. July 1968.

For information or examination copies, write:

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SCIENCE

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COVER

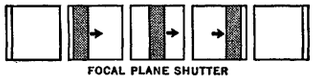
Growth patterns in the posterior acoustical structures of an otolith (sagitta) from the fish *Merluccius bilinearis* (Mitchill). Fish otoliths increase in size by daily additions of calcium carbonate and proteinic material in layers (about × 580). See page 1124. [G. Pannella, Yale University, New Haven, Connecticut]

The 1957 Hasselblad.
It's enjoying a revival. But not by Hasselblad.

A curious thing is happening in the camera business. Other people are just beginning to build what we discarded in 1957. A 2¼" camera with a focal plane shutter.

At the root of the problem is the sudden recognition of the 2¼" picture size as one that couples large format quality with miniature camera versatility (something that Victor Hasselblad recognized 23 years ago). The trouble is, with everyone rushing in to make 2¼" cameras, quality isn't always a big consideration.

Which is why you should know —before you buy any 2¼" camera—why Hasselblad changed from a focal plane to a leaf shutter back in 1957.



FOCAL PLANE SHUTTER

The focal plane shutter has to move across the entire film area, exposing the negative piece by piece, through a travelling slit. When the subject is moving parallel to the film plane, like a moving car, the position of the subject has changed by the time the last slit is exposed. This time lag can create distortion—an elongated or compressed car.

The same thing happens when taking pictures from a moving car or plane. The landscape tends to appear elongated.

In 35mm photography, focal plane shutter distortion is minimized by the short distance the shutter has to travel. But with 2¼" cameras, where the shutter has to travel farther, the distortion becomes more noticeable.

LEAF SHUTTER

The leaf shutter, on the other hand (which we call a Synchro-Compur shutter in the Hasselblad) exposes the entire negative area all at once. Which makes it a much more accurate and desirable shutter.

The focal plane shutter has another considerable disadvantage. It can only be synchronized with electronic flash at very low shutter speeds. Which makes it all but useless with strobe for action and sports photography. (At higher shutter speeds, only a strip of the film would get exposed. At slower speeds you end up with ghost images.)

These problems are overcome by the leaf shutter which can be synchronized with all kinds of flash at all speeds and apertures (giving complete control over depth of field and background brightness). Making the leaf shutter far more versatile and useful to virtually every photographer.

So in 1957, Hasselblad carefully weighed the pros and cons of both shutter systems and decided to change over from the focal plane to the leaf shutter. We had to increase the camera price to do so, because the leaf shutter is a more complex, sophisticated mechanism. But the objective was to build the best camera possible, without being forced to compromise through economic necessity.

We then developed a full line of ten interchangeable lenses, each with its own leaf shutter mounted between the lens elements next to the diaphragm, in the most optically ideal position.

We increased the number of interchangeable film magazines to a total of six, providing a wide variety of different capacities and formats.

We added many accessories, including a microscope shutter and adapter, a gunstock telephoto lens mount, and a prism viewfinder with exposure meter. Giving greater flexibility to what was already the most flexible camera system. Leading NASA to choose Hasselblad as the space camera, using it aboard Mercury and Gemini flights, taking it to the moon on the Apollo flights, and for use on Skylab orbiting laboratories.

Many features of the 1957 Hasselblad were well worth copying. In fact we've copied many of them ourselves. But we also knew what not to copy. With the result that most 2¼" cameras now employ the shutter system we abandoned 14 years ago.

Of course, if price is a consideration, you'll have to select a camera with a less costly focal plane shutter. But before you buy a new imitation of the old 1957 Hasselblad, look into the used camera ads. You can probably pick up the real thing for less.

HASSELBLAD

Paillard Incorporated,
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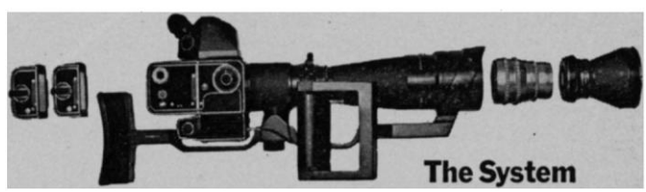
Other products: Bolex movie equipment, Hermes typewriters and figuring machines.



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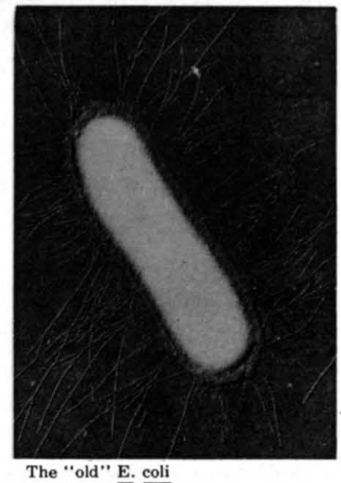
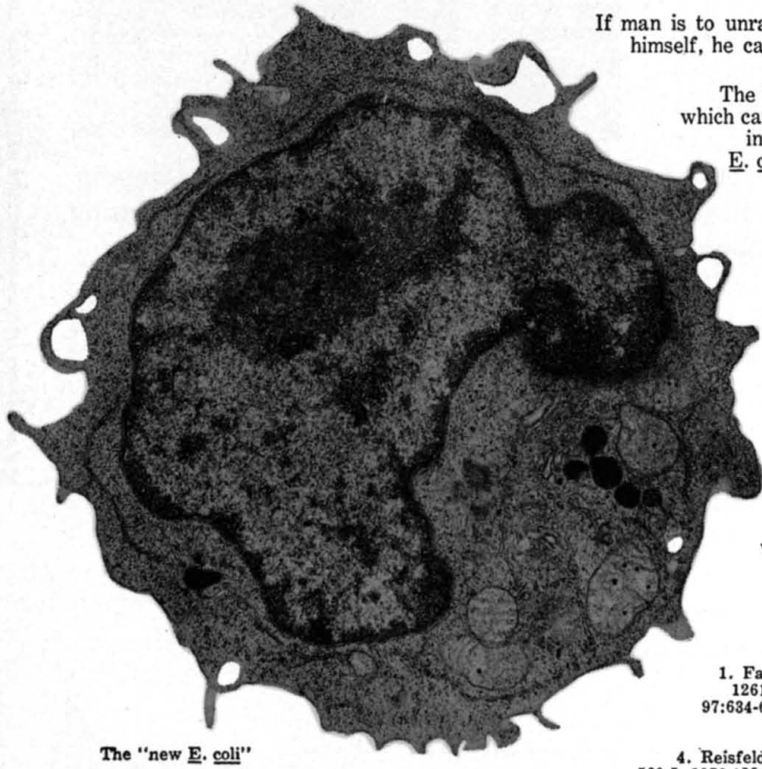


Courtesy of Dr. C. Brinton

The "old" E. coli

This helped answer a lot of questions.

The "new E. coli" will help answer the new ones.



The "new E. coli"

If man is to unravel the structural and regulatory genetic functions of himself, he can no longer base molecular biological research on the "old" E. coli. Human cells are necessary.

The "new E. coli" is a diploid, cultured human lymphoid cell which can be cloned or grown in suspension culture and provided in kilogram quantities. As a result of work with the "new E. coli," mutant lines and gene markers are being reported regularly. A certain number of markers have already been described; Immunoglobulins (1), Complement-C'-3 (2), Interferon (3), Transplantation (HL-A) antigens of the cell surface (4), DNA viruses (5), RNA viruses (6) and Reverse transcriptase - RNA - dependent DNA polymerase (7).

Cultured lymphocyte lines can be derived from patients with genetic deficiency diseases and inborn errors of metabolism with a high degree of success (8).

Recent investigations indicate it will be possible to hybridize cultured lymphocytes with both human and mouse cultured cells or cells taken from blood or other organs (9).

If you are interested in the "New" molecular biology, we would be pleased to share our research with you and provide you with a bibliography of current references.

Start answering the new questions. Write, call or visit ABS for information on the "new E. coli."

1. Fahey JL, Feingold I; Rabson AS, Manaker RA; Science 152:1259-1261, 1966 / Tanigaki N, Yagi Y, Moore GE, Pressman D; J Immun 97:634-649, 1966 / Glade PR, Chessin LN; Clin Invest 47:2391-2401, 1968
2. Glade PR, Chessin LN; Int Arch Allerg 34:181-187, 1968
3. Zajac BA, Henle W, Henle G; Cancer Res 29:1467-75, 1969
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5. Becker Y, Dym H, Sarov I; Virology 36:184-92, 1968 / Weinberg A, Becker Y; Virology 39:312-21, 1969 / Maurer B, Glick JL, Minowada J; Proc Soc Exp Biol Med 133:1026-1030, 1970 6. Hampar B, Kelloff GJ, Martos LM, Oroszlan S, Gilden RV, Walker JL; Nature (Lond) 228:857-59, 1970 7. Sckolnick EM, Aaronson SA, Todaro GJ, Parks WP; Nature (Lond) 229:318-21, 1971 8. Choi KW, Bloom AD; Science 170:89-90, 1970 / Blume RS, Glade PR, Gralnick HR, Chessin LN, Haase AT, Wolff SM; Blood 33:821-832, 1969 / Conover J, Hathaway P, Glade PR, Hirschhorn K; Proc Soc Exp Biol Med 133:750-53, 1970 9. Bodmer WF, Nabholz M, Maggiano V, Santachiara AS, in Informative Molecules in Biological Systems; L Ledoux (ed) North-Holland Publishing Co., Amsterdam, in press.

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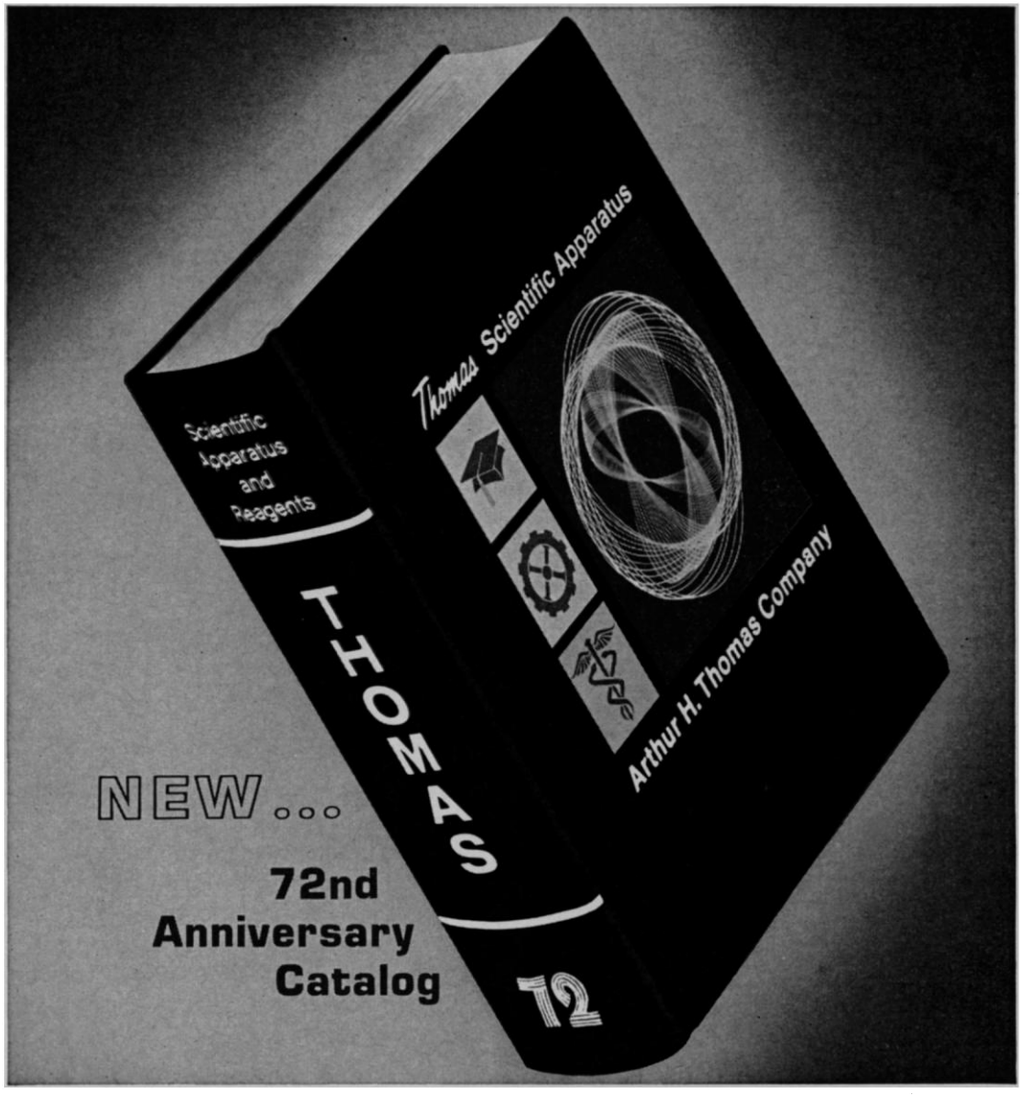

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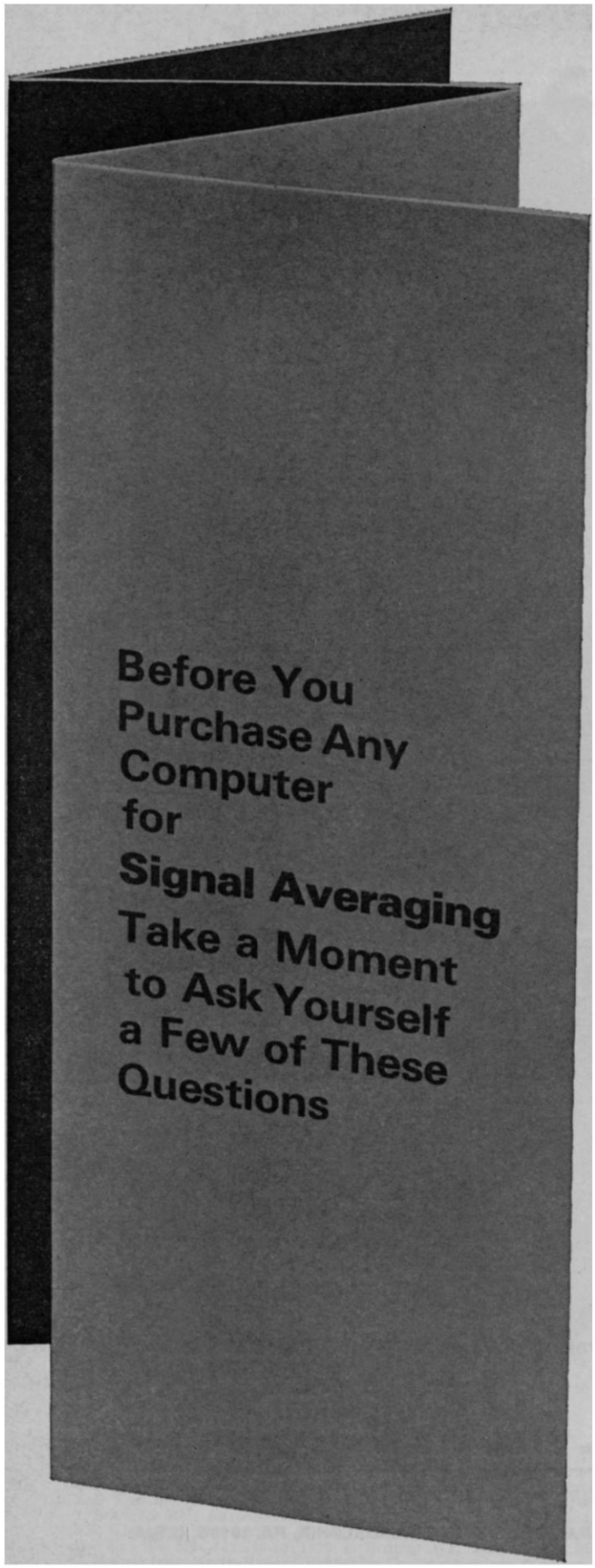

If you're considering the purchase of a signal averaging system, you should get the answers to the questions in this folder. It outlines the relative merits of a programmable mini-computer versus a wired program computer. It poses pertinent questions about interfacing a computer to your experiment, speed limitations on data acquisition, the amount of memory capacity required and whether the computer actually solves your experimental problems or adds to them.

Call or write for your copy or to discuss your specific signal averaging application.

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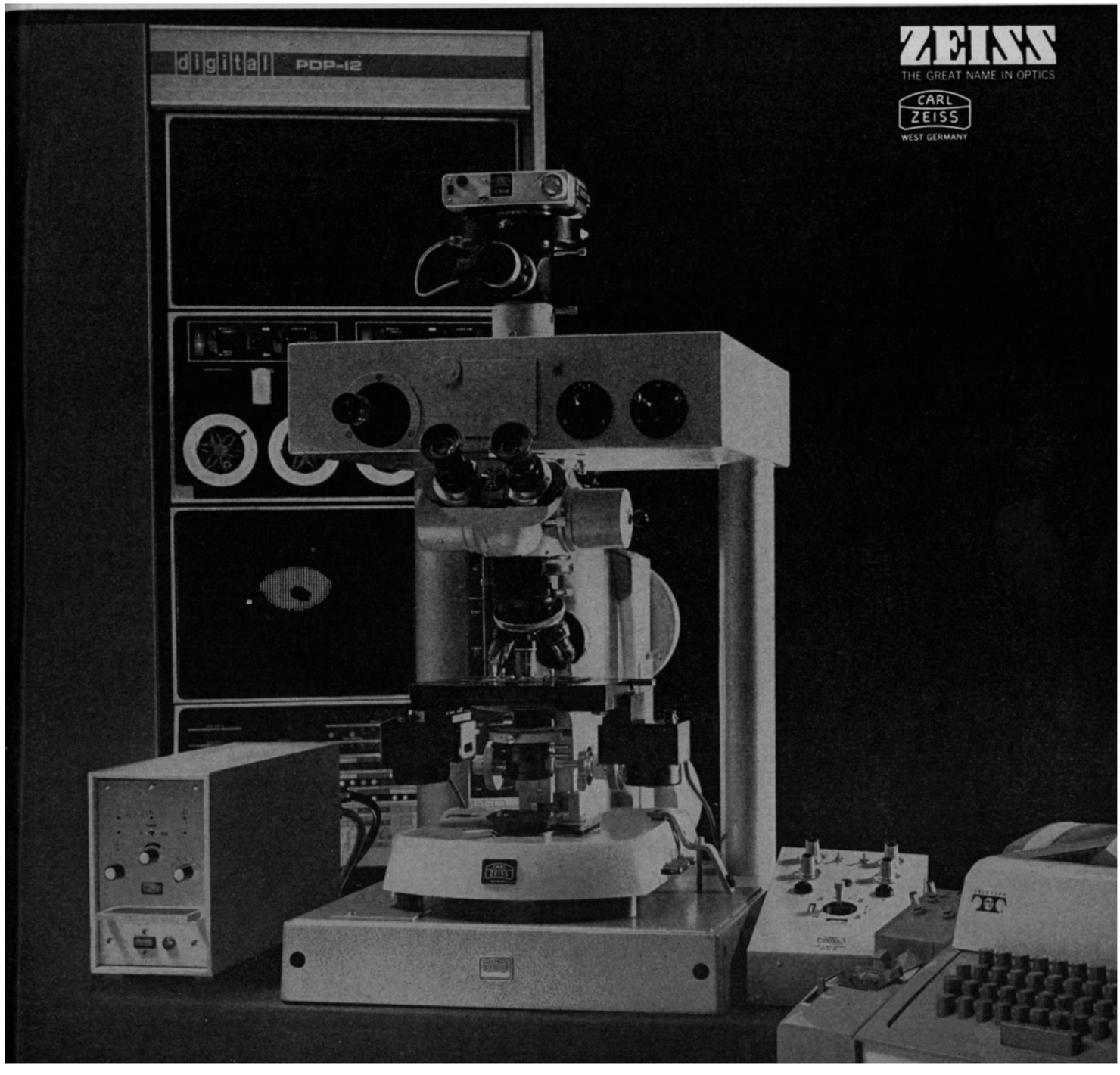

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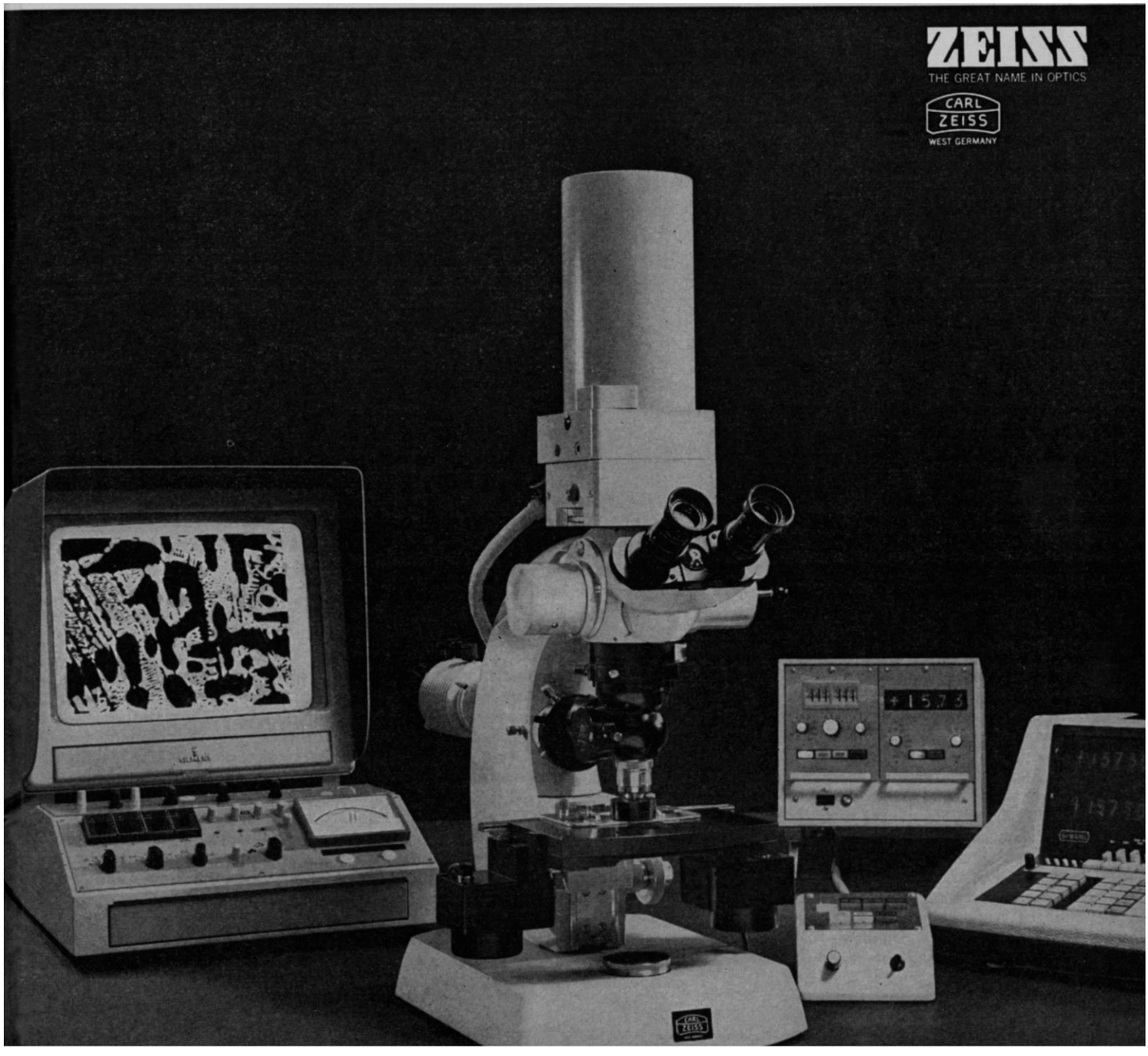

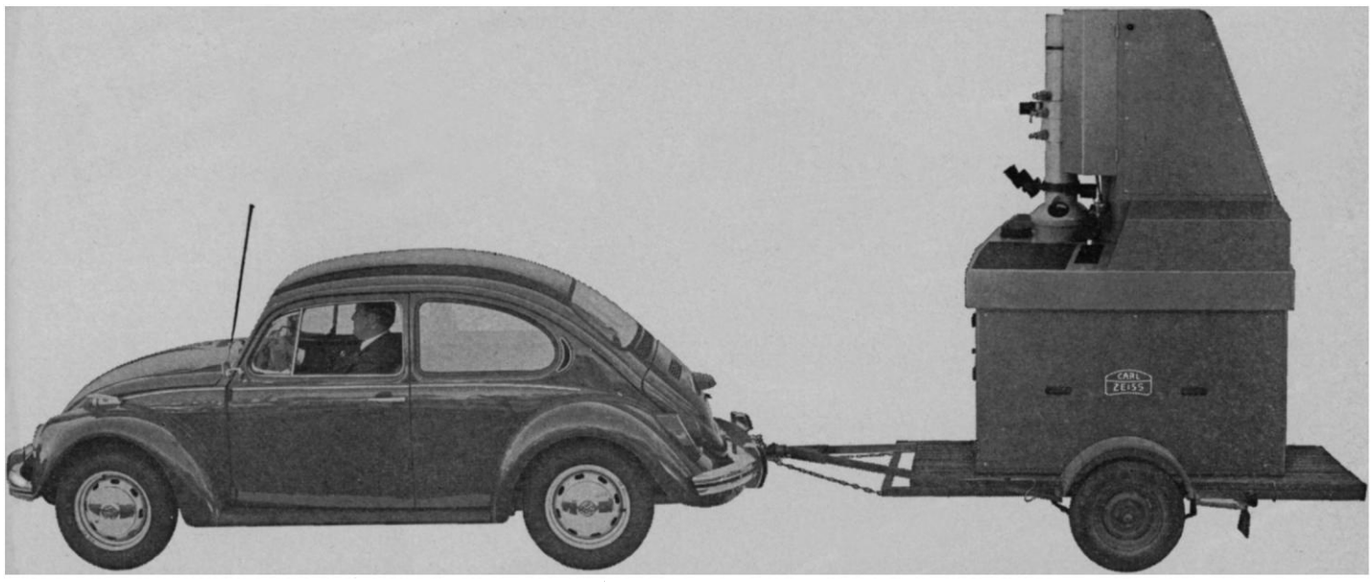

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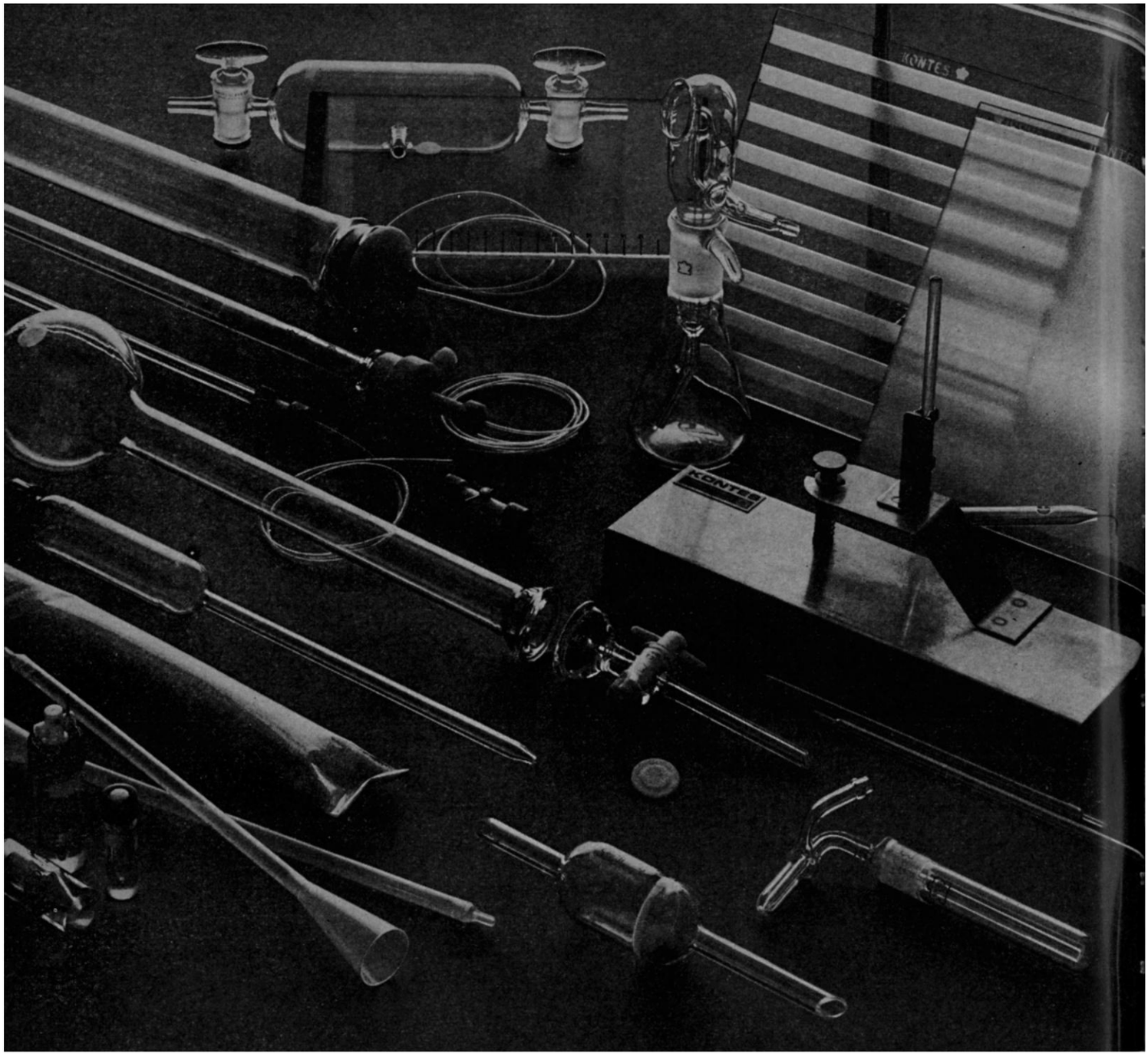

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priorities that gave ascendancy to the seeking of global preeminence over improving the quality of our national life, that these same priorities led to our intervention in Vietnam, and that they are likely to lead to further such interventions, which "seem to undermine the way of life they seek to preserve and spread" (pp. 168–69).

Blankenship would like to use the Apollo decision as an index of the quality of our political decision-making and wants to blame the decision-makers for our not doing better things. He asks, "Why have we had an Apollo but not, for example, a decent health care or welfare system?"—implying that this is part of "a set of questions different from those posed by the author." But I believe my book faces this question squarely. We went to the moon because the values held by the majority of the American people and their leaders in 1961 found Project Apollo congenial. We do not have a decent health care or welfare system because neither in 1961 nor now is there sufficient support in the American polity to accomplish those goals. Thus, if the Apollo decision is an index of anything, it is an index of the values we as a people held in 1961. Blankenship dissents from these values, and so do I. But it is he, not I, who confuses a description of what was with one of what should have been.

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Quality Control

Because of its tremendous importance and the real danger of its quietly falling by the wayside, the peer review system so ably defended by Gross (Letters, 9 July) deserves additional and continued support from concerned scientists.

The biological scientific research community, as well as officials of such federal agencies as the National Institutes of Health and the National Science Foundation, has on numerous occasions in the past praised the peer review system as the fairest way to maintain "quality control" over proposed projects, a control doubly necessary in these times of decreased funding of basic research. Scientific merit must remain the sole basis for award of the meager monies available; and the "relevancy" fad folk must realize that, as Gross also argues, true relevance and "applicableness" will, in the long run, derive far more often from the tackling of well-chosen basic problems than from "direct" approaches when the latter are of a superficial nature or of low scientific merit.

Administrators long out of personal research activity, no matter how well meaning, are seldom as appropriate judges of the quality of a specialized project as are pertinent panels of the principal investigator's peers in that particular field of research.

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Injustice to Women Scientists

Our society is overgrown with trivial hindrances to the advancement of women. This is so much a part of our culture that we are scarcely aware of it. Most of these minor injustices would have no effect at all by themselves, but in the aggregate their impact is enormous. They add up to a widespread, low-key slighting of women, a refusal to be aware of what women can do and and are doing. This affects hiring practices quite directly. More important, it diminishes the aspirations of young women and thus compounds the problem. Therefore it is important to call attention to these offenses and to consider their effects.

One such affront to women is the title of the widely used reference work, *American Men of Science*. It offends women scientists, whose biographies are included in the volume but whose existence is explicitly denied in the title. Furthermore, the name suggests at a glance that scientists are men. Since these prestigious volumes are used not only by members of the scientific community but also by students, reporters, and so forth, and are visible in libraries everywhere, this pernicious suggestion reaches many minds.

Like many other disparagements of women, this one was inadvertent. No malice was intended. In 1906, when publication of *American Men of Science* began, the title may well have been appropriate. This is no longer the case.

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Mass Transit Subsidies

Constance Holden, in her report on mass transit (News and Comment, 11 June, p. 1118), says that "mass transit systems cannot be self-supporting, but must be subsidized, *just as automobile travel is*" (italics added).

She should know that highway travel pays its own way, capital and operating costs, just as she recognizes the need for mass transit subsidies—subsidies amounting to more than half the total operating costs. The effect of such misleading statements, were they to bear fruit, could put far too great an economic load on our society to allow them to pass unchallenged.

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Barr has a point, although, strictly speaking, once taxes become government property and are then redistributed for a specific purpose they can be called subsidies. Also, some areas are clearly getting more from the redistribution than what they put in.

The Highway Trust Fund clearly encourages the use of the automobile. Road users have no choice about where their taxes go. They go into the construction of more roads, with the result that many have been built simply because the money has been available to build them—which in turn generates more user taxes, especially since alternative modes of transport have been left to wither. Nixon himself has acknowledged this imbalance, since under his revenue-sharing proposal he suggests that states be able to use money originally earmarked for highways as they see fit.—C. HOLDEN

Future Ph.D.'s

Because of the shortage of jobs traditionally requiring Ph.D.'s, many proposals have been made to reduce the number of graduate students by administrative measures. This "manpower" approach to the problem overlooks the fact that many graduate students are motivated by a desire for knowledge and not just a desire for a job in a particular field. A qualified student who wants to learn, say, theoretical physics should be allowed to do so even if he may have to work in another field when he finishes. Of course, he should be aware of this risk, and

should not be entitled to a full subsidy for his education. A more serious problem for higher education is the premature filling of tenure slots. In computer science, the next 10 years will produce a generation of new Ph.D.'s more qualified than those of us who now hold the professorships. If these new Ph.D.'s are frozen out, the field will suffer.

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Flying Saucer Sightings

D. I. Warren (6 Nov., p. 599) has brought forth an interesting theory. A number of people that I have talked to reported that the only reason they happened to see the flying saucer was because they went outside to "see what was bothering the horses." So it was really the horses who first sighted the UFO. When horses are used for the primitive task of simply supplying tractive power, they are undoubtedly victims of the status frustration syndrome. Therefore the theory must be valid.

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Sirens' Songs

In "Songs of humpback whales" (13 Aug., p. 585) Payne and McVay mention "the possibility . . . that some other species have been included with . . . [their] data on humpbacks." Although they refer to several species of whales, they fail to mention the most likely candidates, the Sirens. Their song has been described as "clear" by Circe and their voice "sweet as a honeycomb" by Ulysses. These definitions compare well with that of Payne and McVay: "beautiful and varied sounds." It is unfortunate that no recording of the Sirens' songs was made by Ulysses (probably because his hands were tied at the time); it would have been interesting to compare it to the recordings made by Payne and McVay.

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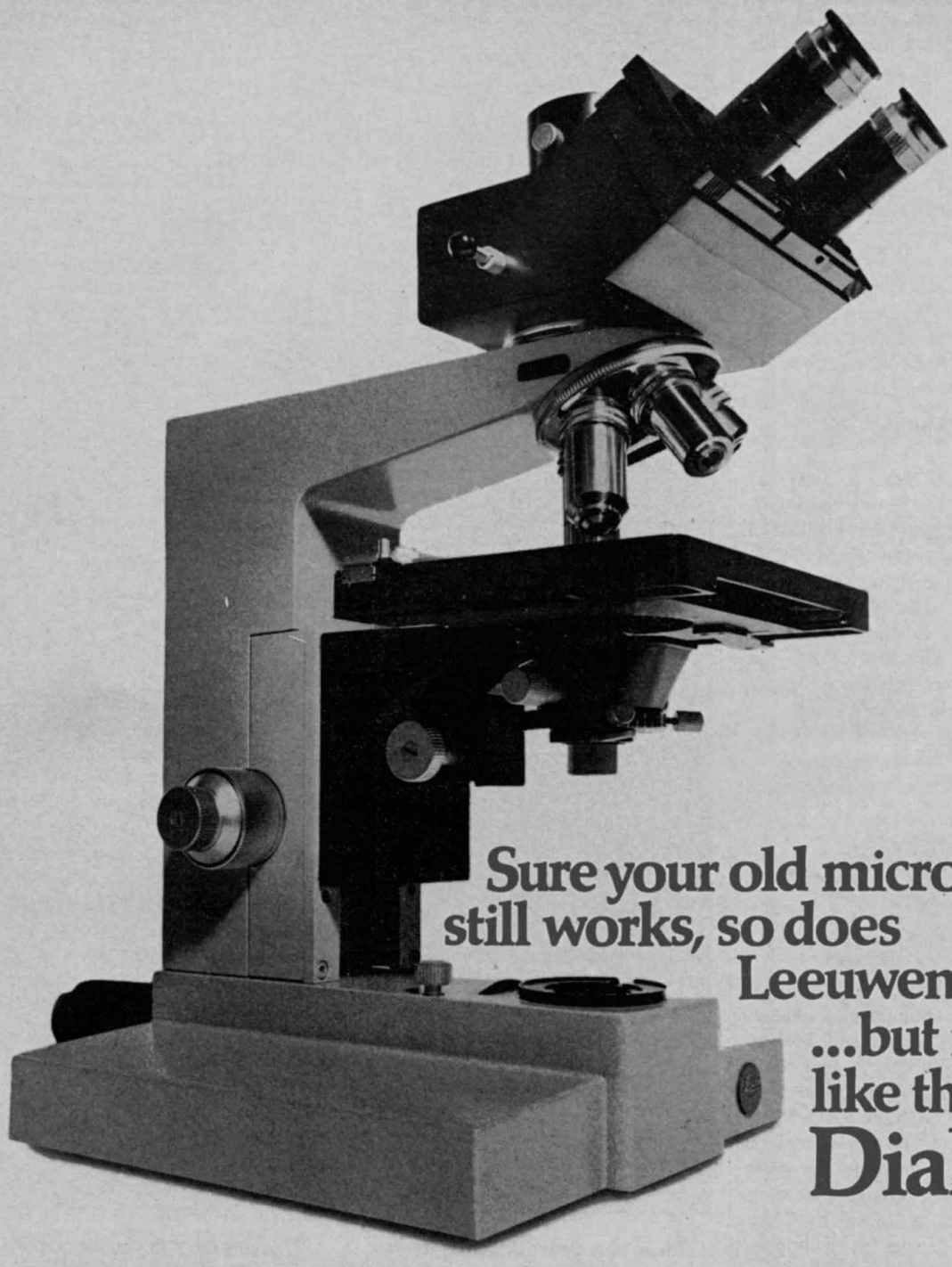

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SCIENCE

International Cooperation in Science

No matter what the motivation, international scientific cooperation is only as good as the science put into it, and it can be successful only if both sides are keenly interested in making it work.

At least, this seems to be the lesson to be derived from the United States–Japan Cooperative Medical Science Program, whose Joint Committee held its seventh meeting recently in Washington. This project arose out of general political discussions between the United States and Japan and was first announced as item 13 in the communiqué issued at the conclusion of Prime Minister Sato's 1965 visit to Washington. It has since become a fine example of an intergovernmental scientific relationship that is functioning extremely well. Although it was intended primarily to benefit the people of Asia, its results are widely available.

Concrete evidence of this is to be found in the form of a 5-year report just issued on the results of research in the six disease categories chosen for inclusion in the program—cholera, leprosy, malnutrition, parasitic diseases, tuberculosis, and viral diseases. These results have been and continue to be substantial.

The interest of both parties in the program has continued to run high, and it has been well financed by both sides. American funding through the National Institutes of Health has been appropriate, and a small, separate staff administers the program. Our members of the Joint Committee, appointed by the Secretary of State, are leading medical scientists with a deep interest in the program. From both Japan and the United States, the Joint Committee members are, in effect, the senior statesmen, but a consistent effort has been made to involve younger scientists.

A number of other factors have also contributed to the success of the program. Although only six disease categories were selected, within each of these the research effort has been further limited to discrete objectives where progress is likely to have large effects; that is, the areas of interest are carefully selected and quite specifically defined. In addition, there is an equitable balance between the relative scientific contributions coming from investigators of the two nations involved. This is not an instance of one country scientifically assisting another; rather, there is an equality of input from both sides. The identification and further definition of research goals are mutual, a joint activity rather than unilateral scientific domination and direction. Finally, and of particular importance in the United States, management of this program has been delegated to the level in government where there is existing research which complements that of the program.

We are aware, of course, that the United States is engaged in a large number of bilateral programs with a number of countries. Indeed, there are three other programs with Japan alone, including the oldest active U.S. program of this nature, the United States–Japan Agreement on Scientific Cooperation, which held its eleventh annual meeting in Tokyo in July.

Our experience with the United States–Japan Cooperative Medical Science Program has convinced us of the usefulness of such agreements. The Department of State values highly the political benefits arising as a by-product of the program—the deepening understanding between two nations engaged in common research. The scientists value highly the effective and efficient manner in which the best talents of two countries have been organized and focused on the problems they are dealing with. This is a combination that is hard to beat.—COLIN MACLEOD, *Chairman, U.S. Delegation of the United States–Japan Cooperative Medical Science Committee*, and HOWARD A. MINNERS, *Secretariat, National Institutes of Health.*

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roplasts from C_4 plants is associated with modification of the biochemistry of CO_2 fixation and may be reflected in the initial products of photosynthesis as proposed by W. J. S. Downton.

The presentations of the biochemistry of photorespiration were one of the highlights of the seminar. M. Gibbs emphasized the close association of carbon metabolism and light reactions during glycolate synthesis, and N. E. Tolbert reported advances with respect to glycolate metabolism in leaf peroxisomes or microbodies. This work was complemented by the structural studies of plant microbodies by E. H. Newcomb and the comparative view of plant microbodies presented by H. Beevers. Photorespiration was considered to be the biosynthesis of glycolate from the photosynthetic carbon cycle and its metabolism in peroxisomes. The magnitude of this respiration increases with O_2 concentration and under conditions of impaired CO_2 fixation. Glycolate biosynthesis in the light in the chloroplasts was viewed as unavoidable, and its subsequent metabolism as gluconeogenic to conserve part of the carbons. W. A. Jackson described the exchange of oxygen associated with photosynthesis and photorespiration, and this technique may permit quantitative estimates of photorespiration in C_4 plants in which the CO_2 produced does not escape from the leaf. In many instances, C_4 plants appear to conserve photorespiratory carbon by refixation of the CO_2 during photosynthesis. In addition, C. B. Osmond provided data suggesting that some C_4 species are deficient in the photorespiratory apparatus. The biochemistry of CO_2 release during photorespiration and in serine formation were evaluated.

Several contributors helped to place the biochemical and anatomical information from the seminar into a physiological and ecological context. It was shown that minimum stomatal diffusion resistances tend to be higher in C_4 than in C_3 plants. Therefore the C_4 plant tended to have a reduced transpiration per unit leaf area. Although CO_2 transport into the leaf also was similarly impeded, this extra gas phase resistance is more than counterbalanced by the much lower intracellular CO_2 resistances in C_4 plants. Hence, total net CO_2 transport resistance tends to be lower, and overall photosynthesis more efficient, than in C_3 plants. As a consequence of higher stomatal and lower intracellu-

lar resistance, water use efficiency tends to be higher in C_4 than in C_3 plants.

The intracellular resistance is composed of physical and biochemical components, the latter being identified with the carboxylation reactions. Several attempts were made to partition the intracellular resistance into these two major components by theoretical analysis, but these procedures were queried. Experimental evidence implied that the main component of the intracellular resistance was the carboxylation resistance. This was also supported by other data for a close relationship between intracellular resistance and levels of RuDP carboxylase activity. Such evidence suggests that, even in C_4 plants, levels of RuDP carboxylase activity may be a major limitation to photosynthetic rate. In C_4 plants the lower intracellular CO_2 resistances probably result from the efficiency of the PEP carboxylation system in the CO_2 concentrating ability of the mesophyll cells.

In terms of adaptation and evolution, it is clear that, in arid environments with high solar radiation and high day temperature, C_4 plants have several advantages over C_3 plants. The C_4 plant has no apparent photorespiration, greater photosynthetic efficiency under high light intensity and higher temperature optimums, and makes more efficient use of water. However, R. O. Slatyer emphasized that one cannot extrapolate directly from single leaf studies to the behavior of whole plants or plant communities, since many factors contribute to overall growth and water use. Furthermore, with regard to economic food yield, such as yield of grain, many other factors must be considered and potential rate of leaf photosynthesis is only one determinant.

In evolutionary terms it appears that both C_4 plants and plants with CAM have arisen polyphyletically among several of the more advanced orders of both dicotyledenous and monocotyledenous plants. The Caryophyllales and the Euphorbiales include both CAM and C_4 plants, but several other orders include only one or the other. All plants apparently rely on the photosynthetic carbon cycle for the ultimate steps in CO_2 fixation. In CAM and C_4 plants, the C_4 dicarboxylic acid products serve essentially as mechanisms for prefixing and concentrating CO_2 in the photosynthetic tissue. Furthermore, in primitive aquatic

environments with low oxygen levels, low light intensity, and the absence of water stress, plants with the C_3 photosynthetic carbon cycle would be at no disadvantage. Only with the colonization of terrestrial environments of high radiation, increasing oxygen levels, and increasing aridity would CAM and C_4 acid fixation and metabolism be advantageous. Again, though, it was emphasized that competitive evolutionary advantage is not just a matter of leaf photosynthesis.

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Clinical Aspects of Inherited Disorders

Genetically determined growth deficiencies, cancer genetics, genetic carrier detection, prenatal chromosome analysis, and prenatal detection of inborn errors of metabolism were some of the topics discussed at a meeting on the clinical aspects of inherited disorders held at the Medical Center, University of Alabama in Birmingham, on 9 and 10 April 1970. The meeting was opened by J. F. Volker, president, University of Alabama in Birmingham, and John Leslie, regional medical director, Maternal and Child Health Services, Health Services and Mental Health Administration.

D. W. Smith (Seattle) discussed the genetic basis for clinical disorders and presented a new classification of growth deficiency syndromes. He emphasized the importance of genetic disorders in medical problems and classified their source as (i) genetic imbalance in which there is a numerical or structural abnormality of the chromosomes, (ii) a major mutation which is transmitted in an autosomal dominant, autosomal recessive, or X-linked manner, and (iii) polygenic factors which include multiple minor variants interacting with the environment. Smith listed the presumed frequency of newborns who have or will have a disorder due to each of the three types of genetic determinations as 0.5 percent for chromosomal imbalance, 1 percent for one of the approximately 1500 individually rare disorders caused by major mutants, and 10 percent for a disorder due to polygenic factors including common malformations, diabetes mellitus, schizophrenia, and the like.

C. J. Witkop, Jr. (Minneapolis), discussed genetic heterogeneity, particularly in gingival fibromatosis and amelogenesis imperfecta. He indicated that recent developments in biochemical genetics have shown the heterogenetic character of many human traits that previously were thought to be determined by single genes.

After discussing the role of hereditary factors in cancer of the skin, endometrium, breast, and colon, H. T. Lynch (Omaha) emphasized the potential for cancer control through utilization of genetic information for early cancer detection in individuals that are at increased risk.

In discussing the question, "How can the teratogenic action of a factor be established in man?" W. Lenz (Münster, West Germany) indicated that few such factors are definitely known in man though many have been suspected. He contrasted the findings due to thalidomide with the drug Meclizine, which has come under suspicion. Comparison of thalidomide embryopathy was made with phenocopies and other established syndromes having similar clinical features. He further indicated the great need for the collection and analysis of data on intake of drugs, such as LSD, in order to answer the question as to its teratogenic properties in man. J. Warkany (Cincinnati) discussed other aspects of determining the teratogenicity of a drug and observed that we should not neglect the single case that may be caused by an unknown teratogen, and therefore that we should be most careful in drawing conclusions. Use of serum enzymes, muscle biopsies, and electromyography in diagnosis and detection of carriers of the gene for muscular dystrophy were discussed by C. M. Pearson (Los Angeles).

James L. German (New York) discussed disturbances of sexual development and the role in human sexual differentiation of various genetic determinants on the X and Y chromosomes. In the last few years new approaches to the study of growth regulation and to human behavioral disorders have been made through the study of sex chromosomal aberrations.

The autosomal aberration syndromes were discussed by W. Finley (Birmingham).

I. A. Uchida (Hamilton, Ontario)

outlined the study which she and her colleagues designed in order to ascertain the association between diagnostic x-rays and the risk of a trisomy offspring.

In the discussion of prenatal chromosome analysis, M. N. Macintyre (Cleveland) indicated how this procedure might be considered lifesaving since, without this technique, families at risk for having a child with a chromosomal aberration syndrome might be advised by the counselor to avoid further pregnancies.

H. L. Nadler (Chicago) discussed the use of cell cultures and his present experience with regard to the detection of inborn errors of metabolism prenatally and mentioned the genetic disorders for which such diagnoses are possible. The direction of things to come in the treatment of genetic disorders were discussed by J. H. Menkes (Los Angeles).

A panel on the special problems of the abnormal child was moderated by C. J. Rosecrans (Birmingham). M. M. Cohen (Boston) discussed some of the dental problems in mentally retarded children, especially in Down's syndrome. R. B. Allison (Birmingham) outlined some of the problems in the psychological evaluation of mentally retarded children. S. Davis (Birmingham) summarized the functions of the University Affiliated Facility at the University of Alabama in Birmingham and the various diagnostic resources available to the family physician with regard to the evaluation of children with congenital malformation syndromes. J. Money (Baltimore) compared the psychologic findings in patients with sex chromosomal aberration syndromes.

Another panel, concerned with prevention of genetic disease, was moderated by E. G. Waldrop (Birmingham). Subjects covered during this discussion were genetic counseling, by S. C. Finley (Birmingham); therapeutic abortion, by A. C. Christakos (Chapel Hill); amniocentesis, by R. V. Barnett (Birmingham); and the psychiatric aspects of therapeutic abortion, by P. H. Linton (Birmingham).

The seminar was supported by Project 262, Maternal and Child Health Service, Health Services and Mental Health Administration, Department of Health, Education, and Welfare.

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(Continued from page 1121)

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