

ditions leading to naturally occurring pathologies in aging rats. His systematic approach reveals that (i) 100 percent of the rats that were more than 12 to 15 months old developed tumors of the mammary glands, (ii) 97 percent of the rats had gross changes in the aortas representing calcifying atherosclerosis, (iii) 46 percent had pitting in the kidneys caused in part by the dilation of the tubules at the surface, (iv) ulcers of the cardiac portion of the stomach were observed in 25 percent, and (v) 90 percent had adrenal glands that were spotted and granular. Ingle's discussion of "Adaptation diseases, adaptation energy and recommendations for further research" graphically illustrates both his scientific storehouse of information and his ability to single out important facets that lend themselves to crystallization.

The zenith of intellectual endeavor reaches a spire of meaning in "Sex steroid replacement in the aging individual" through the efforts of W. H. Masters. The discussion of a third sex will be received as both stimulating and provocative, depending, of course, on the age of the reader.

This book is recommended without any reservations. Here is a book that will make everyone appreciate more thoroughly the physiological process of aging that lies ahead in each of our careers.

JOSEPH T. VELARDO

*Department of Anatomy,
Yale University School of Medicine*

Gmelins Handbuch der Anorganischen Chemie. System No. 60. *Copper*. pt. A, sec. 1. Edited by Gmelin Institute under the direction of E. H. E. Pietsch. Verlag Chemie, Weinheim/Bergstrasse, ed. 8, 1955. 710 pp. Illus. \$92.85.

Gmelins Handbuch der Anorganischen Chemie. System No. 60. *Copper*. pt. A, sec. 2. Edited by Gmelin Institute. Verlag Chemie, Weinheim/Bergstrasse, ed. 8, 1955. 755 pp. Illus. \$101.04.

This volume, as do the others in this excellent reference series, impresses the reader with its thoroughness and with the breadth of its coverage of the topic. It is stated that the literature through 1949 has been completely examined and in certain instances through 1954. The table of contents is highly detailed. At the beginning of the sections on many of the major topics, lists of general references are given. These general references are not confined to German treatises but include works from a number of different nations.

The style in which the German text is

written is clear and easily readable. There are numerous tables and diagrams which help to clarify the text, and the quality of printing and reproduction is excellent. This work is a must for any chemistry library and would be particularly valuable to inorganic chemists, metallurgists, and geologists with an interest in copper or copper ores and minerals.

HARRY S. SISLER

*Department of Chemistry,
University of Florida*

Proceedings of the Conference on Patho-physiologic and Therapeutic Problems of Terminal Conditions Associated with the Clinic and Practice of First Aid. State Publishing House of Medical Literature, Moscow, U.S.S.R., 1954. 240 pp. Illus. (In Russian).

The deliberations of this conference were centered primarily around the methods of revival of organisms developed by V. A. Negovskii, director of the Laboratory of Experimental Physiology of the U.S.S.R. Academy of Medical Sciences in Moscow. The discussions were related to problems of restoration of physiologic functions in animals and patients in agonal states and in early stages of clinical death resulting from severe hemorrhage, burns, drowning, electrocution, and so on. Under consideration also were methods of combating late stages of traumatic and burn shock.

Most of the resuscitation techniques reported at the conference involved (in addition to artificial respiration) the utilization of "antidromic" intra-arterial infusions (that is, directed toward the heart) of blood (usually oxygenated) and, at times, of various physiologic salt solutions. The quantities of blood thus infused (under a pressure of 160 to 220 mm-Hg) were comparatively small: 150 to 500 ml, usually the lower figures. Following the restoration of cardiovascular functions, intravenous infusions were resorted to when more blood or a blood substitute was needed.

The history of intra-arterial infusions goes back to at least 1871-74, when two Russian physicians, S. I. Kostaev and S. P. Kolomnin reported intra-arterial administration of defibrinated blood into patients with severe traumatic episodes. F. A. Andreev, in 1913, initiated experimental investigations of this method, continuing his experiments until shortly before his death in 1952. Extensive experimental and clinical observations were made by V. A. Negovskii *et al.* and many others. According to Negovskii's figures, arterial infusions were made in 1714 patients, 797 of whom (46.5 percent)

survived. Of the 1714 patients thus treated, 1190 were in severe shock, not responding to other forms of therapy, and 57 percent of these survived; 227 were in agonal states and 45 percent of these survived; 116 were in a state of clinical death and 18 percent of these survived.

Briefly, the principle of the method is based on restoration of coronary blood flow and the alleged stimulation of cardiovascular interoceptors, thus leading to reflex stimulation of the cardiovascular system. A fair amount of basic experimental data is presented but not enough to satisfy the curiosity of a physiologist, at least not mine. The bulk of the emphasis was on clinical observations.

Interesting experiments are reported by E. A. Asratyan (Moscow). He produced controlled cerebral anoxia by raising the cerebrospinal fluid pressure to 300-400 mm-Hg in dogs kept alive by artificial respiration. Although the results obtained may be due also to mechanical pressure, the data are still of interest to clinicians and physiologists. Many of the animals remained alive for months even after 16 to 20 minutes of cerebral anoxia. The author reports four phases of restoration: (i) restoration of bulbar and spinal centers; (ii) phase of overexcitation and hyperthermia, at times resembling the state of decerebrate rigidity (the use of central nervous system depressants during this phase appeared to improve the chances of survival; this phase may last for hours or even days and may alternate with periods of calmness); (iii) phase of depression which may last several hours to many weeks; (iv) slow restoration of central nervous system functions.

The speed and degree of restoration of function depended on the length of the period of anoxia, age, and "constitution" of the dog. Thus, after a period of anoxia lasting 16 to 20 minutes, the dogs were able to sit up after 3 to 4 months and to stand after 6 months or even after a longer period. After an anoxic period of 8 to 10 minutes, sitting was possible after 4 to 6 days and standing after 10 to 15 days. Sensation was affected earlier and for a longer period than motor functions.

Conditioned reflexes (motor defense responses) disappear even after 5 to 6 minutes of anoxia but can soon be fully restored. After an anoxic episode of 6 to 8 minutes the conditioned reflexes disappear for longer periods and are not fully restored; ability to differentiate decreases. The conditioned responses are inconstant but, peculiarly enough, are difficult to extinguish. Following a period of anoxia lasting 8 to 12 minutes, conditioned reflexes disappear even for a longer period, differentiation is never restored, the conditioned reflexes are in-

constant and are even more difficult to extinguish. The central nervous system thus appears to have lost its "plasticity." After periods of anoxia lasting 16 to 20 minutes, conditioned reflexes are never restored.

E. M. Smirenskaya, from Negovskii's laboratory, presented some noteworthy data that suggest the importance of the stimulation of vascular interoceptors (by means of arterial infusions) in the restoration of cardiovascular activity in dogs after clinical death from hemorrhage. She utilized Novocain injections into various parts of the cardiovascular system as a means of blocking the interoceptors. Electrocardiographic studies indicated that stimulation of these interoceptors in any part of the arterial tree may lead to increased electric activity of the heart. Under conditions of anoxia, such stimulation (for example, dissecting out an artery without local anesthesia) may lead to fibrillation. This point may bear further investigation.

T. T. Shcherbakova and M. K. Martsinkevich, from Bryukhonenko's laboratory, reported on their experiments on dogs, using an "autojector," a pump that delivers oxygenated blood into an artery (not antidromically, but in the normal direction of blood flow) and removes blood for oxygenation from any peripheral vein. They claimed that their dogs could be revived even after a period of clinical death lasting for as long as 24 minutes and that these dogs remained normal for years. These claims were received with some skepticism by most of the other participants of the conference. Bryukhonenko himself (a noted surgeon) was not present at the conference, although he was invited. He was criticized for his failure to report detailed descriptions of his method and of his experimental results.

F. F. Svidler (Odessa) reported on his method of artificial respiration involving electric stimulation of the phrenic nerve in cats and dogs, including the stimulation of motor points in the region of the neck.

I. P. Petrov and E. V. Gubler (Leningrad) presented some data on the effect of central nervous system depressants and of hypothermia on survival after exposure to various periods of cerebral anoxia. Soporific doses of central nervous system depressants had a beneficial effect, while larger doses had a deleterious effect. Hypothermia was beneficial. There appeared to be some potentiation between hypothermia and soporifics. These results were interpreted in terms of I. P. Pavlov's concept of "protective inhibition" of the central nervous system.

There was considerable disagreement among the members of the conference on whether the arterial infusions should be rhythmic or continuous. It was argued

by some that rhythmic infusions are more likely to produce effective stimulation of the vascular interoceptors, but no convincing data were presented.

SAMUEL A. CORSON
*Department of Physiology and
Pharmacology, University of Arkansas
School of Medicine, Little Rock*

New Books

High Energy Nuclear Physics, Proceedings of the Sixth Annual Rochester Conference. 3-7 Apr. 1956. Compiled and edited by J. Ballam, V. L. Fitch, T. Fulton, K. Huang, R. R. Rau, S. B. Treiman. Interscience, New York, 1956. \$3.75.

The Earth beneath Us. H. H. Swinerton. Little, Brown, Boston, American ed. 1, 1956. 335 pp. \$5.

Clay and Clay Minerals. Proceedings of the Third National Conference on Clays and Clay Minerals. Publ. 395. National Academy of Sciences-National Research Council, Washington, 1955. 573 pp. \$7.

Grasslands of the Great Plains. Their nature and use. J. E. Weaver and F. W. Albertson. Johnsen, Lincoln, Neb., 1956. 395 pp. \$6.50.

The Training of Sanitary Engineers. Schools and programs in Europe and in the United States. Milivoj Petrik. World Health Organization, Geneva, 1956 (order from Columbia University Press, New York). 151 pp. \$4.

Sleep. Marie C. Stopes. Philosophical Library, New York, 1956. 154 pp. \$3.

Applied Electrical Measurements. Isaac F. Kinnard. Wiley, New York; Chapman & Hall, London, 1956. 600 pp. \$15.

Handbuch Der Physik. vol. XXII, *Gas Discharges.* S. Flugge, Ed. Springer, Berlin, 1956. 652 pp. DM. 128.

Chemistry of High Polymer Degradation Processes. Norman Grassie. Interscience, New York; Butterworths, London, 1956. 335 pp. \$6.50.

How to Make and Use a Telescope. H. Percy Wilkins and Patrick Moore. Norton, New York, 1956. 196 pp. \$2.95.

Introductory Psychosomatic Dentistry. John H. Manhold, Jr. Appleton-Century-Crofts, New York, 1956. 193 pp.

The Image. Kenneth E. Boulding. University of Michigan Press, Ann Arbor, 1956. 175 pp. \$3.75.

Chemistry of Carbon Compounds. vol. III, pt. B, *Aromatic Compounds.* E. H. Rodd, Ed. Elsevier, Amsterdam-Princeton, 1956 (order from Van Nostrand, Princeton, N.J.). 1669 pp. \$25.

Textbook of Biophysical Chemistry. Edward S. West. Macmillan, New York, ed. 2, 1956. 399 pp. \$7.

Statistical Mechanics, Principles and Selected Applications. Terrell L. Hill. McGraw-Hill, New York, 1956. 432 pp. \$9.

Bird and Butterfly Mysteries. The truth about migration. Bernard Acworth. Philosophical Library, New York, 1956. 303 pp. \$7.50.

Polyethylene. vol. XI of *High Polymers.* R. A. V. Raff and J. B. Allison. Interscience, New York, 1956. 551 pp. \$16.

Corn and Its Early Fathers. Henry A. Wallace and William L. Brown. Michigan State University Press, East Lansing, 1956. 134 pp. \$3.75.

William Heytesbury, Medieval logic and the rise of mathematical physics. Curtis Wilson. University of Wisconsin Press, Madison, 1956. 219 pp. \$4.

The New Outline of Modern Knowledge. Alan Pryce-Jones, Ed. Simon and Schuster, New York, 1956. 624 pp. \$6.

Supersonic Inlet Diffusers and Introduction to Internal Aerodynamics. Rudolf Hermann. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., 1956. 378 pp. \$16.

High Pressure Technology. Edward W. Comings. McGraw-Hill, New York, 1956. 572 pp. \$11.50.

Latex, Natural and Synthetic. Philip G. Cook. Reinhold, New York; Chapman & Hall, London, 1956. 231 pp. \$3.50.

Perspectives in Organic Chemistry. Alexander Todd, Ed. Interscience, New York, 1956. 527 pp. \$7.50.

Magnetochemistry. Pierce W. Selwood. Interscience, New York, ed. 2, 1956. 435 pp. \$11.50.

The Condensed Chemical Dictionary. Arthur and Elizabeth Rose. Reinhold, New York and Chapman & Hall, London, ed. 5, 1956. 1201 pp. \$12.50.

Observations on Krebiozen in the Management of Cancer. A. C. Ivy, John F. Pick, W. F. P. Phillips. Regnery, Chicago, 1956. 88 pp. \$2.50.

The Chemistry of the Coordination Compounds. John C. Bailar, Jr., Ed. Reinhold, New York; Chapman & Hall, London, 1956. 834 pp. \$18.50.

The International Dictionary of Physics and Electronics. Walter C. Michels, Ed. Van Nostrand, Princeton, N.J.; Macmillan, London, 1956. 1004 pp. \$20.

Miscellaneous Publications

(Inquiries concerning these publications should be addressed, not to Science, but to the publisher or agency sponsoring the publication.)

Lectures on Orthopaedics and the Rheumatic Diseases. Scientific Conferences, 29 Sept.-1 Oct. 1955, held in connection with dedication of the new building of The Hospital for Special Surgery, New York City. Marguerite Clark, Ed. Hospital for Special Surgery, New York, N.Y., 1956. 182 pp.

Symposium on the Management of Tuberculosis. Journal of The Mount Sinai Hospital, New York, vol. XXIII, No. 4. The Hospital, New York, N.Y., 1956. 325 pp. \$2.50.

The National Aeronautical Collection. Smithsonian Institution National Air Museum. Paul E. Garber. Smithsonian Institution, Washington, ed. 9, 1956. 166 pp.

Bernice P. Bishop Museum, Annual Report for 1955. A museum is a point of view. Alexander Spoehr. Bishop Museum Press, Honolulu, Hawaii, 1956.

Index of Taxonomic Specialists in Entomology. N. D. Riley. International Union of Biological Sciences, Entomology Section, British Museum, London, 1956. 37 pp.