SCIENCE

3 March 1961

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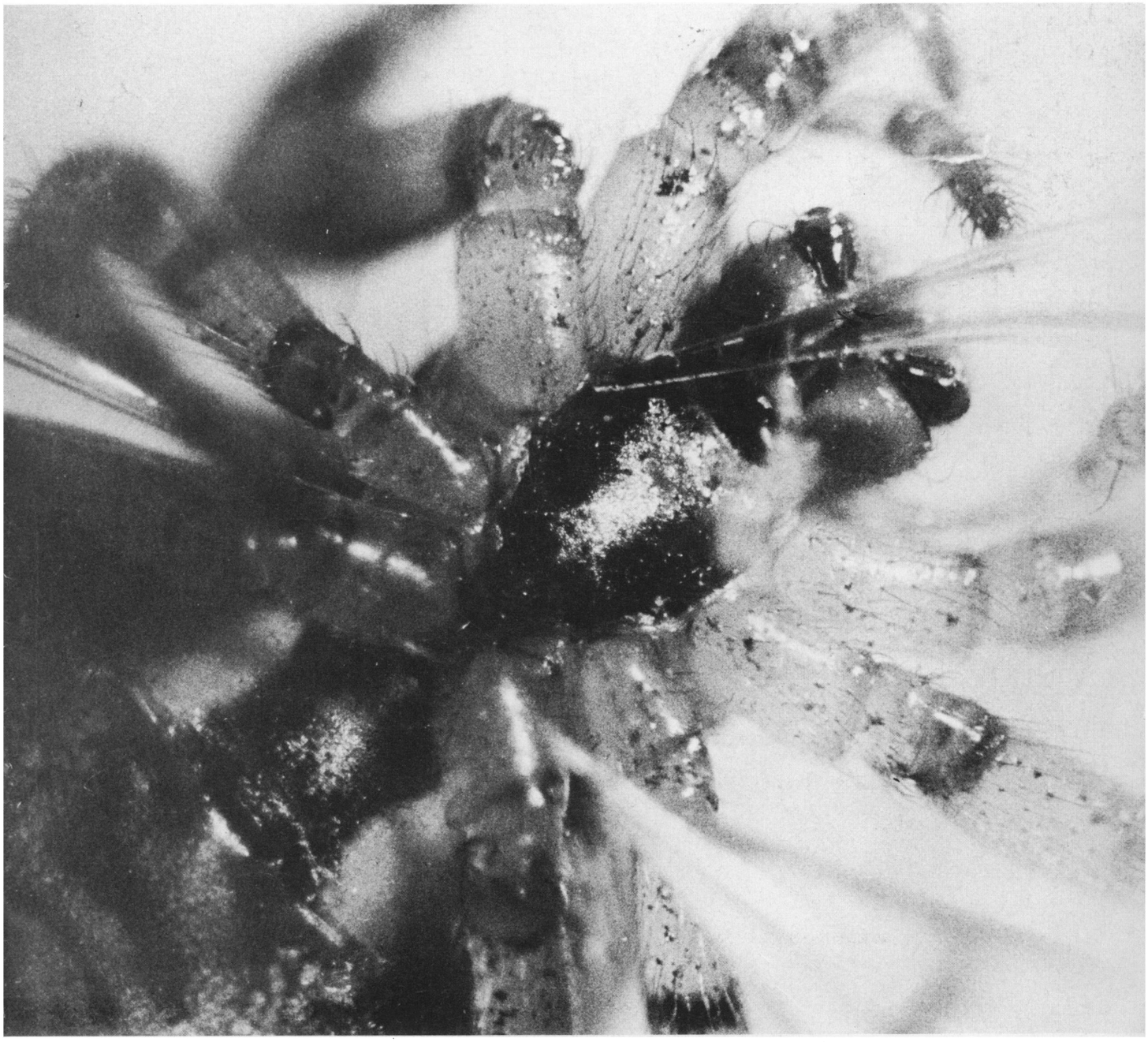
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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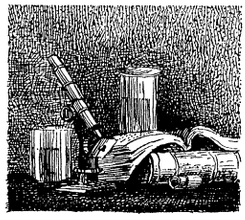
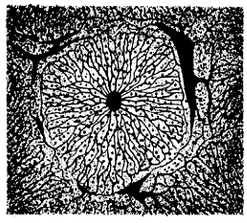
IT HAPPENED THIS MONTH...

a glance at yesterday in relation to today



IN MARCH—(1884)—*Science* reviews a Brazilian pamphlet on the genesis of beriberi. Dr. J. B. DeLacerda cultured blood of beriberi patients in meat solution and obtained a microphyte similar to the "bacillus of carbuncle". Animals infected with this organism succumb to paralytic disease in 5 to 20 days. The microphyte was then recovered from the muscles and spinal medulla. "From these facts the author draws the logical conclusion, that beriberi is a parasitic disease, and that the parasites attack particularly the blood, muscles, and medulla."[1]

With the help of an increased fund of knowledge, we now know that beriberi results from deficiency of cocarboxylase (thiamine pyrophosphate), a derivative of vitamin B_1. Schwarz BioResearch is a leading supplier of cocarboxylase, as well as other important metabolic cofactors such as ATP, ADP, adenylic acid, flavin adenine dinucleotide, DPN, guanosine diphosphate and guanosine triphosphate. Many of these have been labeled with C^{14}.



IN MARCH—(1921)—Frederick Gowland Hopkins reports the discovery of a new sulfhydryl compound in yeast, liver, and muscle cells.[2] This compound appears to contain a dipeptide of glutamic acid and cystein. Although present in low concentration, it accounts for almost all the non-protein organically bound sulfur in the cell. The cystein moiety is found to change readily from the sulfhydryl to the disulfide state under the influence of factors shown to be present in the tissues.

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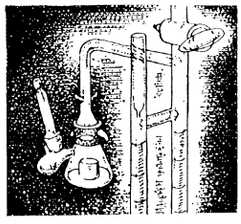

IN MARCH—(1949)—Otto Meyerhof publishes another of his interesting papers in the field of carbohydrate metabolism. Previous studies had shown that large amounts of phosphorylated hexoses are required to maintain steady continuous glycolysis in homogenates or centrifuged extracts of malignant tumors. In the absence of such phosphate donors, continuous glucose utilization can occur only if the activity of ATPase (in terms of phosphate turnover) is twice that of hexokinase. Meyerhof and Wilson[3] show that enzymatic balance may be obtained by adding yeast hexokinase or inhibiting the activity of the tumor ATPase.

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1. (Review): The bacillus of beriberi. Science *3*:331 (March 14) 1884. 2. Hopkins, F. G.: On an autoxidisable constituent of the cell. Biochem J. *15*:286 (1921). 3. Meyerhof, O. and Wilson, J. R.: Studies on the enzymatic system of tumor glycolysis. I. Glycolysis of free sugar in homogenates and extracts of transplanted rat sarcoma. Arch. Biochem. *21*:1 (March) 1949.

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3 March 1961, Volume 133, Number 3453

SCIENCE

Cover Positioning of microinstruments on a living 5-mm spider *Zygiella x-notata*, a test animal for psychopharmacologic (psychotrophic) drugs. The micropipette and microelectrodes were controlled by a micromanipulator. See page 644. (Electronic flash; × 60 at *f*/22) [C. A. Erskine, University of Dublin]

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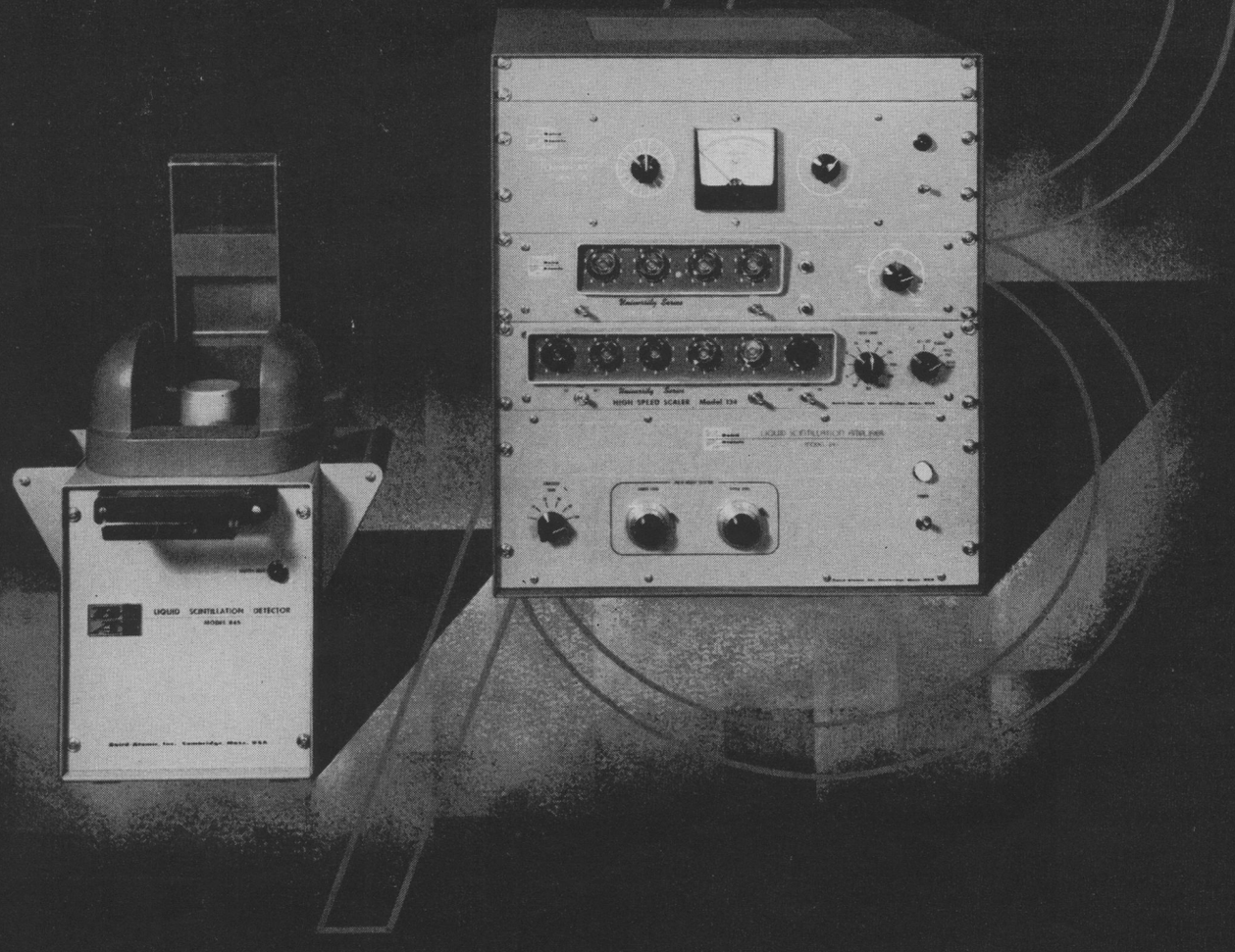

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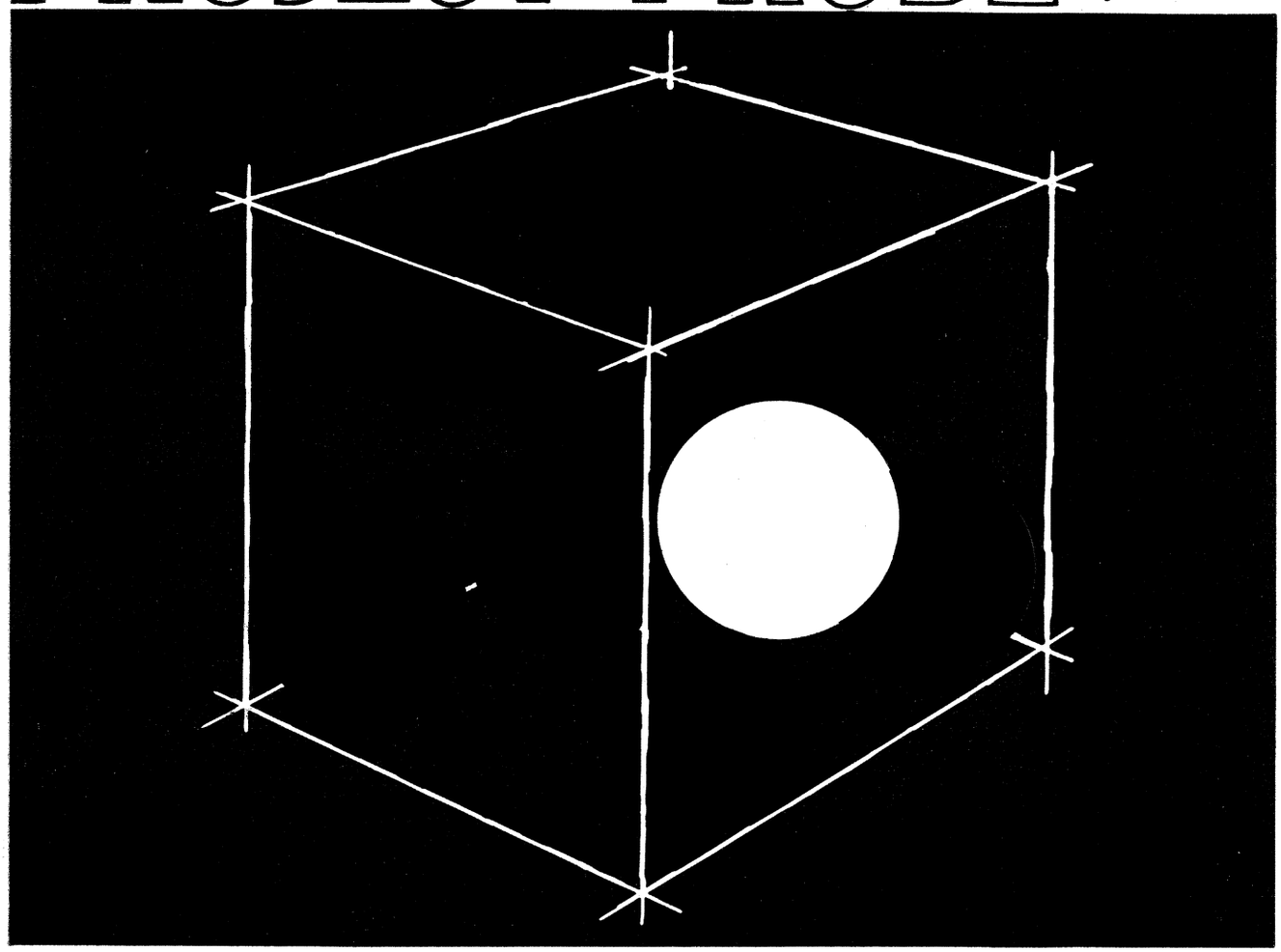

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Electricity and Personal Magnetism

We are puzzled in one respect by a recent series of advertisements in which Arthur Schlesinger, Jr., John Mason Brown, and Edward Teller endorse a 54-volume set of writings called the "Great Books of the Western World." The set of writings is published by Encyclopaedia Britannica in collaboration with the University of Chicago. It is supposed to put the thinking person in touch with the great ideas of civilization by making available to him, in their entirety, great works by the great thinkers themselves. Now the set, which can be bought on easy budget terms, includes some science. It includes, for example, Faraday's *Experimental Researches in Electricity*, which is 642 pages long, two columns to a page. What puzzles us is whether such learned and astute public figures really believe that a person interested in gaining an understanding of modern science and its development should proceed by making his way through this material.

To be sure, the reader is permitted at his discretion to skip unprofitable pages, and few thinking persons are likely to linger very long over, say, tables giving, for the 1840's, monthly magnetic declinations at Toronto, St. Petersburg, Washington, Lake Athabasca, and Fort Simpson. But how helpful, in addition, if the reader were only told which portions of the work describe fundamental discoveries and which of Faraday's views are no longer accepted. And how helpful to be told, if the readers of this material are to communicate with anybody but one another, which of Faraday's special terms have been replaced by other expressions and what the new expressions are. And finally, how helpful to be advised how much of this work to read before turning to other writings of Faraday, to other 19th century scientists, and to other scientists of other centuries.

Putting aside for the moment the problem of the general reader, our own impression is that a professional scholar, who is not a physicist or a historian of science, would be delighted, when reading Faraday, to supplement his own judgment on how he could concentrate his efforts with the judgment of some better informed colleagues. He would regard such assistance as no more presumptious than the suggestion that he read Faraday in the first place. After all, the material may be new to him, but it is not new to the world. Why, then, should more heroic demands be made of the general reader than of the professional scholar? Furnishing each reader with a host of learned friends may not be feasible, but it is possible to give each one, in the form of properly introduced and annotated texts, the information such friends could supply. This is not to say that the general reader cannot improve his understanding of modern science and its development by studying great scientific papers. And there may even be a grain of truth in the advertisements' claim that perusal of man's great intellectual achievements will enable the reader "to think, speak, and act with new and impressive weight." But if contact with the soil is good on occasion for everyone, it does not follow that everyone must plow the soil afresh.

Other readers of these advertisements, of course, may be puzzled in other respects. Admirers of Dostoevski, for example, will note that the set of writings does include a reading schedule for some, if not all, of the books, and that the first half of *The Brothers Karamazov* is scheduled for one year, and the second half for the following year. What may puzzle Dostoevski enthusiasts is whether Schlesinger, Brown, and Teller are really so unfeeling as to ask any reader of the first half of the novel to wait even a week before starting the second half.—J.T.

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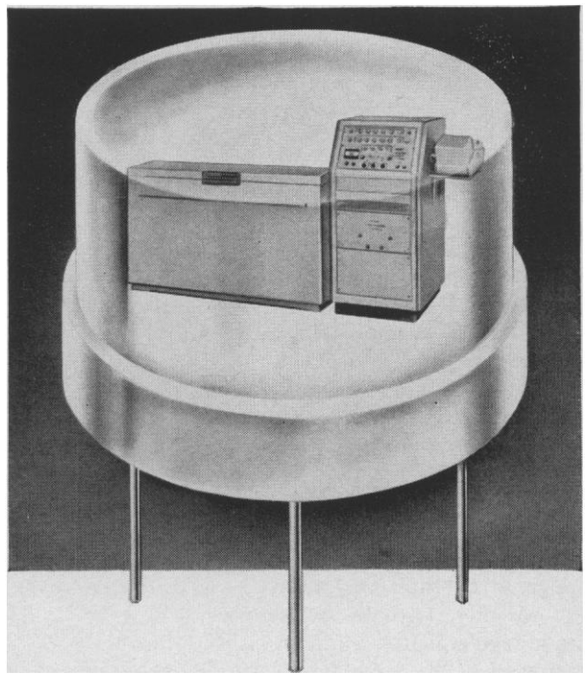

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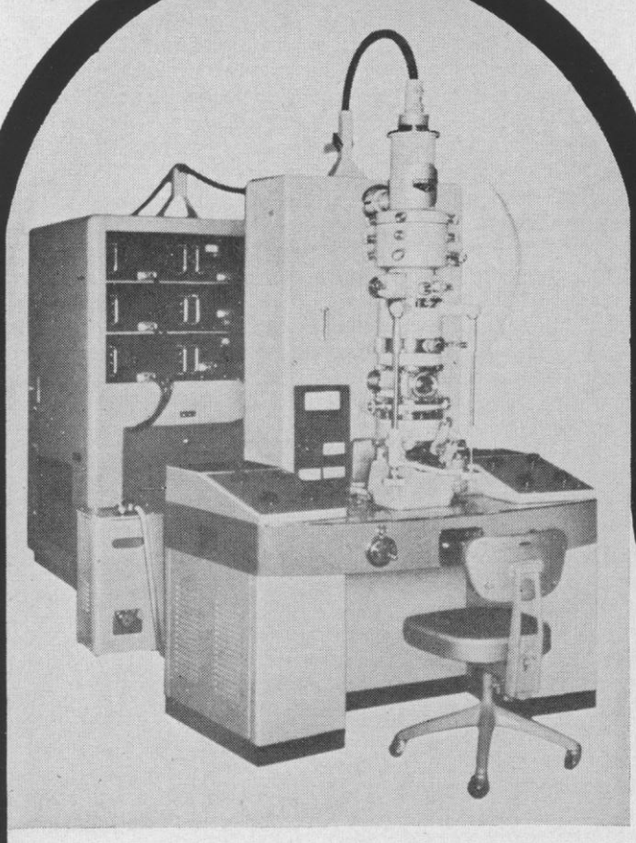
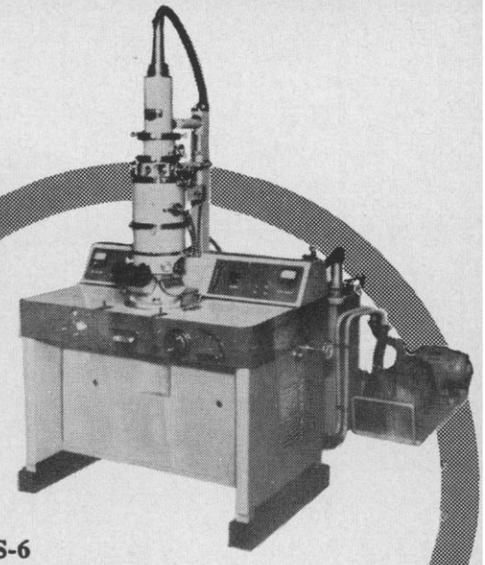


HU-11



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Meetings

Bioclimatology

The second scientific congress of the International Society of Bioclimatology and Biometeorology was held in the chambers of the Royal Society of Medicine, in London, from 5 to 10 September 1960. There were 172 members attending, from 26 countries. The program represented an important departure from that of the first congress (held in Vienna in 1957), and perhaps from programs of most other national and international societies.

Productive exchange of viewpoints within an interdisciplinary field such as bioclimatology is not greatly encouraged by marathons of brief technical communications. Rather, lively discussion of basic concepts, problems, and methodology leads to important cross-fertilization and growth of ideas. To this end, the executive board designed a program aimed at stimulating discussion both on broad problems and on technical matters. On each of four mornings a basic theme was discussed by three speakers, each representing a different background. The speakers were instructed to concentrate on major unsettled issues and their possible resolution. One or several moderators then initiated discussion of the themes and suggestions raised by the main speakers.

The subjects of these four sessions and the speakers were as follows:

1) "High-altitude Bioclimatology": R. Margaria (University of Milan), W. H. Weihe (University of Bern), and R. Schindler (Bernhard-Nocht-Institut, Hamburg).

2) "Tropical Bioclimatology": A. B. Hertzmann (St. Louis University School of Medicine), J. C. D. Hutchinson (Ian Clunies Ross Animal Research Laboratory, Parramatta, Australia), P. W. Richards (University College of North Wales), and C. P. Luck (Kampala, Uganda).

3) "Bioclimatological Classifications": H. Boyko (Negev Institute for Arid Zone Research, Beersheva, Israel), K. J. K. Buettner (University of Washington, Seattle), and H. Jusatz (Heidelberger Akademie der Wissenschaften).

4) "Meteoro-pathological Forecasting": P. M. A. Bourke (Irish Meteorological Service), M. Crawford (Commonwealth Bureau of Animal Health, Great Britain), and Frederick Sargent, II (University of Illinois).

As might have been anticipated, the sessions were not uniformly successful. General discussion was frequently limited because there were too many moderators and because the moderators gave their own views instead of leading the discussion. When these problems were avoided, the discussion was lively and productive. Provision had been made for simultaneous translation, and this gave a considerable measure of freedom in discussion. Most of the attending members considered the program a great success, and it was voted that the discussions planned for the 1963 congress should be held in a similar manner.

During the afternoons, participants joined specialized working groups on restricted technical subjects. These groups worked under a moderator, and few formal communications were presented. The members of the groups discussed their own work and attempted to define both the problems and the general implications of current advances in their special areas. In this way they discussed thermoregulation; atmospheric pollution and aerobiology; agrometeorology; the effects of weather and climate on cattle; urban and architectural climatology; the importance of physical environment in conditioning the organism; microclimatic problems; allergic diseases, with special emphasis on the influence of climate on bronchial asthma; ecological climatography; the biological effects of ionization of the air; chemical tests used in bioclimatological research; tropical bioclimatology; and solar radiation in relation to bioclimatology. These discussions were highly successful and will be continued during future meetings.

The scientific caliber of the formal presentations and the discussions was refreshingly high, and there was a distinctly experimental note. The membership seemed ready to come to grips with mesological mechanisms rather than indulge in speculations arising from chance bioclimatological relationships. In particular, the discussion of human bioclimatology was stimulating and sound.

At the business meeting the following executive board was elected: president, F. Sargent, II (United States); vice presidents, M. P. A. Bourke (Ireland), H. Boyke (Israel), and M. Fontaine (France); advisory members, J. L. Cloudsey-Thompson (Sudan) and W. G. Wellington (Canada); and secretary-treasurer, S. W. Tromp (Netherlands). At the business meeting it was also decided that in future the *Journal of Bioclimatology* will be devoted to reviews. There is a great need for critical appraisals of many aspects of bioclimatology, and no current periodical deals extensively with this important field. It was further decided that a publications committee should explore ways of working with abstracting services and in other ways attempt to provide greater access to the diverse literature of the field.

The proceedings of the congress will

be published in book form by Pergamon Press. They will be available early in 1961 at a cost of approximately $10, either from the secretariat of the society at Hofbrouckerlaan 54, Oegstgeest (Leiden), Netherlands, or from the publisher.

FREDERICK SARGENT, II
University of Illinois, Urbana
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Forthcoming Events

March

24–29. National Science Teachers Assoc., Chicago, Ill. (R. H. Carleton, NSTA, 1201 16th St., NW, Washington 6)

26–29. American Assoc. of Dental Schools, annual, Boston, Mass. (R. H. Sullens, 840 N. Lake Shore Dr., Chicago 11, Ill.)

27–31. Temperature—Its Measurement and Control in Science and Industry, natl. symp., Columbus, Ohio. (C. M. Herzfeld, National Bureau of Standards, Washington 25, D.C.)

30–1. Southern Soc. for Philosophy and Psychology, Atlanta, Ga. (D. R. Kenshalo, Dept. of Psychology, Florida State Univ., Tallahassee)

April

3–6. Massachusetts Institute of Technology, centennial celebration, Cambridge. (Office of Public Relations, M.I.T., Cambridge 39)

3–15. Medical Conference, 11th, Nassau, Bahamas. (Bahamas Conferences, P.O. Box 1454, Nassau)

4–6. Electromagnetics and Fluid Dynamics of Gaseous Plasma, intern. symp., New York, N.Y. (J. Fox, Microwave Research Inst., Brooklyn 1, N.Y.)

4–7. Society of Automotive Engineers, natl. aeronautic meeting, New York, N.Y. (E. W. Conlon and G. W. Periman, 485 Lexington Ave., New York 17)

4–8. National Council of Teachers of Mathematics, 39th annual, Chicago, Ill. (F. A. Janacek, J. S. Morton High School, Cicero 50, Ill.)

5–8. Water Relations of Plants, British Ecological Soc., symp., London. (F. H. Whitehead, Botany Department, Imperial College, Prince Consort Road, London, S.W.7)

6–7. Council on Medical Television, annual, Bethesda, Md. (Institute for Advancement of Medical Communication, 33 E. 68 St., New York 21)

7–8. Eastern Psychological Association, Philadelphia, Pa. (C. H. Rush, P.O. Box 252, Glenbrook, Conn.)

7–9. American Assoc. for Cancer Research, 52nd annual, Atlantic City, N.J. (H. J. Creech, Secretary-Treasurer, Inst. for Cancer Research, Fox Chase, Philadelphia 11, Pa.)

7–9. Fleming's Lysozyme, 2nd intern. symp., Milan, Italy. (R. Ferrari, Organizing Committee, Via Modica 6, Milan)

8–9. Histochemical Soc., 12th annual, Atlantic City, N.J. (H. W. Deane, Albert

Einstein College of Medicine, Bronx 61, N.Y.)

9–13. American Assoc. of Cereal Chemists, annual, Dallas, Tex. (J. W. Pence, Western Utilization Research & Development Division, 800 Buchanan St., Albany 10, Calif.)

9–13. American Industrial Hygiene Assoc., Detroit, Mich. (W. S. Johnson, Bethlehem Steel Co., Bethlehem, Pa.)

9–15. American Institute of Nutrition, Atlantic City, N.J. (A. E. Schaefer, ICNND, Bldg. 16A, National Institutes of Health, Bethesda 14, Md.)

10–14. American Soc. of Civil Engineers, Phoenix, Ariz. (W. H. Wisely, 33 W. 39 St., New York 18)

10–14. Detection and Use of Tritium in the Physical and Biological Sciences, intern. symp., Vienna, Austria. (Office of Special Projects, U.S. Atomic Energy Commission, Washington 25, D.C.)

10–15. Federation of American Societies for Experimental Biology, 45th annual, Atlantic City, N.J. (M. O. Lee, 9650 Wisconsin Ave., Washington 14, D.C.)

10–15. Metallic Corrosion, 1st intern. cong., London, England. (Society of Chemical Industry, 14 Belgrave Sq., London, S.W.1)

11–13. Institute of Environmental Sciences, annual, Chicago, Ill. (H. Sanders, Box 191, Mt. Prospect, Ill.)

11–13. Ultrapurification of Semiconductor Materials, conf., A.F. Office of Scientific Research, Boston, Mass. (Miss H. Turin, Conf. Secretary, Electronics Research Directorate, Air Force Cambridge Research Lab., L. G. Hansom Field, Bedford, Mass.)

12–13. Information and Decision Processes, 3rd symp., Lafayette, Ind. (R. E. Machol, School of Electrical Engineering, Purdue Univ., Lafayette)

12–14. Agglomeration, intern. symp., Philadelphia, Pa. (Metallurgical Soc. of the AIME, 29 W. 39 St., New York 18)

12–14. Chemical Soc., anniversary meeting, Liverpool, England. (Chemical Society, Burlington House, Piccadilly, London, W.1)

13–14. Society of Technical Writers and Publishers, 8th annual, San Francisco, Calif. (R. B. Meier, Head Editor, Engineering, Stanford Research Inst., 333 Ravenswood Ave., Menlo Park, Calif.)

17–18. Great Lakes Research, 4th conf., Ann Arbor, Mich. (C. F. Powers, Great Lakes Research Division, 1119 Natural Science Bldg., Ann Arbor)

17–19. Fluid Seal Meeting, intern., Ashford, Kent, England. (Information Officer, British Hydromechanics Research Assoc., South Road, Temple Fields, Harlow, Essex)

17–24. International Congress of Nurses, 12th quadrennial cong., Melbourne, Australia. (Miss D. C. Bridges, Secretary, 1 Dean Trench Street, London, S.W.1, England)

18–20. Chemical Reactions in the Lower and Upper Atmosphere, intern. symp., San Francisco, Calif. (R. D. Cadle, Stanford Research Inst., Menlo Park, Calif.)

18–21. American Geophysical Union and American Meteorological Soc., Washington, D.C. (American Geophysical Union, 1515 Massachusetts Ave., NW, Washington 5, D.C.)

19–21. Southwestern Inst. of Radio Engineers Conf. and Electronics Show, Dallas, Tex. (SWIRECO 61, P.O. Box 7443, Dallas 9)

20–21. Society of Chemical Industry, fungicide symp., London, England. (B. J. Heywood, 103 Harrow Drive, Hornchurch, Essex, England)

20–22. Association of Southeastern Biologists, Lexington, Ky. (H. J. Humm, Department of Botany, Duke Univ., Durham, N.C.)

20–24. Microbial Reactions in Marine Environments, intern. symp., Chicago, Ill. (C. H. Oppenheimer, Inst. of Marine Science, Univ. of Texas, Port Arkansas)

21–22. American Assoc. of Univ. Professors, Boston, Mass. (W. P. Fidler, AAUP, 1785 Massachusetts Ave., NW, Washington 6, D.C.)

23. American Pharmaceutical Assoc., Chicago, Ill. (W. S. Apple, 2215 Constitution Ave., NW, Washington, D.C.)

23–26. American Assoc. of Colleges of Pharmacy, Chicago, Ill. (C. W. Bliven, George Washington Univ., Washington 6, D.C.)

23–27. American Ceramic Soc., 63rd annual, Toronto, Canada. (C. S. Pearce, 4055 N. High St., Columbus 14, Ohio)

23–27. Society of American Bacteriologists, Chicago, Ill. (E. M. Foster, 311 Bacteriology, Univ. of Wisconsin, Madison)

(See issue of 17 February for comprehensive list)

Letters

Fell Swoop

With Tom Brown safely underground for some 250-odd years, perhaps one may be allowed to adapt his famous lines, and to thank Honor B. Fell for her delightful "Fashion in cell biology" [*Science* **132**, 1625 (1960)] as follows:

Well do I like thee, Dr. Fell,
The reason why I fain would tell;
Since fads in cells thou dost dispel,
Well do I like thee, Dr. Fell.

F. B. HUTT
Department of Poultry Husbandry, Cornell University, Ithaca, New York

Statistics and Legalized Gambling

Your 23 December issue [*Science* **132**, 1859 (1960)] contained an excellent editorial on the value of properly weighted and applied statistical evidence. Thornton Page had an article, "Recent statistical studies in astronomy" [**132**, 1870 (1960)] which illustrated fine use of the method.

Unfortunately, there appeared in the same issue [**132**, 1879 (1960)] a prime example of the ignorant and careless use of statistics, a news note entitled, ". . . More is spent on [legalized] gambling than education," which included a statement by the "Council for Financial Aid to Education" to the effect that Americans spend $20 billion a year for *legalized* gambling while only $4.5 billion goes for higher education, the $4.5 representing only half the actual cost, the other half being found in various ways by the institutions.

Neither your editor nor the council, in their zeal for drama, caught the falsity of the *figures* and their statistical misuse.

1) At least 90 percent of legalized gambling is on horse racing, on which there was a turnover of $1 billion in New York and no more than a total of $2.5 billion for the whole country.

2) This money is not all "spent"; 85 percent goes back to the bettors. Even if $4 billion were bet, all but $600 million is retained by the public. Of the $600 million, about $350 million goes for state taxes, some of which is used for higher education. The remaining $250 million goes for upkeep of the tracks and for salaries and purses, and much of it is subject to federal income tax, a fraction of which is included in university grants.

Racing is conducted on a nonprofit basis at all New York tracks—Delaware, Aksarben, Fairgrounds, and Keeneland. The profits are donated for higher education, research, and civic causes. Many more millions are donated each year for the same purposes by the profit-making tracks. Racing and breeding provide employment for thousands who pay taxes to keep the wheels turning.

What did the council mean by "spent" money? Did they mean wasted money? Does anyone really know about "money"? On any basis, higher education does not suffer because of legalized gambling. If all money were put into education and the mere raising of potatoes (production of essentials), we would have the Puritan New England of 1750 (and about 60 percent of our people would be out of work).

Ordinary gambling needs no justification. Those who live in the world of reality realize that it is an established human urge and that even a small wager provides a bit of romance, however fleeting, in the drab life of millions of people.

The majority of the faculty members of our universities are well informed, but all professors are not necessarily intellectuals, and all scientists are not educated, as was readily admitted in his own defense by J. Robert Oppenheimer.

Fortunately we have only a few who deserve to be called eggheads and who would have made the mistake on gambling statistics. However, when they appear they are as conspicuous as the rare drunken son of a religious leader.

More and more academicians are in the spotlight, and more is expected from them than from any other group. Scientists, previously silent, are now articulate (sometimes vociferous) on public matters, and Kennedy has gone to the universities for many high-ranking appointments (and good ones).

For the sake of the students and of the nation, we hope for our educators and scientists a complete education in the "humanities," meaning not only the proper university disciplines but also the humanities of the world at large—knowledge of things in general and of the facts of life.

ESLIE ASBURY
902 Carew Tower, Cincinnati, Ohio

Naming Enzymes

Enzymes are usually named after the substrate used by the investigators who first describe them. The name is not necessarily stable, because further work may show that other substrates are attacked. For instance, tyramine oxidase is now called monaminoxidase because many amines besides tyramine are oxidatively deaminated by the enzyme. Such a change in name is desirable, as is any change which defines more precisely the activity of the enzyme.

These considerations are promoted by the following case history. Some years ago my co-workers and I described and partially purified an enzyme found in some plants and animals which hydrolyzes hydantoin to hydantoic acid [*J. Biol. Chem.* **163**, 683 (1946); **181**, 449 (1949)]. Since no substituted hydantoins were hydrolized, the name hydantoinase seemed appropriate. The enzyme is very active but its function is not clear, since nobody has been able to bring unsubstituted hydantoin into any metabolic scheme. This is always somewhat frustrating.

In 1957, Wallach and Grisolia [*J. Biol. Chem.* **226**, 277 (1957)] further purified the enzyme, which they said we called hydantoin peptidase—a name we had not thought of. This preparation, which was 80-percent pure, hydrolyzed hydropyrimidines as well as hydantoin. They renamed the enzyme hydropyrimidine hydrase, and Dixon and Webb [*Enzymes* (Academic Press, New York, 1958)] rapidly made a further contribution by calling it dihydropyrimidinase.

The enzyme now has a respectability it did not have as a simple hydantoinase, since everyone is interested in pyrimidines and nobody in hydantoin. But, as Wallach and Grisolia showed, the turnover number for hydantoin is 27,000; for hydrouracil, 4300; and for hydrothymine, 420. The K_m for hydantoin is higher than the K_m for the pyrimidines, but these values have not been used as criteria for naming enzymes.

The question is this: Does one name an enzyme after the substrate most rapidly attacked, or after the substrate of most interest? Apparently the latter. One is reminded that some years ago certain towns in Russia changed names in accordance with the current political status of the leaders. Perhaps enzymes should be named in accordance with the current metabolic status of the substrates.

F. BERNHEIM
Duke University Medical Center, Durham, North Carolina

Advancement of Scientists

Please accept my resignation from the AAAS in protest of your policy, which, in my opinion, fails to advance science because of your reluctance to aggressively push for the advancement of *scientists*. I am not denying that you do a good job in disseminating the facts of science, and you may even encourage a certain amount of research. But the fact remains that science will only really be advanced when the scientist himself has gained greater status, more recognition, and more acceptance by the average American as someone to look up to. The American Medical Association has accomplished this for physicians in the United States. What we need is a comparable association that will achieve this for America's Ph.D. scientists.

Whether or not you like this approach, or whether you feel that it goes against the grain of your organization to compromise the scientific ivory-tower tradition, the fact remains that the Ph.D. scientist is not generally compensated in our culture for the sacrifice, effort, and skill that his extensive training entails. I don't like the idea of unions being necessary, but if it takes a "union" (such as the AMA) to get the scientist his due, then any organization dedicated to the advancement of science must transform itself into a union.

My resignation is predicated on the fact that I believe that it is a hopeless task to try to influence the AAAS in regard to its obligation to the scientists. This is not the first correspondence I have had with your office on this subject. Therefore, I feel that I must resign. As a final request I will ask you to print this letter in *Science*.

THEODORE C. KAHN
United States Air Force Hospital, Wiesbaden, Germany