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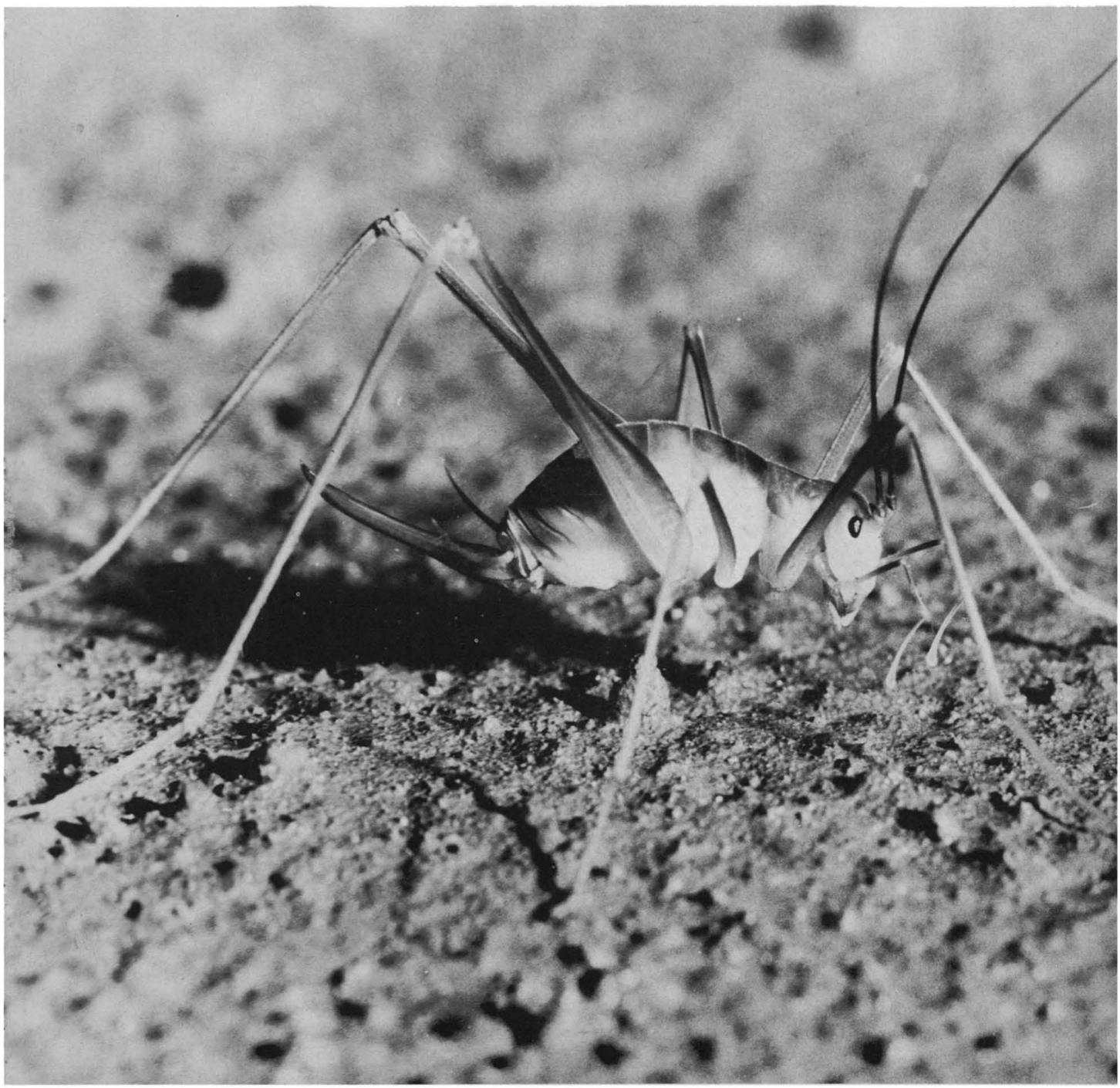
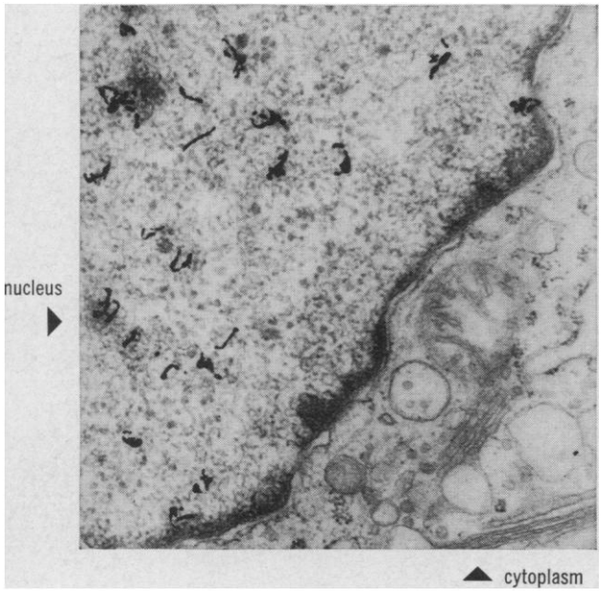


CAVE CRICKET

Kodak reports on:

an emulsion fine-grained enough to be a subject for electron micrography itself . . . decent-sized color prints in 8 minutes

A work of art



This electron micrograph at 30,000× of a salamander cell in which the nuclear DNA has been tritium-labeled may look to artists like nothing but science, though scientists will recognize it as a work of art. Note the delicacy of those dense specks over the nucleus. Each marks the final resting place of a β-particle, delineated in a new KODAK Nuclear Track Emulsion, Type NTE, which has been coated over the tissue section. This new medium much reduces error in locating the organelle whence came the β-particle. The artists who did us the honor of pioneering this medium were Dr. Miriam M. Salpeter and Dr. Luis Bachmann, their *atelier* the Department of Engineering Physics of Cornell University, their sponsor the U. S. Public Health Service. In fulfilment of their role as scientists, they have prepared a detailed description of the technique. Any other scientist who then does it exactly the same fails his role as an artist.

For those details, write Eastman Kodak Company, Special Sensitized Products Division, Rochester, N. Y. 14650. May the marriage of autoradiography and electron micrography prosper!

A place for art and a place for hot water

Since just about any laboratory that ever undertakes photomicrography, metallography, or makes any other use of decent-sized color photographic prints would be embarrassed to have to explain undue delay in acquiring at least one of these devices, we had better explain what it does.

It converts a sheet of KODAK EKTACOLOR Professional Paper into an 11″ x 14″ color print in less than 8 minutes after leaving the enlarging easel. Using well under a dollar's worth of processing chemicals. And an operator who perhaps learned only the same morning of his interest in darkroom artistry. Who proceeds to deliver even and more reproducible results than can be expected from many high-rent square yards of workspace occupied by big trays. Because the drum spins at 200 ft/min. Whipping a homogeneous film of fresh solution over the print. Which is held stationary by the nylon net blanket. Pictured here rolled up as furnished. Along with the thermometer. For checking the hot water. That flows into the drum to keep it at 100°F. So that only 2½ minutes suffices for development. Followed by a tilt of the tray to dump the 4 ounces of developer. And 4-oz. chasers of each of the four other solutions. Punctuated by shots of plain water. With full roomlight permissible for 4½ of the 8 minutes. And that's about all there is to the perfect processing of an 11″ x 14″, 8″ x 10″, or pair of 4″ x 5″ color prints. When enjoying the freedom of choice in number and size of prints that the color-negative method leaves open to you.

Camera shops all across the country are asking less than $200 for this KODAK Rapid Color Processor, Model 11. No, a digit has not been dropped through typographical error.

Price subject to change without notice.

This is another advertisement where Eastman Kodak Company probes at random for mutual interests and occasionally a little revenue from those whose work has something to do with science

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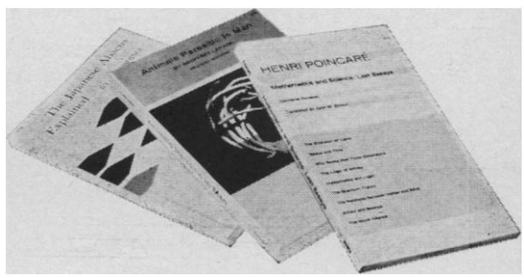

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Hadenoecus subterraneus Scudder (actual size, 30 mm) is an important link in the food chain in Mammoth Cave, Kentucky, and other caves. At night the crickets eat arthropods and other small invertebrates outside the cave. During the day they roost in large colonies on the ceilings of caves; their guano is the major source of food for detritus-feeding cavernicoles. Eggs and first instar nymphs of the crickets are eaten by an eyeless carabid beetle. See page 321. [T. C. Barr, University of Kentucky]

14 NEW BOOKS for your Science Library

RADIOACTIVE METAL MOBILIZATION IN MEDICINE *by* **Alexander Catsch**, *Technische Hochschule and Nuclear Research Center, Karlsruhe, Germany. Translated from the German by* **Bergene Kawin**, *Veterans Administration Hosp., Fort Howard, Md.* Emphasis throughout is on the use of a well-defined group of chelating agents—the synthetic polyaminopolycarboxylic acids. Other approaches—*isotopic dilution, hormones,* and *diuretics* are also treated. A thorough analysis of theoretical foundations precedes the presentation of experiences with human beings. *March '64, about 200 pp., about 46 il. (Amer. Lec. Living Chemistry edited by I. Newton Kugelmass), about $8.00*

LAW, MEDICINE, SCIENCE—AND JUSTICE *edited by* **Larry Alan Bear**, *Univ. of Puerto Rico, Rio Piedras, Puerto Rico. Assisted by* **Brian Parker**. *(With 20 Contributors.)* Provides a common frame of reference for the three great professions of *law, medicine* and *science* insofar as pertains to areas of common endeavor. Shows what an important part the scientist can play in the law's search for truth both in and out of the courtroom. Includes a unique chapter on the forensic scientist, his laboratory and the law. *Feb. '64, 656 pp., 38 ill., $14.50*

PRACTICAL ANALYTICAL METHODS FOR CONNECTIVE TISSUE PROTEINS *by* **J. E. Eastoe**, *Royal College of Surgeons of England, London, England, and* **A. Courts**, *Unilever Research Laboratory, Colworth, England.* Gives full details of procedures required in the laboratory dealing with fibrous proteins and related materials. Thin layer chromatography is described. The applications of this new and important technique to amino acids, DNP-amino acids and sugars are given in detail, and considerable attention is paid to analysis of materials associated with proteins such as mucopolysaccharides. *Dec. '63, 160 pp., il., $8.50*

TECHNIQUES IN MEDICAL COMMUNICATION *by* **Warner F. Bowers**, *New York Medical Coll., New York City.* Packed from cover to cover with stimulating, workable ideas on how to improve medical communication. Includes detailed coverage of medical public speaking, writing the medical paper, data presentation, and planning and presenting a medical meeting. *Should be in the library* of every speaker, writer, administrator, and editor in medical and related technical and scientific fields. *Nov. '63, 96 pp., 21 il., $4.50*

MATHEMATICAL ELEMENTS OF LAMELLAR BONE REMODELLING *by* **H. M. Frost**, *Henry Ford Hosp., Detroit, Mich.* The purpose of this monograph is to aid others who, like the Henry Ford Hospital group, wish to use morphometric analysis of bone as a means for studying cell dynamics both *qualitatively* and *quantitatively*. The problem of language barrier and special concepts has been handled by including a glossary in which definitions are expressed in basic and common scientific language. *Feb. '64, 140 pp., 45 il. (Henry Ford Hospital Surgical Monograph edited by Conrad R. Lam) $6.75*

LECTURES FOR MEDICAL TECHNOLOGISTS *by* **H. Ivan Brown**, *The Methodist Hospital of Central Illinois, Peoria, Ill.* With Contributions by Naomi Buchanan, Oscar T. Monson, J. Leonard Watson, and Raymond M. Zwicker. Published by popular request of both present and past students of the author, this book represents 200 formal lectures designed to cover the medical background for various specialty fields represented in the clinical laboratory. *Encompasses all departments* including hematology, blood coagulation, blood banking, serology, bacteriology, parasitology, physiological chemistry, metabolic studies, urinalysis, toxicology, and histopathology. *March '64, 660 pp. (7 x 10), 285 il., 33 tables, $19.50*

PHYSIOLOGICAL PROBLEMS IN SPACE EXPLORATION *edited by* **James D. Hardy**, *Yale Univ., New Haven, Conn. (With 7 Contributors)* Seven experts present background information on important aspects of space psychophysiology . . . temperature problems, high energy radiations, gaseous requirements (respiration), food requirements, acceleration, weightlessness and subgravity problems, sensory and perceptual problems, isolation and disorientation, and physiologic rhythms. *April '64, about 368 pp., 100 il. (Amer. Lec. Physiology), about $14.75*

THE PHYSICS OF RADIOLOGY (2nd Ed., Rev. 2nd Ptg.) *by* **Harold Elford Johns**, *Univ. of Toronto, Toronto, Canada.* Includes chapters on diagnostic radiology, isotopes, protection, radiobiology, and rotation therapy. *Detailed calculations show how absorbed dose in rads may be obtained from exposure dose in roentgens.* All statements of dose for x-rays, radium and isotope therapy are based on the rad. Radiation physicists will be especially interested in extensive data on absorption coefficients and related topics. *March '64, 788 pp. (7 x 10), 469 il. (Amer. Lec. Radiation Therapy edited by Milton Friedman), about $23.00*

SOME MEDICAL ASPECTS OF MATHEMATICAL BIOLOGY *by* **Nicolas Rashevsky**, *Univ. of Chicago, Chicago, Ill.* Designed to show how mathematical biology may be applied to various medical problems . . . to the retention of particulate material in the respiratory passages, certain aspects of cardiovascular dynamics, pharmacological problems, periodic phenomena in the endocrine system, and certain aspects of the central nervous system with special reference to neuroses. The reader will require a basic knowledge of calculus and differential equations. *Feb. '64, 342 pp., 60 il., 31 tables (Amer. Lec. Living Chemistry), $12.75*

COMPUTER APPLICATIONS IN MEDICINE *by* **Edward E. Mason** *and* **William G. Bulgren**, *both of State Univ. of Iowa, Iowa City, Iowa.* Provides a complete report on the present state-of-the-art. Also outlines steps of computing in a medical research project . . . design of experiments, data collection, selection of computer library programs, writing a special program in FORTRAN, and processing and interpretation of results. Some detail is included on selection of scales and transformation. *Jan. '64, 188 pp., 7 il. (Amer. Lec. Living Chemistry), $6.75*

ELECTRONIC AND COMPUTER-ASSISTED STUDIES OF BIO-MEDICAL PROBLEMS *edited by* **Otto H. Schmitt,** *Univ. of Minnesota, Minneapolis, Minn., and* **Cesar A. Caceres**, *U.S. Public Health Service, Washington, D.C. (With 34 Contributors)* Experts in bio-medical electronics examine prospects for the development of electronic computers and related equipment to aid in the "life sciences." The subject is complex but it is one that can reshape much in the practice of medicine. *Will interest all those in engineering, medicine, and biology. Feb. '64, 344 pp., $12.50*

CHEMISTRY AND PREVENTION OF CONGENITAL ANOMALIES *by* **Hideo Nishimura**, *Kyoto Univ., Kyoto, Japan. With the assistance of* **Joan Staats,** *Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine.* An outstanding contribution to a new field of science in which leading the unborn child to the most favorable postnatal life is the aim. Measures for prevention of congenital anomalies are discussed from the point of view of individual medicine as well as public health. *March '64, 132 pp., 16 il. (Amer. Lec. Living Chemistry), $5.75*

THE A.T.A. MANUAL OF LABORATORY ANIMAL PRACTICE AND TECHNIQUES (From Animal Technicians Association) *edited by* **Douglas J. Short**, *M.R.C. Human Nutrition Research Unit, London, England, and* **D. P. Woodnott**, *M.R.C. Laboratory Animals Centre, Carshalton, England.* A ready reference on the practical, everyday problems of running an animal house. A brief summary of the contents includes the law and laboratory animals, animal house design, methods of identification, routine care, humane killing, preparation for surgery and post-operative care, breeding, and nutrition. *Dec. '63, 360 pp., 120 il., $9.75*

THE CHEMICAL ORIGIN OF LIFE *by* **Alexander I. Oparin**, *Bach Institute of Biochemistry, Moscow, U.S.S.R. Translated from the Russian by* **Anne Synge**, *Stonehaven, Scotland.* In this classic monograph Doctor Oparin describes in as great detail as achievements of contemporary science will allow the three stages in the evolution of organic substances which preceded the appearance of life on Earth. He makes the widest possible use of the data of evolutionary biochemistry to sketch in a picture of later development of biological metabolism and cellular structure. *March '64, about 120 pp., 33 il. (Amer. Lec. Living Chemistry), about $4.75*

droxide. The solution is acidified with 10 ml. of 1:1 sulfuric acid then diluted to exactly 1 liter with distilled water. The vanadium concentration is determined by the sulfur dioxide and standard permanganate procedure (*2*).

Mixed Acid. Concentrated sulfuric, nitric, and hydrochloric acids, and distilled water are mixed in the volume ratio of 1:2:2:3, respectively.

All spectrophotometric measurements were made at 25° C. with either a Beckman DU or Beckman DB spectrophotometer using 1-cm. matched silica cells.

Recommended Procedure. Weigh an appropriate size sample of aluminum powder (2 to 5 grams, but not to exceed 0.4 mg. of V) into 600-ml. beakers. Dissolve by careful repeated addition of 0.5- to 1.0-ml. portions of mixed acid. (Violent reaction and frothing occur with larger repeated acid additions.) After the reaction subsides (85% dissolved), add more of the acid mixture to make a total volume of ca. 175 ml. Evaporate this mixture to strong fumes of sulfuric acid (ca. 50 ml.). Cool, add 15 ml. of 85% phosphoric acid, and dilute to 200 ml. with distilled water. Heat to boiling and add 1.5 ml. of 0.5*M* sodium tungstate solution. Add 4% sodium permanganate solution to the boiling mixture until it remains pink after boiling for 5 minutes. Then carefully discharge pink color with 1 to 2 drops of 1:4 HCl. Destroy excess HCl (if any) with 1 to 2 drops of the 4% sodium permanganate to just the first pink color. Cool the mixture, transfer it to a separatory funnel, and dilute it to 350 ml. with distilled water. Add 18 ml. of *n*-hexanol to the solution in the separatory funnel. Shake for 30 to 40 seconds, let stand 3 to 5 minutes, and remove the aqueous phase. Add 30 ml. of 2.5*M* H_2SO_4 to the *n*-hexanol extract, shake for 30 to 40 seconds, and let the phases separate. Remove

$\log[BiX_2^{3-}]/[BiX][X^{3-}]=9.54$ である。

ちいて恒温槽中で 25°±0.1°C に保持した。

特性は 0.1N 塩化カリウム溶液中において

$t=4.70$ sec(開回路) である。電解液の調製

A溶液を適量とって緩衝溶液を加えてイオン

し，窒素ガス通気したの

大抑制剤は使用しなかった。pH の測定には

ーターを使用した。

紫外吸収スペクトルの測定には島津自記光電

27型と Beckmann DU 分光光度計を使用し，

の石英製を使用した。

被検液の調製はビスマス溶液，NTA溶液を

酸と水酸化ナトリウムで pH を調節し，イオン強

定した。なお，緩衝溶液はもちいなかった。温度

測定した。

3 実験結果および考察

3.1 ビスマス-NTA錯塩のポーラログラフ波

ビスマス 4.8×10^{-4} mol/l，NTA 10^{-2} mol/l

酢酸ナトリウム緩衝溶液を加えてイオン強度を 0.2

化ナトリウムと過塩素酸で pH を調節した被検液に

ログラムを記録した。図1に示すように2段波を示す

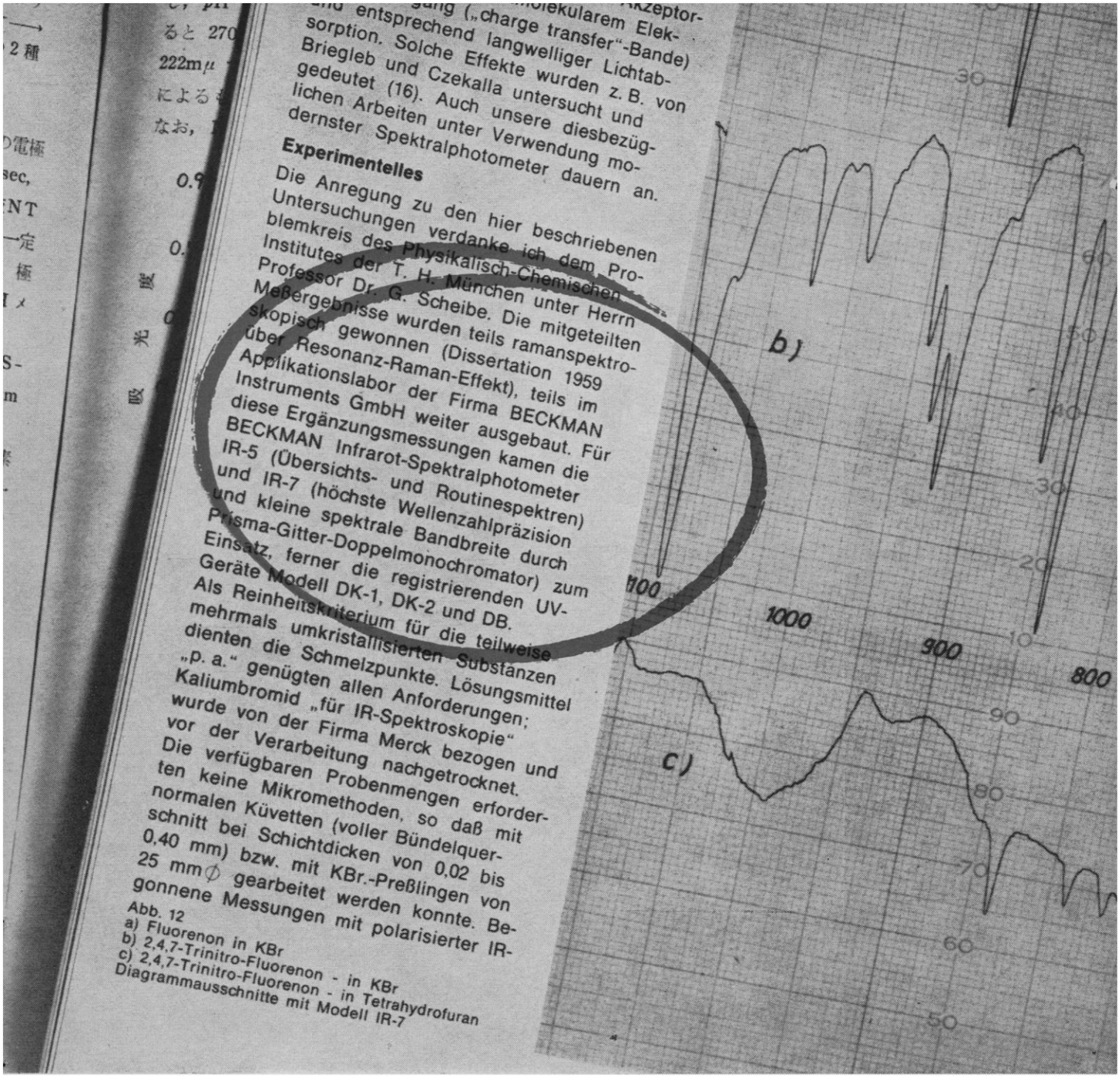
明確な第3波がみられるがこれについてはのちに述べ

高くなるにつれて半波電位は負側へ移行し，第1波は

2波が増大する。半波電位の位置からみて第1波は錯

たビスマス単イオンの還元波ではなく，両波ともに錯

還元によるもので，2種の錯体が共存し，平衡をたも



Makes sense too.

That our DU® and DB* ultraviolet spectrophotometers get so many mentions in the literature of so many languages.

For these models represent worldwide standards of precision in ultraviolet spectrophotometers.

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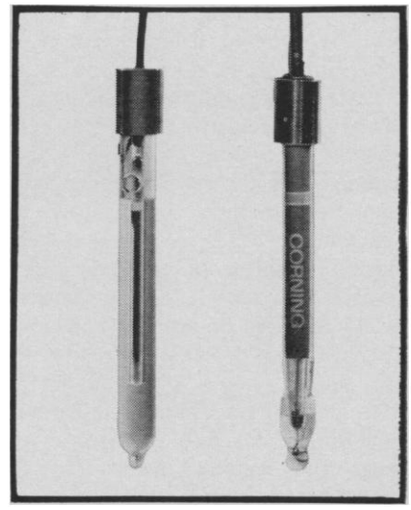

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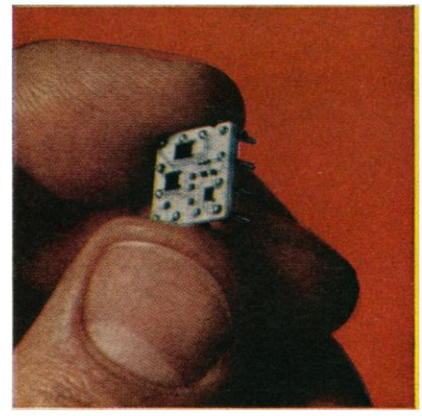

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All this adds up to more thruput, better machine utilization and faster answers to problems.

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With SYSTEM/360 you pick and choose from the broadest array of input/output devices and processing power ever offered in one system. You can select from tapes, direct-access storage, printers, communications terminals, card, paper tape and character readers and visual display devices.

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SYSTEM/360 solves today's problems efficiently. It expands without a lot of costly reprogramming, to solve tomorrow's problems.

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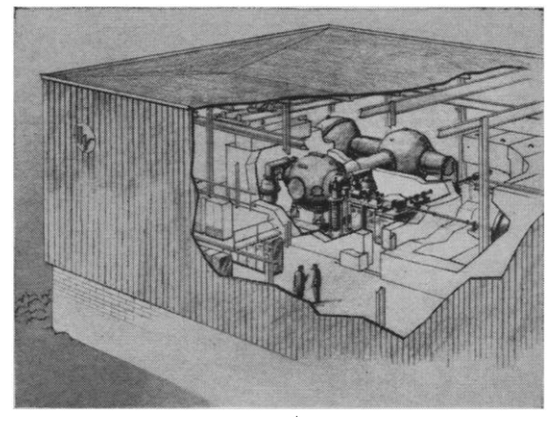
ACCELERATOR AUXILIARIES: how HVEC research programs broaden the versatility of particle accelerators

New HVEC Tandem Research Laboratory

Expanding the versatility and flexibility of particle accelerator systems requires a continuing research and development effort. HVEC's new Tandem Research Laboratory will be an outstanding contribution to this effort.

This new $1.5 million laboratory will have five important missions:

(1) To examine basic acceleration processes, ion beam formation and handling, and voltage handling and stabilization in the presence of intense ion beams;
(2) To develop single-stage tandem injectors and two-stage tandem accelerators capable of proton and negative hydrogen currents in the tens-of-milliampere range;
(3) To develop high proton current capabilities of 3-stage tandem accelerators;
(4) To enable tandems to handle all the heavy ions that can be generated;
(5) To develop neutral-beam tandem injector technology.

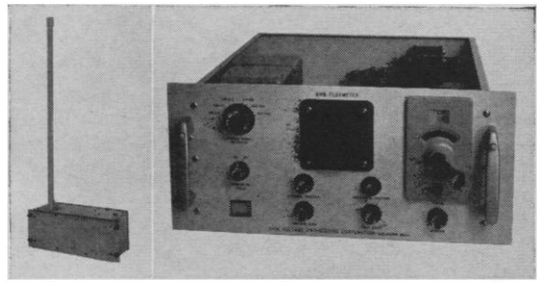


A 3-MV ICT-powered Tandem Accelerator and another higher energy machine to allow complete testing of 3-stage tandem operation will be housed in the new 20,000 square-foot laboratory which will be staffed by 20 research personnel.

New High-Transmission System

Analyzed proton currents in the order of 10 to 15μA can be achieved over the entire energy range of Model EN and FN Tandem Accelerators equipped with inclined field tubes by the use of a newly developed high-transmission system. The system is now available from High Voltage and can be installed in the field or delivered with new machines.

New Single-Probe Fluxmeter

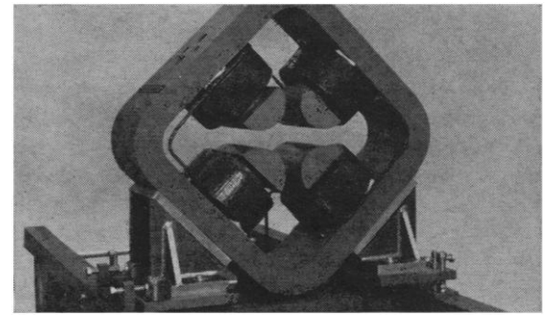


This new NMR fluxmeter allows convenient and accurate determination of magnetic field strengths over a range of 900 gauss to 19 kilogauss. A single probe covers the entire range; there is no need for probe changing and/or shunting. Accuracy is one part in 10^5 and signal-to-noise ratio is 20 db, making the unit easily tunable. At magnetic fields exceeding 10 kilogauss, the proton probe is at least one hundred times more sensitive then deuterium or lithium.

New Magnetic Auxiliaries

A new multiport switching magnet, Model 70-88, is available for use with HVEC Tandem Accelerators. The new switching system will deflect a 77 MeV proton through an angle of 70°.

The new HVEC Quadrupole Lens Model QMD 2.5-360 has been designed for use with the Model 70-88 Switching Magnet beam tube extension. The lens aperture is 2.5 in. and the field at the pole tip center is 2.25 kg/in. Shown at right: new 5-in. aperture Quadrupole Lens Model QMS-5-1100.



HVEC accelerator auxiliaries are all designed to enhance the versatility and flexibility of HVEC accelerator systems.

For detailed information, please write to Technical Sales, High Voltage Engineering Corporation, Burlington, Massachusetts.

HIGH VOLTAGE ENGINEERING

17 April 1964, Volume 144, Number 3616

SCIENCE

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Chemistry in the Universities

Adequate financial support for basic research in chemistry in universities should enjoy a very high priority among the federal granting agencies. Chemistry is crucial to both science and technology. Advances in most sciences are dependent both on superior chemical techniques and on new fundamental understanding of matter and its reactions. Chemistry is central to many fields, including biochemistry, molecular biology, neurochemistry, chemotaxonomy, and solid-state physics.

Advances in pure chemistry are necessary to progress in applied chemistry, including such fields as polymers, petrochemicals, and chemotherapeutics. Almost all products that meet man's urgent needs depend upon chemistry. Food, clothing, shelter, transportation, and recreation involve this science at every turn.

During the last decade chemistry has been out of the spotlight as attention has been focused on atomic energy, electronics, and space. In all these activities the science has had an important though not clearly visible role. It appears that we are now to have a period of peaceful economic competition among nations. Under such conditions exploitation of chemistry's potentialities will be essential to success. Over the long haul the strongest nation will be the one which applies chemistry most effectively. The long-range interests of our nation require a strong chemical profession, and basic to this are strong chemistry departments in the universities.

The universities serve two roles; they are a source of new fundamental knowledge, and they educate. For chemistry the first function is in part filled by industry, but there is no substitute for the training function. Out of a total of 6,900 Ph.D. degrees in science and engineering given in the United States in the academic year 1960–61, 1,140 were in chemistry.

Until recently the need for federal support in chemistry was urgent but not acute. Many fellowships were supported by the universities and by industry. Costs of supplies and equipment were comparatively modest. This is no longer true. The style of chemical research has changed. Today's well-equipped laboratory is a maze of electronic gear. There is now a critical need for modern instruments and equipment in university chemistry laboratories. These must be provided if training and research are to be geared to the future and not to the past.

In the light of the importance of chemistry and the number of students being trained, a fraction approaching one-sixth of the total support for basic research should go to chemistry. But this does not happen. Out of a budget of $322 million in fiscal 1963, the National Science Foundation devoted $9.5 million to chemistry. During this time total government support of basic research in chemistry in universities amounted to about $37,800,000. In the same period the space agency was providing more than $500 million for research in space, and another $3.2 billion for development work. In fiscal 1964 NSF support for chemistry is scheduled to decline, while support for NASA has increased more than 30 percent. This disparate treatment of what is essential and what is glamorous points up a weakness in federal support of research. With growing international competition we cannot afford to be prodigal in our financial or intellectual expenditures. We must find better mechanisms for allocating our investments in the future if we are to have a future.—PHILIP H. ABELSON


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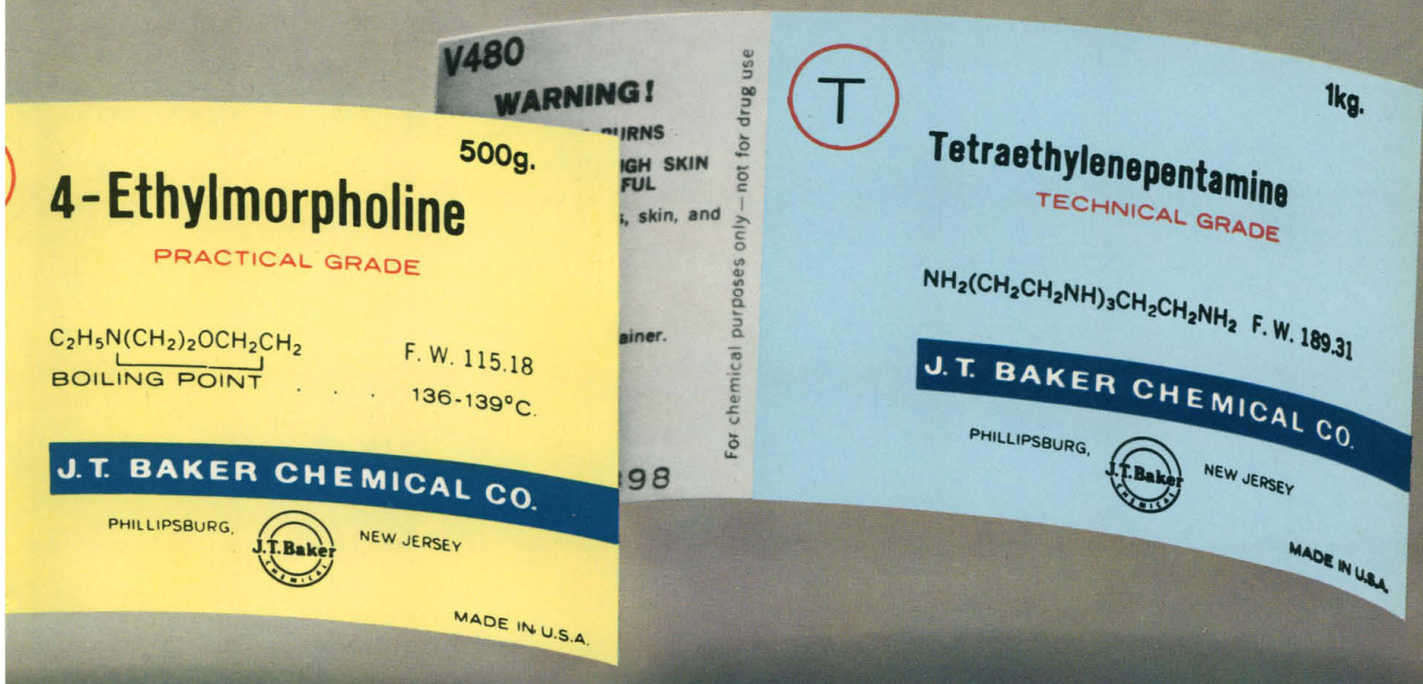

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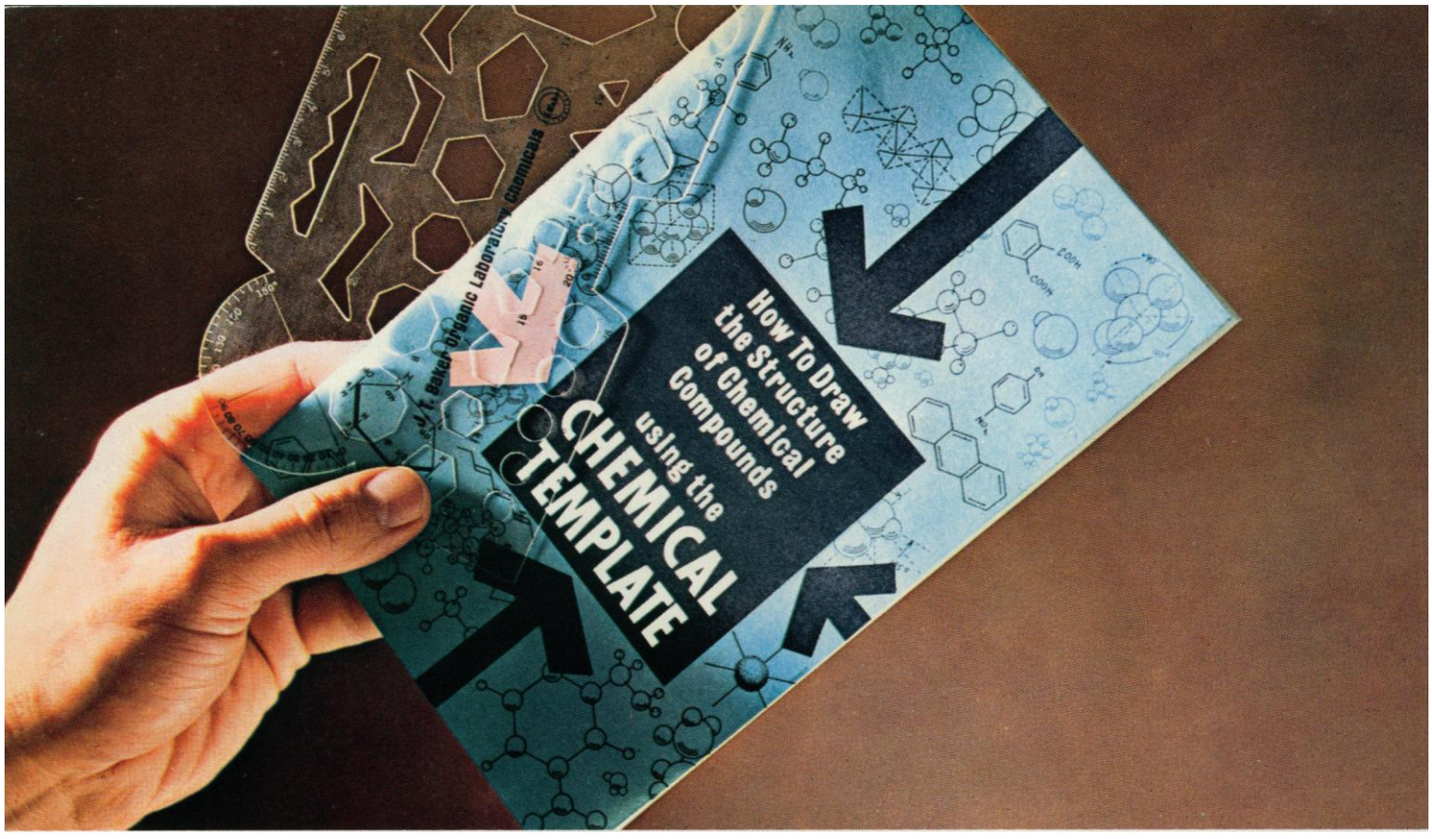

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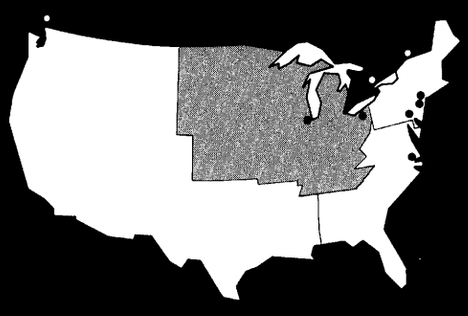

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pound dermal structures as mesectoderm inductions, derived from a modification of a fundamental structure resembling the present toothbud. Enamel is thus considered a phylogenetically old material rather than a recent invention. Moss elaborated this hypothesis and commented on such implications as the essential homology of the keratinized beak of turtles to the external portions of teeth; both were derived by modifications of the enamel organ. Amino acid analysis was stated to have established the homology of mammalian enamel, shark (denticle) enamel, the elastoidin of dermal fin rays, and the ichthylepidin of teleost scales. All are ectodermal collagens.

The active discussion elicited the comment (by Moss) that conodont fossils should, on morphologic and crystallographic grounds, be considered of nonvertebrate origin.

Robert A. Robinson (Johns Hopkins) discussed the results of studies in the ultrastructure of hard tissues. He showed that the nature of the bone matrix exhibits recognizable quantitative but not qualitative differences between most forms (differing on the family level) yet checked for this point. Analysis suggests that the osteoblasts produce a hydrated collagen fibril matrix that appears to achieve a characteristic ratio of mineral plus residual (that is, bound) matrix water to organic matter when mineralized. Distinctive ratios are obtained from hard tissues deposited on the collagen matrices formed by epiphyseal cartilage cells and odontoblasts. Calculations indicate that mineral exchange in the living animal could occur along the exposed interior surfaces of the marrow canal, the osteocyte spaces, and the canaliculi. This diffuse distribution might satisfy the mineral homeostatic needs of the animal without necessarily requiring exchange at "hot spots." "Hot spots" represent regions of very high water and low mineral content.

The studies confirm the transformation of osteoblasts into osteocytes, but as yet cannot refute the argument that osteoclasts could be alternate modifications of a primitive cell rather than manifestations of the same cell in different phases of metabolic activity.

In discussing aspects of the blood-bone continuum, Marshall R. Urist (U.C.L.A.) interpreted the physiological function of hard tissues to be one of storage. Calcified areas and body fluids then are tied into a single feedback cycle. He supported this with data derived from comparisons of vertebrate groups in general and of related fishes inhabiting marine and freshwater environments in particular. Calcification is believed to have arisen in fresh or brackish waters and to have served both as a storage reservoir that permitted some ionic independence and as a supporting-protecting structure. Any diffuse or localized calcification would serve for ion storage, but distinct mechanical presence of calcification was required for structural functions.

Carl Gans (State University of New York at Buffalo) was chairman of the meeting and Warren F. Walker (Oberlin) organized the symposium. Discussant was Bobb Schaeffer (American Museum of Natural History).

CARL GANS
Department of Biology, State University of New York at Buffalo

Forthcoming Events

April

21–24. American **Geophysical Union**, Washington, D.C. (AGU, 1515 Massachusetts Ave., NW, Washington, D.C.)

22–24. Institute of **Electrical and Electronics Engineers**, 16th annual southwestern conf., Dallas, Tex. (F. E. Brooks, Jr., Military Electronics Div., Ling Temco Vought, P.O. Box 6118, Dallas 75222)

22–24. British Inst. of **Radiology**, 25th congr., London, England. (British Institute of Radiology, 32 Welbeck St., London, W.1)

22–25. National Council of **Teachers of Mathematics**, Miami Beach, Fla. (H. T. Karnes, Dept. of Mathematics, Louisiana State Univ., Baton Rouge 3)

23–25. American **Gastroenterological** Conv., Philadelphia, Pa. (C. E. Nelson, 313 N. First St., Ann Arbor, Mich.)

27–1. **Photographic Science and Engineering**, intern. conf., New York, N.Y. (W. Clark, Eastman Kodak Laboratories, Rochester, N.Y. 14650)

28–1. Dallas-Southwest **Industrial Trade** Fair, Dallas, Tex. (C. L. Wells, P.O. Box 26010, Dallas 26)

29–1. **Acoustical Fatigue**, 2nd intern. conf., Dayton, Ohio. (D. M. Forney, Research and Technology Div., U.S. Air Force Systems Command, Wright-Patterson Air Force Base, Dayton)

29–2. **Peaceful Uses of Space**, 4th natl. conf., Boston, Mass. (G. A. Rogovin, 501 Boylston St., Boston 16)

29–2. American **Thyroid** Assoc., annual, Rochester, Minn. (T. Winship, ATA, 110 Irving St., NW, Washington, D.C. 20010)

30–1. Institute of **Hospital Administrators**, annual, Edinburgh, Scotland. (IHA, 75 Portland Place, London, W.C.1, England)

30–1. **Zonal Centrifugation Systems**, Oak Ridge, Tenn. (F. C. Von der Lage,

Office of Industrial Cooperation, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn. 37831)

30–2. **Agricultural History** Soc., annual, Cleveland, Ohio. (A. G. Bogue, History Dept., Univ. of Iowa, Iowa City)

30–2. American **Cleft Palate** Assoc., 22nd annual, Los Angeles, Calif. (ACPA, Parker Hall, Univ. of Missouri, Columbia 65202)

30–2. Midwestern **Psychological** Assoc., 36th annual, St. Louis, Mo. (F. A. Mote, Psychology Dept., Univ. of Wisconsin, Madison 53706)

30–3. Wilson **Ornithological** Soc., Kalamazoo, Mich. (P. B. Hofslund, Biology Dept., Univ. of Minnesota, Duluth)

30–6. Mexican Natl. Acad. of **Medicine**, Mexico City. (A. Lavarez-Bravo, Unidad de Congresos del Centro Mexico, Bloque "B", Av. Chauhtenoc 330, Mexico, D.F.)

May

1. Chemical Inst. of Canada, **Rubber Chemistry** Div., annual, Niagara Falls, Ont. (CIC, 48 Rideau St., Ottawa, Ont.)

1–2. American **Type Culture** Collection, symp., Washington, D.C. (W. A. Clark, 12301 Parklawn Dr., Rockville, Md.)

1–2. Association of **Clinical Scientists**, Philadelphia, Pa. (R. P. MacFate, 54 W. Hubbard St., Chicago, Ill. 60610)

1–2. **Minnesota Acad. of Science**, Moorhead. (M. R. Boudrye, 3100 38th Ave. S., Minneapolis 6, Minn.)

1–2. **Nebraska Acad. of Sciences**, Lincoln. (C. B. Schultz, 101 Morrill Hall, Univ. of Nebraska, Lincoln 8)

1–2. **North Dakota Acad. of Science**, Fargo. (B. G. Gustafson, Univ. of North Dakota, Extension Div., Grand Forks)

1–3. Society of **Biological Psychiatry**, Los Angeles, Calif. (H. E. Himwich, SBP, Galesburg State Research Hospital, Galesburg, Ill.)

1–3. **Wisconsin Acad. of Sciences, Arts, and Letters**, annual, Wausau. (W. E. Scott, 1721 Hickory Dr., Madison, Wis.)

1–4. American **Psychoanalytic** Assoc., annual, Los Angeles, Calif. (Mrs. H. Fischer, APA, 1 E. 57 St., New York N.Y. 10022)

2–3. Academy of **Psychoanalysis**, annual, Los Angeles, Calif. (J. R. Royce, The Academy, 125 E. 65 St., New York, N.Y. 10021)

3–7. **Electrochemical** Society, spring meeting, Toronto, Ont., Canada. (ES, 30 E. 42 St., New York, N.Y. 10017)

3–7. American Soc. for **Microbiology**, annual, Washington, D.C. (American Inst. of Microbiology, 115 Huron View Blvd., Ann Arbor, Mich.)

3–9. **Medical Biological** Congr., Mutters, Austria. (P. Newhaüser, Abilindastr. 52a, München-Gräfelfing, Germany)

4–5. **Bioengineering**, 1st annual Rocky Mountain symp., U.S. Air Force Acad., Colorado Springs, Colo. (R. J. Gowan, Dept. of Electrical Engineering, U.S. Air Force Acad., Colorado Springs 80840)

4–5. **Chemical and Petroleum Instrumentation**, 5th natl. symp., Instrument Soc. of America, Wilmington, Del. (G. H. Robinson, Engineering Dept., E. I. duPont de Nemours Co., Wilmington)

4–6. Instrument Soc. of America, **Biomedical Sciences** Div., 2nd natl. symp.,

Albuquerque, N.M. (R. F. Rust, Brooks, Feeger Assoc., 1238 Ortiz S.E., Albuquerque)

4–6. American Inst. of Aeronautics and Astronautics, **Aerospace Propulsion** meeting, Cleveland, Ohio. (AIAA, 500 Fifth Ave., New York, N.Y. 10036)

4–6. Aerospace **Instrumentation**, 10th natl. symp., Instrument Soc. of America, New York, N.Y. (ISA, 530 William Penn Pl., Pittsburgh 19, Pa.)

4–6. Asymptotic Solutions of **Differential Equations** and Their Applications, symp., Madison, Wis. (C. Wilcox, Mathematics Research Center, Univ. of Wisconsin, Madison 53706)

4–6. American Soc. for **Quality Control**, 18th annual conv., Buffalo, N.Y. (ASQC, 161 West Wisconsin Ave., Milwaukee 3, Wis.)

4–6. Inhaled **Radioactive Particles and Gases**, symp., Richland, Wash. (W. J. Bair, Biology Laboratory, Hanford Laboratories, Richland, Wash.)

4–7. **Biomedical Sciences Instrumentation**, 2nd natl. symp., Instrument Soc. of America, Univ. of New Mexico, Albuquerque. (P. F. Salisbury, St. Joseph Hospital, 501 S. Buena Vista St., Burbank, Calif.)

4–8. American **Psychiatric** Assoc., 120th annual, Los Angeles, Calif. (W. E. Barton, 1700 18th St., NW, Washington, D.C.)

4–8. **Strata Control and Rock Mechanics** intern. conf., New York, N.Y. (S. Boshkov, School of Mines, Columbia Univ., New York, N.Y.)

4–22. United Nations Commission on **Narcotic Drugs**, 19th session, Geneva, Switzerland. (UN, Palais des Nations, Geneva)

5–6. **Human Factors in Electronics**, 5th natl. symp., San Diego, Calif. (M. Freitag, 1910 Shire Dr., El Cajon, Calif.)

5–7. **Electronic Components Conf.**, Washington D.C. (J. Bohrer, 401 N. Broad St., Philadelphia, Pa.)

5–9. **Nuclear Radiation** Hazards, intern. symp., Intern. Civil Defence Organization, Monaco. (ICDO, 28 avenue Pictet-de-Rochemont, Geneva, Switzerland)

5–9. **Virginia Acad. of Science**, Charlottesville. (R. C. Berry, P.O. Box 8315, Richmond, Va.)

6–7. **Laser/Electron Beam**, seminar, Chicago, Ill. (R. Aptekar, Information Services Dept., American Soc. of Tool and Manufacturing Engineers, 10700 Puritan Ave., Detroit, Mich. 48238)

6–7. **Optical Masers** Symp., Toronto, Ont., Canada. (R. N. Hall, General Electric Research Laboratory, P.O. Box 1088, Schenectady, N.Y.)

6–8. American Assoc. of **Genito-urinary Surgeons**, Rye, N.Y. (2020 93rd St., Cleveland 6, Ohio)

6–8. **Psychosomatic Research**, European conf., Athens, Greece. [G. S. Philippopoulos, 4 Monis Petraki St., Athens (140)]

6–8. Society for **Experimental Stress Analysis**, spring meeting, Salt Lake City, Utah. (B. E. Bossi, 21 Bridge Sq. Westport, Conn.)

6–9. **Acoustical Soc.** of America, 66th spring meeting, New York, N.Y. (W. Waterfall, 335 E. 45 St., New York, N.Y.)

7–8. **Vacuum Microbalance Techniques**, 4th conf., Pittsburgh, Pa. (F. A. Brassart, Westinghouse Research and Development Center, Beulah Rd., Pittsburgh 35)

7–8. International College of **Surgeons**, British section, summer meeting, London. (Secretariat, 1516 Lake Shore Dr., Chicago, Ill. 60610)

7–9. Society for American **Archaeology**, 30th, Chapel Hill, N.C. (W. H. Sears, Florida State Museum, Gainesville)

7–9. Society of **Neurological Surgeons**, Rochester, Minn. (SNS, Duke Univ. Medical Center, Durham, N.C.)

7–10. International Assoc. for **Bronchology**, 14th congr., Vienna, Austria. (Secretariat, Vienna Acad. of Medicine, 4, Alserstr., Vienna 9)

8–9. **Colorado-Wyoming Acad. of Science**, Denver, Colo. (Mrs. C. Norton, Dept. of Botany, Colorado State Univ., Fort Collins)

8–9. **North Carolina Acad. of Science**, Davidson. (J. A. Yarbrough, Meredith College, Raleigh, N.C.)

8–9. **Surgical Research** Soc., Sheffield, England. (A. P. M. Forrest, Surgical Unit, Cardiff Royal Infirmary, Newport Rd., Cardiff, South Wales)

8–9. **Surface Physics**, Washington State Univ. Pullman. (E. E. Donaldson, Physics Dept., Washington State Univ., Pullman)

8–20. **Space Research**, 7th plenary meeting, ICSU committee, Florence, Italy. (E. R. Dyer, Jr., National Acad. of Sciences–National Research Council, 2101 Constitution Ave., Washington, D.C.)

10–14. **Cardiology**, 3rd Asian-Pacific congr., Kyoto, Japan. (S. Hayase, Medical Clinic, Kyoto Univ. Hospital, Sakyo-ku, Kyoto)

10–14. French Soc. of **Ophthalmology**. 71st congr., Paris. (M. A. Dollfus, Societé Français d'Ophthalmologie, 27, rue du Faubourg-Saint-Jacques, Paris 16e)

10–14. American **Proctologic** Soc., Philadelphia, Pa. (APS, 7815 East Jefferson, Detroit 14, Mich.)

10–15. **Photographic Science and Engineering**, intern. conf., Palisades Park, N.J. (Executive Secretary, Soc. of Photographic Scientists and Engineers, Box 1609, Main Post Office, Washington, D.C.)

11–13. **Aerospace Electronics**, 16th natl. conf., Dayton, Ohio. (Y. Jacobs, 1917 Burbank Dr., Dayton 45406)

11–14. Society for **Industrial and Applied Mathematics**, spring meeting, Washington, D.C. (SIAM, Box 7541, Philadelphia 1, Pa.)

11–14. American **Urological** Assoc., annual, Pittsburgh, Pa. (AUA, 1120 North Charles St., Baltimore, Md.)

11–16. Assessment of **Radioactive Body Burdens** in Man, symp., IAEA, Heidelberg, Germany. (IAEA, Div. of Public Information Kärntnerring 11, Vienna, Austria.)

11–14. **Aerospace Medical** Assoc., 35th annual, Bal Harbour, Fla. (W. J. Kennard, c/o Washington Natl. Airport, Washington, D.C. 20001)

11–14. **Biological Editors**, conf., Ann Arbor, Mich. (R. L. Zwemer, Committee on European Editors, c/o American Physiological Soc., 9650 Wisconsin Ave., Bethesda, Md. 20014)

11–16. International College of **Surgeons**, 14th intern. congr., Vienna, Austria. (S. E. Henwood, 1516 Lake Shore Dr., Chicago, Ill. 60610)

12. American Inst. of **Chemical Engineers**, tri-sectional symp., Newark, N.J. (R. H. Dodds, Gibbs & Hill, Inc., 393 Seventh Ave., New York, N.Y.)

13–14. Society of **Plastics Engineers**, plastics in space, conf., Garden City, N.J. (D. Hassel, Grumman Aircraft Engineering Corp., Bethpage, L.I., N.Y.)

13–15. **Biomathematics and Computer Science** in the Life Sciences, 2nd annual symp.. Houston, Tex. (Univ. of Texas Graduate School of Biomedical Sciences, 102 Jesse Jones Bldg., Texas Medical Center, Houston 77025)

13–15. Society of Professional **Well Log Analysts**, 5th intern. symp., Midland, Tex. (F. Wheeler, SPWLA, P.O. Box 4713, Tulsa 14, Okla.)

14–15. **Radiochemical Processing** Symp., Buffalo, N.Y. (R. F. Lumb, Western New York Nuclear Research Center, Power Drive, Buffalo 14214)

14–15. **Scandinavian Biochemistry** Meeting, Stockholm, Sweden. (Sveriges Biokemiska Förenig, Karolinska Inst., Stockholm 60)

14–16. American Inst. of **Industrial Engineers**, 15th annual conf., Philadelphia, Pa. (W. J. Jaffe, Dept. of Management Engineering, Newark College of Engineering, Newark, N.J.)

14–16. Central States **Anthropological** Soc., annual, Milwaukee, Wis. (N. O. Lurie, Dept. of Anthropology, Univ. of Wisconsin, Milwaukee 11)

14–16. Society of **Technical Writers and Publishers**, 11th annual conv., San Diego, Calif. (C. M. Johnson, U.S. Navy Electronics Laboratory, San Diego 92132)

16–2. European **Energy** Conf., Paris, France. (H. Perdon, Institut Français des Combustibles et de l'Energie, 3, rue Henri-Heine, Paris 16e)

17–20. American Inst. of **Chemical Engineers**, natl. meeting, Pittsburgh, Pa. (F. J. Van Antwerpen, 345 E. 47 St., New York, N.Y. 10017)

18–20. **Radiation Research** Soc., 12th annual, Miami Beach, Fla. (G. D. Adams, Radiological Laboratory, Univ. of California Medical Center, San Francisco 22)

18–20. **Water**, 2nd conf., Technical Assoc. of the Pulp and Paper Industry, Green Bay, Wis. (H. O. Teeple, TAPPI, 360 Lexington Ave., New York, N.Y.)

18–21. Society of **Economic Paleontologists and Mineralogists**, Toronto, Ont., Canada. (R. H. Dott, Box 979, Tulsa 1, Okla.)

18–21. American Assoc. of **Petroleum Geologists**, 49th annual conv., Toronto, Ont., Canada. (R. E. King, American Overseas Petroleum, Ltd., 485 Lexington Ave., New York, N.Y. 10017)

19–20. Council on **Medical Television**, 6th annual, Atlanta, Ga. (S. A. Agnello, Duke Univ. Medical Center, Box 3163, Durham, N.C. 27706)

19–21. **Microwave** Theory and Techniques, intern. symp., New York, N.Y. (H. L. Browman, Airborne Instruments Laboratory, Deer Park, N.Y. 11729)

19–22. **German Metallurgical** Soc., general assembly, Bremen. (Deutsche Gesellschaft für Metallkunde, An der Alteburger Mühle 12, Köln-Marienburg, Germany)

19–22. German Soc. for **Applied Optics**, 65th, Gmunden am Traunsee. (H. Volkmann, Deutsche Gesellschaft für Ange-