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SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

executive health

the report that briefs you on what to watch

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Volume XV, Number 1 • October, 1978 • Pickfair Bldg., Rancho Santa Fe, Calif. 92067 • Area 714:756-2600

Jan Koch-Weser, M. D.:

ON SYSTOLIC HYPERTENSION, more common than diastolic hypertension and at least as dangerous

What it is, what it does, and what to do about it.

PUBLISHER'S NOTE: *Jan Koch-Weser, M.D., Director of the Merrell International Research Center in Strasbourg, France, has been in the thick of the battle against hypertension for the past two decades. As Head of the Hypertension Unit at the Massachusetts General Hospital from 1966 to 1975 he was instrumental in developing and evaluating many of the most effective antihypertensive drugs and drug combinations in use today. He was among the first to emphasize the increasing opportunity to select for each hypertensive patient the drug or drugs most appropriate to the etiologic and hemodynamic characteristics of his disease. At the Merrell International Research Center, Dr. Koch-Weser is now concentrating his efforts on the creation of new therapeutic agents for the ongoing battle against cardiovascular diseases.*

—Richard Stanton

No other disease has received more therapeutic attention during recent years than hypertension. Three factors account for this opportunistic concern. First, cardiovascular diseases are by far the most common cause of disability and death in civilized societies. Second, abnormally elevated blood pressure is one of the most important factors responsible for cardiovascular morbidity and mortality. Third, normalization of blood pressure by appropriate treatment largely or completely eliminates the adverse effects of hyper-

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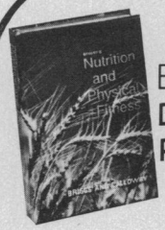
COVER

Prototype of the 10-meter sail windmill installed at the campus of the National Aeronautical Laboratory, Bangalore, India. The tower height is 12 meters. The rotary pump is under the platform. This windmill is expected to irrigate 1 hectare of wheat crop with wind speeds averaging 10 kilometers per hour for about 10 hours per day. See page 481. [S. K. Tewari, National Aeronautical Laboratory, Bangalore, India]

Announcing the Best



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By George M. Briggs and Doris Howes Calloway, both of University of California, Berkeley. Ready 1979. About 600 pp. Two color. Soft cover. About $13.95 (Can. $16.05). Order #1987-8.

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By Mary E. Clark, San Diego State University. Ready 1979. About 600 pp. Soft cover. Two color. About $14.95 (Can. $17.20). Order #2598-3.

Bond
Biology of Fishes

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in Biology for 1979!

Villee, Walker & Barnes
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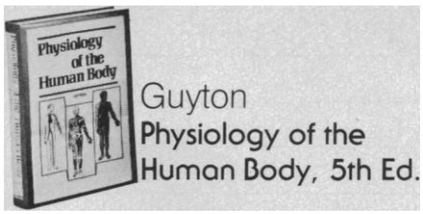
The adaptability and diversity of the animal kingdom is the key to this selectively condensed version of the authors' longer *General Zoology*. You'll find balanced coverage of animal types and animal form and function, as well as an introductory section on cells and molecular biology. Genetics, evolution, ecology and animal behavior are also covered. Review questions conclude each chapter, and a glossary of zoological terms has been included at the end of the book. A **Study Guide** and **Instructor's Manual** are available. *By Claude A. Villee, Harvard University, Warren F. Walker, Jr., Oberlin College, and Robert D. Barnes, Gettysburg College. Ready Feb. 1979. About 600 pp. Illustd. About $14.95 (Can. $17.20) Order #9026-2.*



Now including more basic and detailed information, this popular text (formerly *Function of the Human Body)* offers students an updated and comprehensive approach to human physiology. Organization of function in the body is traced step-by-step from a broadened look at cellular function through more detailed descriptions of the physiology of each human organ system. New features include: integration of pertinent material from Guyton's *Textbook of Medical Physiology;* special emphasis on cell physiology; more logical chapter sequence; the addition of questions at the end of each chapter and two-color illustrations. An **Instructor's Manual, Study Guide** and **Lab Manual** are available. *By Arthur C. Guyton, University of Mississippi. Ready Jan. 1979. About 530 pp. About 380 illustrations (inc. about 30 in two color). About $12.50 (Can. $14.40). Order #4378-7.*

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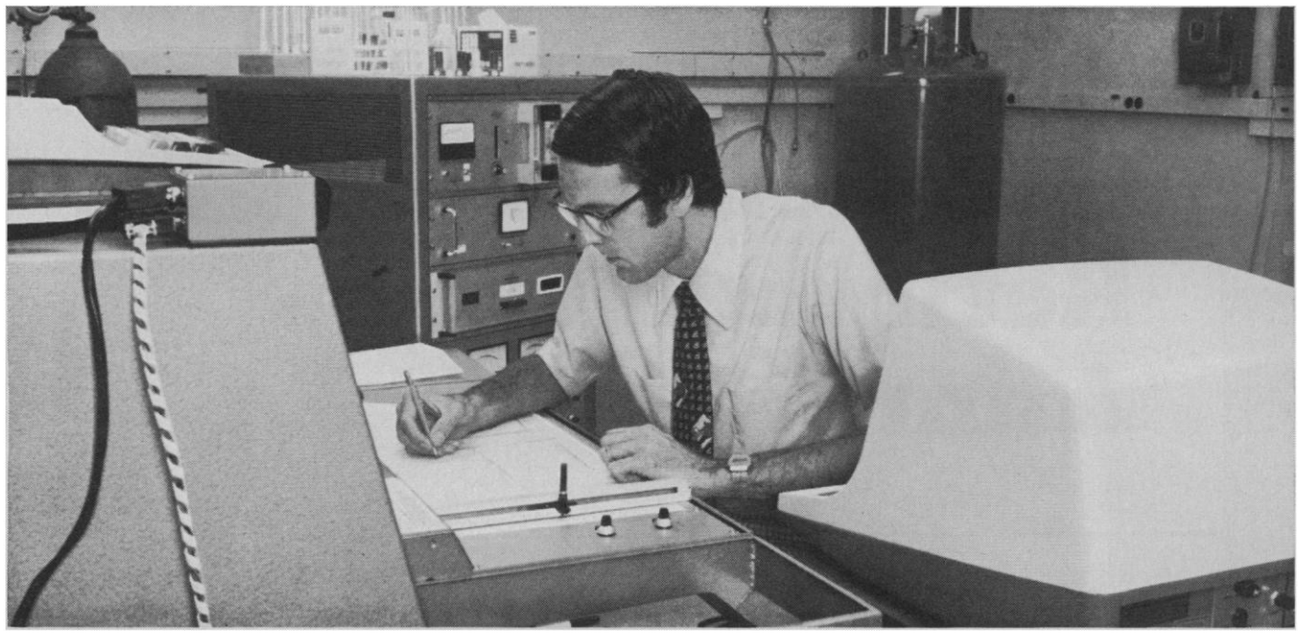

No grants needed, thank you

There is science for its own precious sake, and there is the use of scientific instruments, techniques, and personnel to make a buck and stay out of trouble. What P. Mark Henrichs does certainly sounds like basic science. Nevertheless, if the management were convinced that his contributions had nothing whatsoever to do with making some bucks for Kodak, *he'd* be in trouble. Not in finding other suitable employment, of course, but in troubling to write grant proposals, the way scientists have to do when less directly tied into the general economy.

Indeed, a scant five years after joining us from post-docs in Basel and South Carolina Dr. Henrichs got the management to buy him a nuclear magnetic resonance (NMR) spectrometer with a 63-kilogauss field supplied by a magnet with windings kept superconducting by liquid helium. He uses it for Fourier transform spectroscopy to explore structures of compounds tagged with such nuclides as ^{13}C, ^{15}N, and ^{109}Ag, along with ^{1}H.

Lately Henrichs has focused on developing a method for separating relaxations of degenerate transitions. He has also come up with interesting information about the molecular structure of a variety of silver complexes in solution, and about charge distribution, aggregation, and conformation in various dyes. We are furthermore much impressed by his skill in detailing composition and microstructure of polymers.

Conformational Analysis of Carbocyanine Dyes with Variable-Temperature Proton Fourier Transform Nuclear Magnetic Resonance Spectroscopy

P. M. Henrichs* and S. Gross

Contribution from the Research Laboratories, Eastman Kodak Company, Rochester, New York 14650.

"Selective excitation transfer and separated relaxation measurements of degenerate transitions in NMR spectroscopy," by P. M. Henrichs and L. J. Schwartz

(to be published in J. Chemical Physics)

Application of ^{13}C Chemical Shifts and Relaxation Times to the Study of Charge Distribution, Aggregation, and Conformation in Carbocyanine Dyes. Part I

By P. Mark Henrichs, Research Laboratories, Eastman Kodak Company, Rochester, New York 14650

"Diad, Triad, and Pentad Sequence-Distribution Analysis of Acrylonitrile-Vinylidene Chloride Model Copolymers by ^{13}C-NMR," by D. B. Bailey and P. M. Henrichs

(to be published in J. Polymer Science)

Complexation of Silver(I) with Thiourea and Tetramethylthiourea in Dimethyl Sulfoxide Solution as Studied by ^{13}C and ^{109}Ag Nuclear Magnetic Resonance Spectroscopy

P. M. Henrichs,* J. J. H. Ackerman, and G. E. Maciel*

Contribution from the Research Laboratories, Eastman Kodak Company, Rochester, New York 14650, and the Department of Chemistry, Colorado State University, Fort Collins, Colorado 80521.

Selective Excitation Transfer in Nuclear Magnetic Resonance

P. M. HENRICHS, L. J. SCHWARTZ — *Research Laboratories, Eastman Kodak Company, Rochester, New York 14650*

"Selective Excitation Transfer in Spin-Spin Multiplets: A Method of Obtaining Separated Relaxation Measurements on Degenerate Transitions," by P. M. Henrichs and L. J. Schwartz

(paper presented at Experimental NMR Conference)

If information presented in any of the above offers hope of benefitting others than Kodak, so much the better. For a reprint: note Henrichs' address above.

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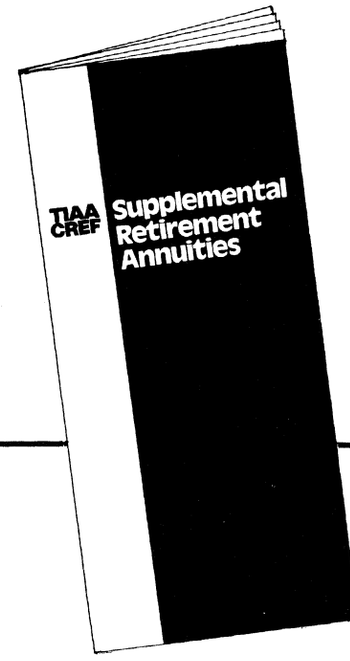

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Regulation of the Chemical Industry

Recently I visited six of the major industrial laboratories in the United States, including three chemical establishments. I found much that was interesting and at the forefront of science and technology. At the same time, there was much evidence of the impact of federal regulations on industrial research, particularly in the chemical companies. Expenditures for long-range research have declined markedly, but funds for defensive research and development, including toxicology, are sharply higher.

In almost all conversations, chemists alluded to federal regulations. Attitudes ranged from the view that the chemical industry is in mortal peril to the thought that the present trauma will lead to beneficial results both for society and for the industry. Directors of research contritely admitted past shortcomings in the chemical industry's behavior with respect to its products. They particularly regretted inadequate consideration of the long-term fate of substances and were unhappy about careless errors by some users of chemicals. They now recognize that if misuse leads to untoward effects, they will share the onus. Thus there is now a willingness to monitor the use and fate of chemical products all the way to final disposition.

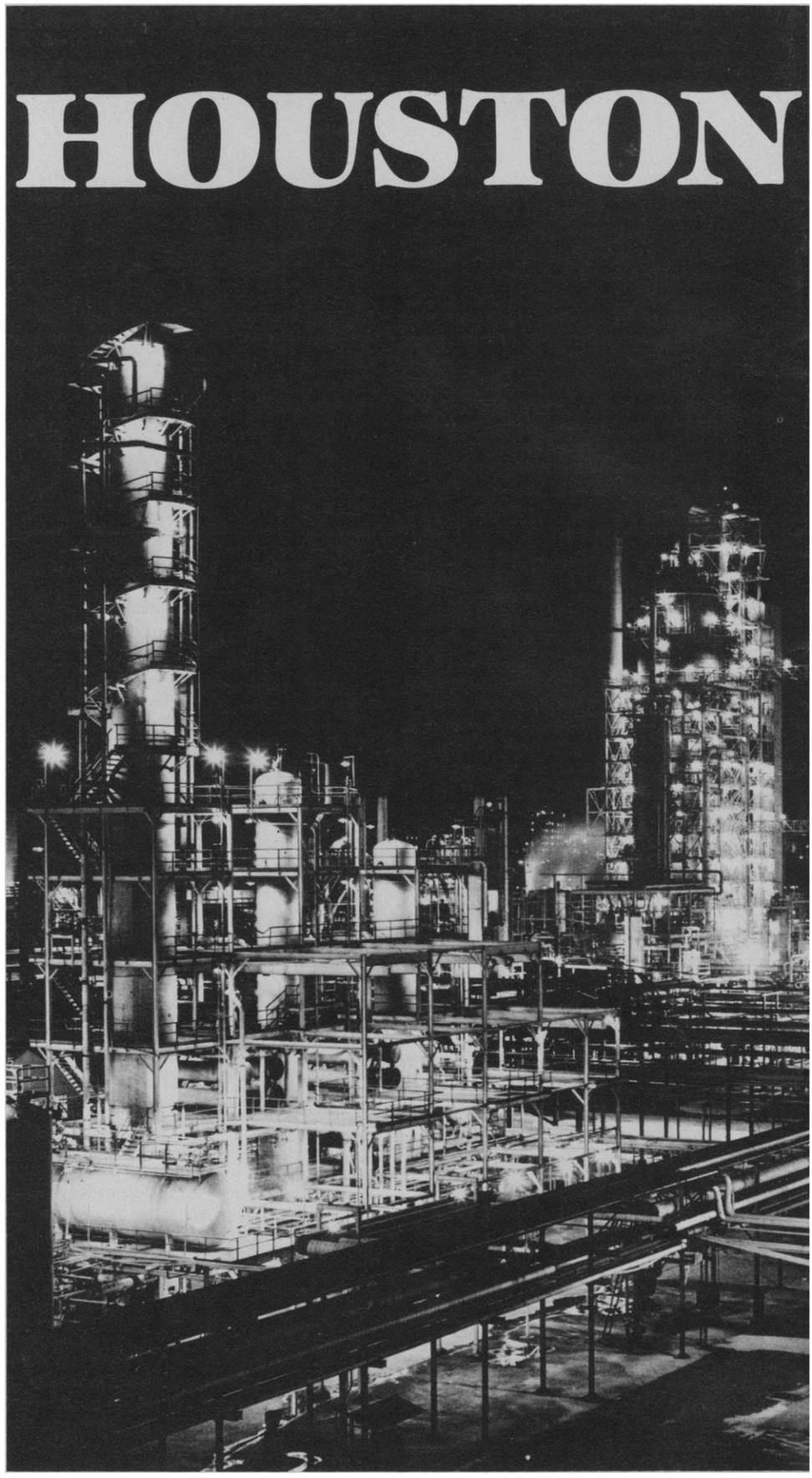
An important trend is an expansion of efforts devoted to toxicology. Companies that already have toxicology laboratories have expanded them. Other companies have established new facilities. In addition, a Chemical Industry Institute of Toxicology has been created, financed by contributions from 36 companies. Precise figures are not available, but the total professional personnel involved industry-wide is now of the order of 1500. The demand for trained toxicologists has far exceeded the supply.

Chemical companies have long been aware of the problems created by toxic substances in the workplace. Some of the lessons were learned inadvertently decades ago at the expense of workmen. This led to the establishment, for example, of the Haskell Laboratory of DuPont in 1935. Much of the early work of such laboratories was devoted to studies of acute toxicities. Although some attention was given to effects of chronic exposure, the possible risks of carcinogenicity were not probed deeply.

At the moment, the magnitude of the carcinogenic hazards posed by industrial chemicals is not well known. But the public has gained the impression that the risks are substantial, and the tendency of the government is to take no chances. Thus chemical companies live in fear of sudden drastic action. Many long-term studies are now in progress or have been completed. A typical experiment on a single chemical involves following 800 animals for 2 years and performing pathological examinations on 40 different tissues per animal for a total of 32,000 specimens. In instances where no excess cancer is found in comparison with controls, the outcome is clear. But what of instances similar to the saccharin case in which an extremely large dose seems to produce some cancer? Is there or is there not a threshold dose? Are there detoxifying mechanisms by which the animal or human disposes of small amounts of chemicals which in large doses are carcinogenic? How applicable to humans are studies on microorganisms or rodents?

Uncertainty is compounded by the language of relevant legislation. For example, the opening policy statement of the Toxic Substances Control Act asserts that the regulations are "not to impede unduly or create economic barriers to technological innovation while fulfilling the primary purpose . . . to assure that such innovation and commerce . . . do not present an unreasonable risk." With such a compounding of uncertainty, it seems obvious that in future thousands of toxicologists will obtain their livelihood in the laboratories while bevies of lawyers will grow rich on litigation. But perhaps the outcome will be more constructive. From the studies we may develop general principles about the functioning of living systems. The chemical industry may emerge more capable of discharging its responsibilities to society and accordingly stronger and more acceptable.

—PHILIP H. ABELSON



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