CONTENTS

ACTIONS TAKEN AT SPRING MEETING

April 9-14, 1972

ELECTIONS - Daniel C. Tosteson was elected to the position of President-Elect. Arthur C. Guyton was elected to a full four-year term on Council.

Jere Mead was elected to fill the unexpired term (one year) of Dr. Tosteson.

All candidates nominated by Council were elected to membership (See Newly Elected Members).

ABSTRACTS - All qualified abstracts received for 1973 will be programmed using the same rule as 1972, i.e. limiting to 800 to 850 the number of papers for oral presentation.

April 1, 1972

Active Members	3509
Retired Members	219
Honorary Members	16
Associate Members	356
	4100

SUSTAINING ASSOCIATES

Abbott Laboratories
Ayerst Laboratories
Burroughs Wellcome & Co., Inc.
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DEATHS SINCE 1971 FALL MEETING

George A. Baitsel - 9/24/71 - Emeritus Prof. Biology, Yale Univ.
Theodore A. Balourdas - 12/1/71 - Assoc. Prof. Pharmacol., Howard Univ.
Samuel Bellet - 12/13/71 - Director, Div. Cardiology, Philadelphia Gen. Hosp.
Henry A. Blair - 11/4/71 - Prof., Dept. Radiation Biol., & Biophys., Univ. of Rochester
Henry A. Charipper - 11/17/71 - Prof. Comparative Anatomy & Embryology, New York Univ.
Leonard A. Cole - 9/13/71 - Mgr., Immunobiology Program, Stanford Research Inst.
Jack D. Emerson - 9/22/71 - Prof. Physiol. & Biophys., Univ. of Alabama Medical Center
Wallace O. Fenn - 9/20/71 - Distinguished University Prof. of Physiol., Univ. of Rochester
Clarence H. Graham - 7/25/71 - Prof. of Psychology, Columbia Univ.
Herbert I. Horowitz - 3/3/71 - Clinical Asst. Prof. of Medicine, Medical College of Cornell
Robert C. Lasiewski - 8/2/71 - Chairman, Dept. of Zoology, Univ. of Florida, Gainesville
Frank W. Maurer - 12/7/70 - Regional Manager, Arthur D. Little, Inc., Santa Monica, Calif.
Eric Ogden - 1/30/72 - Emeritus Prof. of Physiol., Ohio State Univ.
Walter S. Root - 3/30/72 - Prof. Emeritus Physiol., Columbia Univ.

Arthur L. Kelly - 1/22/71 - Asst. Prof. Biology, Boston Univ. (Assoc. Mem.)
Abraham E. Zornitzer - 10/28/70 - Research Associate, UCLA (Assoc. Mem.)
Bernardo A. Houssay - 9/20/71 - Research Prof. and Director, Inst. (Honorary) of Biol. & Exptl. Med., Univ. of Buenos Aires

50-YEAR MEMBERS

Edward F. Adolph
Walter C. Alvarez
Joseph C. Aub
J. Percy Baumberger
Olaf Bergeim
Harold C. Bradley
Dayton J. Edwards
Lester M. Dragstedt
Mable P. Fitzgerald
Carl H. Greene
Charles M. Gruber
Harold L. Higgins
Paul E. Howe
Andrew C. Ivy
Dennis E. Jackson
Norman M. Keith
Edward C. Kendall
Benjamin Kramer
Henry Laurens
Edward Lodholz
David Marine
Jesse F. McClendon
Walter R. Miles
Frederick R. Miller
Clarence A. Mills
Sergius Morgulis
Stuart Mudd
Leonard B. Nice
David Rapport
Alfred C. Redfield
Andrew H. Ryan
Charles D. Snyder
Norman B. Taylor
Joseph T. Wearn
George H. Whipple
Rosalind Wulzen

NEWLY ELECTED MEMBERS

The following, nominated by Council, were elected to membership in the Society at the Spring Meeting, 1972.

REGULAR MEMBERS

BAILEY, Leslie: Asst. Prof., Dept. Pharmacol. & Therapeutics, Univ. of Manitoba
BECKER, Donald P.: Assoc. Prof. Surg., UCLA
BRINKMAN, Charles R. III: Asst. Prof. Obstet.-Gynecol., UCLA
BRODOFF, Bernard N.: Assoc. Cl. Prof. of Med., New York Med. College
CALDWELL, Peter R. B.: Asst. Prof. Med., Coll. P & S., Columbia
CARGILLE, Charles M.: Sr. Invest., Natl. Inst. Child Health & Human Development
CHICK, William L.: Instr. Dept. of Med., Harvard Med. School
CLAUS-WALKER, Jacqueline L.: Dir., Neuroendocrine Lab., Texas Inst. Rehab. & Research
CONRAD, Marcel E.: Dir., Div. of Med., Walter Reed Army Inst. of Research
COWLEY, Allen W., Jr.: Asst. Prof., Dept. Physiol. & Biophys., Univ. of Mississippi
DAVIS, Robert H.: Assoc. Prof. Physiol. & Biophys., Hahnemann Med. Coll. & Hosp.

EKNOYAN, Garabed: Assoc. Prof. Med., Baylor Coll. of Med.
ELIZONDO, Reynaldo S.: Asst. Prof. Physiol., Indiana Univ.
ENSINCK, John W.: Assoc. Prof. Med., Univ. of Washington
FAULKNER, Lloyd C.: Prof. & Chrmn., Dept. Physiol. & Biophys., Colorado State Univ.
FAY, Fredric S.: Asst. Prof. Dept. Physiol., Univ. of Massachusetts
FREEMAN, John A.: Research Sci., Aerospace Med., Wright-Patterson AFB
GALE, Henry H.: Asst. Prof. Physiol., Creighton Univ.
GELLER, Ronald G.: Pharmacol. Res. Assoc., Natl. Heart & Lung Inst.
GOLDMAN, Israel D.: Asst. Prof. Med. & Pharmacol., Univ. of North Carolina
HARPEL, Peter C.: Asst. Prof. of Med., Cornell Univ.
HERMSMEYER, Ralph K.: Asst. Prof. Physiol. & Biophys., Univ. of Nebraska
HINDS, Joseph E.: Asst. Prof. Physiol. & Biophys., Howard Univ.
HUBBARD, Roger W.: Research Chemist, U.S. Army Res. Inst. of Environmental Med.
JOHNSON, Joseph A.: Postdoctoral Fellow, Dept. Physiol., Univ. of Missouri
KAFKA, Marian S.: Physiologist, Natl. Heart & Lung Inst., NIH
KAHAN, Barry D.: Resident in Surg., Massachusetts Gen. Hosp.
KLASSEN, Gerald A.: Assoc. Prof., Exptl. Med., McGill Univ.
KLEINMAN, Leonard I.: Assoc. Prof. Pediat. & Asst. Prof. Physiol., Univ. Cincinnati
KUPFERMANN, Irving: Asst. Prof. Exptl. Psychol., Public Health Res. Inst., City of New York
KURTZMAN, Neil A.: Dir. & Chief, Metabolic Br., US Army, Brooke Army Med. Ctr.
LAUF, Peter K.: Assoc. Prof. Physiol., Duke Univ. Sch. of Med.
LEBOVITZ, Harold E.: Prof. of Med., Asst. Prof. Physiol., Duke Univ. Med. Ctr.
LEON, Arthur S.: Asst. Prof. Med., New Jersey Coll. Med. & Dent.
McCAA, Connie S.: Assoc. Prof. Physiol. & Biophys., Univ. of Mississippi
McGRATH, James J.: Asst. Prof., Dept. Environ. Physiol., Rutgers Univ.
MAKSUD, Michael G.: Assoc. Prof. & Dir., Exercise Physiol. Lab., Univ. of Wisconsin
MEHLMAN, Myron A.: Assoc. Prof., Dept. Biochem., Univ. of Nebraska
MILLER, Myron: Asst. Prof. Med., State Univ. New York, Upstate Med. Ctr., Syracuse
MILLER, Ralph E.: Asst. Prof. Pharmacol., Univ. of Kentucky
NADEL, Ethan R.: Asst. Prof. Environ. Physiol., Yale Univ.
O'HEA, Eugene K.: Asst. Prof., Dept. Physiol., Univ. of Western Ontario
PADILLA, George M.: Assoc. Prof. Physiol. & Pharmacol., Duke Univ. Med. Ctr.
PARKER, John C.: Assoc. Prof. Med., Univ. of North Carolina
POWELL, Don W.: Spec. NIH Fellow, Dept. Physiol., Yale Univ.
REID, Kenneth H.: Asst. Prof., Physiol. & Biophys., Univ. Louisville

RIEGLE, Gail D.: Assoc. Prof. Physiol., Michigan State Univ.
ROBINSON, Sumner M.: Group Head, Biochem. & Pharmacol. Lab., U.S. Army Res. Inst. Environ. Med.
ROSENBERG, Jerry C.: Assoc. Prof. of Surg., Wayne State Univ.
RUSSELL, Diane H.: Sr. Sci., Dept. Pharmacol., Baltimore Cancer Res. Ctr.
SABA, Thomas M.: Asst. Prof. Physiol., Univ. of Illinois Coll. Med.
SALAS, Manuel A.: Assoc. Invest., Physiol. Inst. de Invest., Bio Medicas, Mexico
SCHAFER, James A.: Asst. Prof. Physiol. & Biophys., Univ. of Alabama Med. Ctr.
SCHOOLER, James M.: Asst. Prof. Physiol. & Pharmacol., Duke Univ.
SIKAND, Rajinder S.: Asst. Prof. Med., Yale Univ. Sch. Med.
SILVERMAN, Melvin: Asst. Prof. Med., McGill Univ.
SKELTON, Charles L.: Instr. in Med., Harvard Medical School
SNOOK, Robert B. II: Asst. Prof. Dept. Animal Sci., Iowa State Univ.
SORDAHL, Louis A.: Asst. Prof. Dept. Pharmacol., Baylor Coll. Med.
SOUHRADA, Joseph F.: Res. Assoc., Dept. Anatomy, Indiana Univ.
SPIES, Harold G.: Res. Assoc., Assoc. Prof. Anat., Tulane Univ.
SPITZER, Adrian: Assoc. Dir. Pediat., Nephrol. Res. & Tr. Program. Rose F. Kennedy Ctr.
STONEY, Samuel D., Jr.: Prof., Dept. Physiol., Med. Coll. Georgia
TAKADA, Akikazu: Research Fellow, Roswell Park Memorial Inst.
TAKADA, Yumiko: Res. Fellow, Roswell Park Memorial Inst.
THIER, Samuel O.: Assoc. Prof., Dept. Med., Univ. of Pennsylvania
WACHTEL, Howard: Asst. Prof. Physiol., Duke Univ.
WEIDLER, Donald J.: Assoc. Prof., Dept. Physiol. & Biophys., Univ. of Nebraska
WHIPP, Brian J.: Asst. Prof. Physiol., UCLA
YARBROUGH, James D.: Assoc. Prof. Zool., Mississippi State Univ.

ASSOCIATE MEMBERS

AMEND, James F.: Asst. Prof., Dept. Physiol., Baylor Coll. Med.
ANDERSON, James H.: Grad. Student, Dept. Physiol. & Biophys., Univ. of Illinois
ANDERSON, Marjorie E.: USPHS Spec. Fellow, Neurophysiol., Rockefeller Univ.
BARCLAY, Jack K.: Postdoct. Fellow, Dept. Physiol., Univ. of Florida
BEALL, James R.: Sr. Scientist, Dept. Pathol. & Toxicology, Schering Corp.
BRADLEY, Mark E.: Student, Dept. Physiol., Harvard Sch. of Public Health
BRITTAIN, David B.: Assoc. Prof. Biology, Ripon College
BYNUM, Turner E.: Asst. Prof. Physiol., Univ. of Oklahoma Sch. Med.
CANONICO, Peter G.: Prin. Invest., US Army Med. Res. Inst., Ft. Detrick
CHERTOK, Robert J.: Physiologist, Bio-Medical Div., Univ. of California, Livermore
DAMON, Edward G.: Assoc. Scientist, Dept. Comp. Environ. Biol., Lovelace Fndn.
DEYSINE, Maximo: Asst. Prof. Surg., Mt. Sinai Sch. Med., New York
ESKIN, Arnold: Res. Fellow, Dept. Biol., Reed College, Portland

FEIST, Dale D.: Asst. Prof. Zoophysiol., Inst. of Arctic Biol., Univ. of Alaska
GROSE, Susan A.: Technical Assoc., Dept. Physiol., Harvard Med. School
GROSS, Joseph F.: Bioengineer, Physical Sci. Dept., The Rand Corp., Santa Monica
JOHNSON, Melvin A., Jr.: Chrmn., Dept. of Biol., Central State Univ., Wilberforce, Ohio
JORDAN, Joseph L.: Res. Asst., Dept. Physiol., Univ. of Illinois
JUE, Jack G.: Asst. Prof. Pharmacol., St. Louis Univ. Sch. of Med.
KIRSTEN, Edward B.: Associate, Dept. Pharmacol., Coll. P & S, Columbia Univ.
LEACH, Carolyn: Head, Endocr. Lab., NASA-Manned Space Ctr., Houston
LEACH, John K.: Assoc. Prof. Med., Univ. of New Mexico
LIEBERMAN, James S.: Asst. Prof. Neurol., State Univ. New York, Downstate Med. Ctr., Brooklyn, N.Y.
LIEBESKIND, John C.: Asst. Prof., Dept. Psychology, Univ. of California, L.A.
McBride, Russell L.: Predoct. Fellow, Dept. Biol., Texas A & M
McCONN, Rita: Asst. Prof. Surg., Albert Einstein Coll. Med.
MILLER, Arthur J.: Asst. Prof. Physiol., Univ. of Illinois Med. Ctr.
MISTRETTA, Charlotte M.: Postdoct. Res. Fellow, Univ. of Oxford, England
MOORE, Terence O.: Asst. Prof. Physiol., Univ. of Hawaii Sch. Med.
NACHT, Sergio: Res. Scientist, Alza Corp., Palo Alto, Calif.
NAHRWOLD, David L.: Assoc. Prof. Surg., Milton S. Hershey Med. Ctr.
OLSON, Robert M.: Research Physician, USAF Sch. Aerospace Med., San Antonio
O'NEIL, John J.: Grad. Student, Dept. Physiol., Univ. of California, San Francisco
QUAY, John F.: Research Sr. Physical Chemist, Eli Lilly & Co.
REHDER, Kai: Consultant and Asst. Prof. Anesthesiol., Mayo Clinic
ROBERTS, Donald E.: Postdoct. Fellow, Dept. Physiol., Bowman Gray Sch. Med.
TISI, Gennaro M.: Asst. Prof. Med., Univ. of California, San Diego
VOROSMARTI, James Jr.: Postdoct. Fellow, Dept. Physiol., State Univ. of New York, Buffalo
WEXLER, Ira: Resident, Neurol., Univ. of Maryland
WEINSTEIN, Herbert: Assoc. Prof. Chem. Engineering, Illinois Inst. of Technology
WURTH, Mary A.: Res. Instr. Surg., Washington Univ. Sch. Med.
YATES, William G.: Instructor, Dept. Surg., Univ. of Washington
YING, Shao-Yao: Postdoct. Research Fellow, Harvard Medical School

INTERNATIONAL SYMPOSIUM ON DYNAMICS AND CONTROL IN PHYSIOLOGICAL SYSTEMS

This International Symposium is to be held at the University of Rochester, N.Y., August 22-24, 1973. It is co-sponsored by the International Union of Physiological Sciences, the American Physiological Society, the American Society of Mechanical Engineers, and the International Federation of Automatic Control.

The objective of the Symposium is to encourage important summaries of the major physiological control systems in complex living systems by both physiologists and engineers, with at least some papers presented as combined efforts of physiologists and engineers working together.

Suggested topic areas are: - Biochemical control at the membrane level; Organ regulation and control; Overall systems response (metabolism, thermoregulation, electrolyte regulation, behavioral regulation, nervous control); Homeostatic regulation.

Interested authors of either discipline (physiology or engineering) may write to either of the program chairmen (see below) indicating by brief outline their specific interest for contributing to the program. About one-third of the papers will be invited overviews. Potential authors should write one of the program chairmen. Interested attendees should write to the general chairman.

General Chairman: Prof. G. Cohen, Univ. of Rochester, Rochester, N.Y.

Program Chairmen: Prof. A. C. Guyton, School of Medicine, Univ. of Miss., School of Medicine, Jackson, Minn. 39216

A. Iberall, General Technical Services, Inc., 8794 West Chester Pike, Upper Darby, Pa.

(See Enclosed Flier)

1971 FISCAL REPORTS

The Bylaws of the Society (Article VII) identify the three principal funds which are used for the fiscal management of the Society's affairs. The behavior of these funds during the year 1971 is summarized below.

SOCIETY OPERATING FUND

This fund is used for direct services to members through arrangement of meetings, programs, etc.; the expenses and activities of Council and its committees (other than publications); the generation and distribution of educational materials; and the supervision of the business affairs of the Society.

INCOME

Membership Dues	$68,806	(70%)
Sustaining Associates Contributions	4,825	(5%)
Reimbursement for Services rendered in connection with the Fed. Spring Meeting	12,143	(12%)
Interest (on advance monies received)	6,489	(7%)
Fall Meeting (net)	4,548	(5%)
Other Income (sale of educational and other material, etc.)	1,003	(1%)
Total Income	$97,814	

EXPENSES

Salaries and Benefits	$40,079	(31%)
Dues to Fed. and other Organizations	21,101	(16%)
Office Rental (paid to Fed.)	4,660	(4%)
Travel and Subsistence for Officers and Committees (other than publications)	6,040	(5%)
Education Committee and Office	41,337	(32%)
Bowditch Lecture	500	(-)
Mail, Telephone, Supplies & Misc.	4,171	(3%)
Business Office Expenses (11%)	11,994	(9%)
Total Expenses	$129,882	

Excess of expenses over Income (deficit)	($32,068)
Subsidy for Education 1/71 from Savings	38,000
Actual Balance	$5,932

PUBLICATIONS OPERATING FUND

This fund represents the functions of the Society as a publisher of scientific journals.

INCOME

Subscriptions	$590,824	(68%)
Sale of Reprints (net)	63,579	(7%)
Sale of Back and Single Issues	13,213	(2%)
Page Charges	155,343	(18%)
Advertising (net)	14,074	(2%)
Interest (on advance subscriptions, etc.)	21,825	(3%)
Royalties	4,641	-
Miscellaneous	4,789	-
Total Income	$868,588	

EXPENSES

Printing and Engraving	$508,466	(56%)
Salaries and Benefits	155,981	(17%)
Mail, Telephone, Supplies, etc.	58,997	(7%)
Office Rental (paid to Fed.)	15,110	(2%)
Section Editor Expenses & Professional Services	54,800	(6%)
Travel & Subsistence for Officers, Committee, and Editors	8,273	(1%)
Miscellaneous	1,454	-
Business Office Expenses (89%)	97,040	(11%)
Total Expenses	$900,121	
Allocated to Handbook Operations	(17,772)	
Adjusted Total	$882,349	
Excess of Expenses over Income (deficit)	(13,761)	

PUBLICATIONS CONTINGENCY AND RESERVE FUND

This is a reserve fund which the Society has accumulated over many years. Its existence is dictated by prudent business practice, in case of any severe reversals etc. the journals can continue to be published for at least one year following such reversals. The Society has very few tangible, salable assets that could be used as collateral for borrowing money. The fund's size should be from one to two times the annual operating costs of the publication operations, including the Handbooks. It is held in long term investments managed by an investment counselor. Its uses are carefully spelled out in Article VII, Section 3 of the Society Bylaws.

Balance Dec. 31, 1970 (market value)	$1,039,508
Dividend and Interest paid to APS in 1971	46,375
Balance Dec. 31, 1971 (market value)	1,211,521
Gain in market value during 1971	172,013

SOCIETY FOR NEUROSCIENCE

The Second Annual Meeting of the Society for Neuroscience will be held in the Shamrock Hilton Hotel, Houston, Texas October 8-11. 1972. The program will consist of symposia, workshops of volunteer papers and demonstrations. The registration fee will be $25 for members: $20 for non-members; and $5 for graduate students. For further information write:

Second Annual Meeting
Society for Neuroscience
9650 Rockville Pike
Bethesda, Md. 20014

ANIMAL TISSUES

The Tissue Bank of the St. Louis Zoological Park has available to researchers and educators tissues from almost every order of Mammals. Birds, Reptiles and Amphibia. A 52 page catalog listing available tissues may be obtained by writing:

William J. Boever
Tissue Bank
St. Louis Zoological Park
St. Louis, Mo. 63110

1972 FALL MEETING

The Fall Meeting this year will be held in conjunction with the Division of Comparative Physiology and Biochemistry of the American Society of Zoologists. The physiologists of both campuses of the University, i.e., those from the College of Medicine at Hershey and those from University Park as well as the zoologists from University Park, cordially invite all members of the American Physiological Society to attend the 23rd annual Fall Meeting. All activities will be held on the University Park Campus.

For those confused by identities, the University Park Campus of The Pennsylvania State University is situated in State College, Pennsylvania, approximately in the geographical center of the State. Travel guidance will be provided in a mailing to the membership.

The refresher course on "The Physiology of Human Reproduction" has been organized by Ernst Knobil, Professor of Physiology, University of Pittsburgh. The topics for the refresher course are: Ovulation and Its Control, Pregnancy, Lactation, Sexual Behavior, and Control of Testicular Function. The refresher course will be offered Monday, August 28 from 9 AM to 12 Noon, and from 1:30 to 4 PM.

The scientific sessions and symposia will start Tuesday morning, August 29.

Seven symposia have been organized. They are:

	Chairman
1. Regulation of Protein Turnover	Howard E. Morgan
2. Physiological Effects of Noise	Bruce L. Welch
3. Physiological Problems in Occupational Health	Austin Henschel and David Minard
4. Long Term Adaptive Responses to Exercise	John O. Holloszy
5. Diffusional Exchange of Water Vapor Across the Avian Egg Shell	Charles V. Paganelli
6. Metabolism of the Lung	Henry O. Heinemann
7. Problems in Calcium Metabolism	Harold Schraer

Only one symposium will be held each half day unless the number of submitted abstracts permits tight enough scheduling to end the meeting with the Thursday afternoon sessions. In this event, two dissimilar symposia will be offered Thursday afternoon. The symposia will run concurrently with the scientific sessions. A more complete description of the symposia will appear in the meeting announcement.

The Bowditch Lecture will be presented at 4:30 PM on Tuesday, August 29, by Felix Strumwasser, Professor of Biology at the California Institute of Technology. His topic will be "Neural and Humoral Factors in the Temporal Organization of Behavior."

The Society business meeting will be held at 4:30 PM on Wednesday, August 30th.

John R. Brobeck, Professor of Physiology, University of Pennsylvania School of Medicine will present the Past-President's address, "A Reconsideration of the 'Biological Clock in the Unicorn'," at the Annual Banquet which will be held at 7 PM, Wednesday evening, August 30th.

Those registrants wishing to live on campus will be housed in Waring Hall. If air-conditioned accommodations are desired, reservations should be made at one of the local motels for none of the dormitories on campus are air-conditioned.

Those who can drive to State College are encouraged to do so because of the limited air transportation. Air service is provided by Allegheny Airlines into Mid State Airport (Philipsburg, State College, Bellefonte) situated 25 miles from campus, and by Pennsylvania Commuter Airlines into University Park Airport, which is five miles from campus. Auto rentals (reservations should be made in advance) can be made at other accessible airports such as Washington, D. C., Pittsburgh, Harrisburg, and Altoona, Pennsylvania. State College is approximately 20 miles from the Milesburg exit (#23) on Route I-80 (East-West freeway through Pennsylvania). Adequate parking is available on campus.

Registration will begin Sunday, August 27 at 2 PM and continue from 8 AM to 5 PM throughout the meeting.

A program for the ladies has been prepared which can keep them partially occupied throughout the week.

AN ADDRESS DELIVERED BY DR. ROBERT F. PITTS AFTER RECEIVING THE FIRST ACDP PLAQUE

I greatly appreciate this plaque which honors me for my outstanding contributions to the teaching of Physiology. This award surprises me somewhat. I have never considered that teaching was my special forte. Rather, I've always believed that I've been a somewhat better-than-average investigator. Now with this plaque, given me by a council of my peers, I'm beginning to feel a bit like Cassius Clay who made the immortal comment: "I never said I was the brightest, I just said I was the greatest."

In trying to analyze the basis for this award given by the Association of Chairmen of Departments of Physiology, my thoughts turn to my monograph entitled, "The Physiology of the Kidney and Body Fluids," as a possible contributing factor. This monograph was first published nine years ago. That June, my students presented me with a Pulitzer Award, and the citation read as follows: "For the Best Work of Fiction published in 1963." But all joking aside, this award warms the heart of an old man who will shortly close his career as an active teacher of Medical Students.

Dr. Selkurt, on writing to me informing me of this award, suggested that a few words on some question of concern to all assembled here tonight might be appropriate. The question I've chosen is, who is best suited to teach Physiology, the Professional Physiologist or the Clinician. I shall restrict my discussion even more as you shall presently see.

About 18 years ago, there was a meeting in Atlantic City on Teaching of Physiology, Biochemistry and Pharmacology, sponsored by the Association of American Medical Colleges. Dr. Comroe presented a statistical summary of the replies to a questionnaire entitled "Who should Determine Course Content of Physiology for Medical Students." The questionnaire was sent to upper classmen, House-staff, Clinical Teachers and Practicing Physicians. Each group was practically unanimous in their belief that they alone were best fitted to make this decision. Thus decisions, which are increasingly made today by administrators, were in the forefront two decades ago. The recent ferment in Medical Education is really not so recent, only the decisions.

I shall not argue the many pros and cons of clinical participation, clinical orientation, clinical determination of course content. I shall restrict my comments to one facet of the problem, the Physiology Laboratory. I firmly believe that the laboratory is an important element of both the teaching and learning experience. Strictly didactic teaching lacks realism. From the student's point of view it consists of "he said" or "the text says." The laboratory adds, "I saw." I do not claim that all teaching of Physiology can or should be solely by the deductive laboratory method. It's very expensive both of time and money. But when you've repeatedly heard students exclaim, "its real," with genuine excitement in their voices, after they've dissected a frog's sciatic nerve, measured its conduction velocity and absolute and rela-

tive refractory periods, it cannot but impress you with the value of the laboratory. I've never heard a medical student say I'm a human doctor, not a frog or a cat or a dog doctor when he's had an exciting laboratory experience which illustrates some basic principle.

My first conclusion is that a laboratory course should include carefully thought out experiments which illustrate significant principles, independent of their numbers. To as great an extent as consistent with feasibility and safety, the student should be the subject of the experiment.

My second conclusion is that the professional physiologist is abrogating his responsibility as a teacher if he gives up all laboratory teaching, either voluntarily or under pressure. This seems to be common practice among Biochemists, who I believe will be relegated to undergraduate or graduate schools within the brief span of a few years. Perhaps this is what they want. I want Physiology to remain an important part of Medical School teaching. Of one thing I'm certain, no clinician should or could devote the time and energy required to put a good laboratory show on the road.

In these days of anti-intellectualism and of substitution of systems of delivery of medical care for scientific medicine; the pressures to shorten the medical curriculum, and to increase enrollment; the uncertainties of financing medical education as well as research and the growing governmental and local interest in Community Medicine, all conspire to denegate the role of physiology in Medical Education.

The situation will worsen over the next few years, but in time there will come another Flexner Report.

My advice is salvage as much as possible and save it for the day of the renaissance.

HANDBOOK OF PHYSIOLOGY

Section 7: Endocrinology

Volume I: Endocrine Pancreas

Publication of the first volume in a new section of the Handbook of Physiology is scheduled for June 1972. This volume, ENDOCRINE PANCREAS, is one of seven or more volumes that will cover all of the classically recognized endocrine glands. This most comprehensive treatment of the endocrine system ever undertaken will be contained in about 250 chapters.

It is appropriate for the Handbook series in endocrinology to begin with a volume on the endocrine pancreas. It is now 100 years since the discovery in 1869 of the unique islands of endocrine cells in the midst of the acinar pancreatic tissues by the young pathologist, Paul Langerhans. Moreover 1971-1972 is the 50th anniversary year of the discovery of insulin.

ENDOCRINE PANCREAS, edited by Donald F. Steiner and Norbert Freinkel, is a volume in which an attempt has been made to consider every aspect of the islets of Langerhans. Thus morphological characteristics; formation, storage, and release of all the known pancreatic hormones; their chemical attributes; and the molecular as well as physiological dimensions of their actions are included. When it was appropriate, sections have been incorporated on selected clinical topics, since diabetes mellitus remains a disease of civilization, and animal models are significant only insofar as they impinge upon human disease.

Editors of the other volumes in the section on Endocrinology are Ernst Knobil, Wilbur H. Sawyer, Monte A. Greer, David H. Solomon, Gerald D. Aurbach, George Sayers, Hermann Blaschko, A. David Smith, and Roy O. Greep. The Section Editors are Roy O. Greep and Edwin B. Astwood.

The Handbooks are prepared especially for use by graduate students, teachers, and investigators. They go far beyond the conventional textbooks in dealing with involved problems and controversial issues. They are, likewise, not in the nature of the usual comprehensive and uncritical literature surveys. Instead the current status of each special field of research has been depicted against a backdrop of the firmly established facts. For the interested investigator these volumes will provide a starting point and for the teacher a summary of the field.

The subject index for this volume of the Handbook was prepared by Constantine J. Gillespie, of the National Institutes of Health Library, Bethesda, Maryland.

Members are reminded that printing costs have increased about 7% per year in each of the four years since the last Handbook was published. Nevertheless the Society has set the price of the new volume as low as

possible in its continuing effort to attain a wide distribution for the series. Economies have been achieved without sacrificing quality by introducing several changes in the format of the volume. About 5-10% more words have been added per page without reducing the type size, thus saving on the cost of paper and mailing. Printing is by offset rather than by letterpress thus allowing us to use negatives rather than the more expensive metal engravings. By switching to negatives it was also possible to use halftones with greater resolution, which was believed to be necessary to accommodate the many fine electronmicrographs that will appear in this Section. ENDOCRINE PANCREAS is priced at about 5.7¢ per page compared to 5.2¢ per page for the last volume of the Handbook published in 1968.

ENDOCRINE PANCREAS is available to members of the Society at a discount, $33 rather than $41.50, if they order directly from the Society's business office, 9650 Rockville Pike, Bethesda, Md. 20014.

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INTERNATIONAL CONGRESS OF NUTRITION

The IXth International Congress of Nutrition will be held in Mexico City from September 3-9, 1972. In the scientific program, composed of over 40 symposia or panel sessions and nearly 600 short communications, considerable attention is given to the practical aspects of the nutritional sciences. An interesting social program free of cost for participants has been planned. Registration fee is $55 for full members and $25 for accompanying members. For further information and registration forms contact: IX Congreso Internacional de Nutricion, P.O. Box 22-112, Mexico, D.F. Mexico.

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WHY AUDITORY NEUROPHYSIOLOGISTS SHOULD BE MORE INTERESTED IN ANIMAL SOUND COMMUNICATION*

ROBERT R. CAPRANICA
Section of Neurobiology and Behavior
and
School of Electrical Engineering
Cornell University
Ithaca, New York

My comments are intended for those of you who seek an understanding of how the auditory system encodes meaningful information at the level of single nerve cells. By inserting microelectrodes into the auditory nervous system, we can record the firing patterns of single cells in response to acoustic stimuli in a number of different animals. These electrophysiological studies hopefully will lead us to understand how the overall auditory system provides an animal with its sense of hearing. To me, this is the primary rationale for embarking on single-unit studies in the sensory nervous system. That is, by recording from individual cells in various ascending centers in the auditory system, we eventually should try to relate our data to behavioral correlates of sound communication. Studies in non-human species presumably will provide us with insight into comparable mechanisms of auditory processing in the human nervous system, possibly to include aspects of speech encoding. Given this eventual goal, I would like to raise the question of how we should proceed. I hope that my comments will at least cause you to review your current strategy and your motivation in pursuing neural encoding in the auditory system. While my remarks may seem directed specifically toward the auditory nervous system, they apply in general to other modalities and their concommitant sensory channels.

Let me begin by stating what the strategy for the most part has been in the past. Neurophysiological studies of sensory encoding in the auditory system have relied almost exclusively on the use of pure tones, clicks, and noise bursts. We routinely plot tuning curves in response to pure tones; we measure latencies and post-stimulus time histograms to clicks; and we compare statistical firing patterns to filtered noise bursts. Why have we chosen this particular set of stimuli in our studies? There are perhaps two main reasons for this choice.

First, these signals are simple to describe and they are simple to produce in the laboratory. Sinewave oscillators, pulse generators, and noise generators are commercially available from a large number of

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*Taken from the introductory remarks given at the session on Auditory Neurophysiology at the 1972 Federation meetings.

Supported by the National Science Foundation (Research Grant GB-18836) and the Public Health Service (Research Grant NS 09244).

sources. These instruments are relatively easy to operate and to understand. The signals that they produce have simple spectral properties, and we can easily describe them either in the time domain or in the frequency domain. Interactive computer programs have been fashioned that can tabulate the response properties of single auditory cells to the presentation of these signals. And so we find that auditory neurophysiologists universally have adopted this particular set of simple, and perhaps very artificial, stimuli.

The second reason that these simple stimuli have been used, and this is especially true of pure tones, is that they are believed to be the basic building blocks of more complex sounds. Most natural sounds contain rather complicated spectral patterns. If one makes a sonagram of such a sound, say a vocal signal, we find that energy is distributed at many different frequencies. In the most general situation, this distribution can be a continuous function of an infinite number of frequency components.

Now, from Fourier analysis, we know that we can describe a sound waveform mathematically as a sum of sinewaves, each having an appropriate amplitude and an appropriate phase angle. If each sinewave component in this sum is an integral multiple of some common fundamental frequency, then we say that they are harmonics of one another, and we can represent the waveform by a Fourier Series. A typical example is a vowel sound in which the different frequency components are harmonics of the periodic vibration frequency of the vocal cords. If the sinewave components instead involve a continuous distribution of frequencies, then we must describe this waveform by a Fourier Integral, namely the Fourier Transform. A typical example is a consonant sound in which the sinusoidal components are distributed along a frequency continuum; these sounds do not exhibit a common fundamental frequency. They are produced by non-periodic air flow through the larynx and vocal tract. Most animal sounds consist of a mixture of vowel-like and consonant-like components that interact during their vocal production.

The Fourier representation is unique. It states that there is one, and only one, set of sinusoidal components which, when added together with appropriate amplitudes and phases, will sum to reconstruct the original complex waveform. This uniqueness has been used in machine analysis and synthesis of various sounds, particularly speech.

The point we might consider is whether Fourier analysis applies to the auditory nervous system, especially at the level of single cells. Auditory neurophysiologists, neither knowingly or unknowingly, have assumed that it does. This assumption leads to the defense of pure tones as adequate stimuli for studying neural encoding in the auditory system. The rationale then follows that the basic building blocks in a complex sound are its sinusoidal components. Thus, by studying the response of the auditory nervous system to pure tones, we eventually will discover how it processes complex sounds. I would like to question this belief - I don't think it's justified.

Suppose we consider an unknown communication system, with some input signal x(t) and a corresponding output signal y(t), as shown in Figure 1.

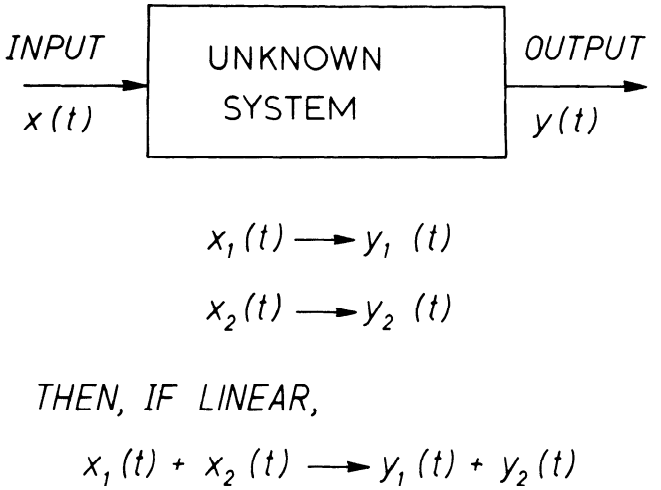

Fig.1. Input-output relationships for a general communication system. If the system is linear, then superposition of input signals gives rise to superposition of output signals.

The system might represent a single neuron, or a sequence of neurons, or it could represent the entire auditory system; x(t) could be some input sound waveform and y(t) might be the train of nerve spikes of a single cell in response to the sound. If we apply a particular signal, say $x_1(t)$, we would obtain some output signal $y_1(t)$. If we apply a different signal $x_2(t)$, in general we would obtain a different output $y_2(t)$. Then we would conclude that the system is linear if the simultaneous presentation of $x_1(t)$ and $x_2(t)$ together produce an output which is the sum of the two individual outputs taken separately, namely $y_1(t) + y_2(t)$. In other words, superposition is a cardinal property of a linear system. It means that the response of a complex (input) signal can be studied by measuring the responses separately for the individual components in the input signal. For example, suppose x(t) can be broken down into a number of components $x(t) = x_1(t) + x_2(t) + \ldots\ldots + x_n(t)$. Rather than study the response y(t) of the system to the complex signal x(t), instead we could study the individual responses $y_1(t)$, $y_2(t)$, $y_3(t)$, $\ldots\ldots y_n(t)$ to each of the separate components in x(t). By then adding up these individual responses, we would obtain the response to the complex signal. $y(t) = y_1(t) + y_2(t) + \ldots\ldots + y_n(t)$.

This procedure is fine if the system that we are dealing with is linear. It makes our task easier, for then we need only concern our-

selves with relatively simple input signals. But suppose the system is not linear. Then superposition does not apply. And we then cannot obtain the response of a non-linear system to a complex stimulus by simply studying the responses to individual components in that stimulus. To take a very elementary example, consider multiplication $y=x^2$. This is a nonlinear process. Suppose the input signal contains but two components, $x=x_1+x_2$. Then each component separately would give rise to $y_1 = x_1^2$ and $y_2 = x_2^2$. Superposition would yield $y_1 + y_2 = x_1^2 + x_2^2$. But presentation of the input signal x would yield a quite different result, namely $y = (x_1+x_2)^2 = x_1^2+2x_1 x_2+x_2^2$. If we but extend this simple example to the case in which the input signal contains a large number of components, then obviously the assumption of linearity would give a very misleading result. This distinction is quite important. Linearity is a very special property. Electronic engineers spend a great deal of their time in trying to design linear circuit elements, linear amplifiers, linear loudspeakers, etc. If these instruments were not linear, then we would have a difficult time in using them in the laboratory.

Now what about the auditory nervous system - is it linear? If it is linear, then we can study its response to a complex sound by studying its responses to simple sinusoidal components. And so we could justify our preoccupation with plotting tuning curves and related histograms of spike activity to pure tones. But such a blind assumption of linearity in the real world of biological systems and animal behavior seems naive and questionable. For instance, consider the initiation of an action potential in a single neuron. Just to describe the propagation of an action potential along an axon and to account for various degrees of refractoriness requires highly non-linear differential equations. Spike patterns that are affected by habituation do not behave linearly. There are numerous examples of such basic properties of single cells that depart drastically from any sort of simple linear relationship with regard to their input-output characteristics.

The response properties of most auditory neurons, especially at higher levels in the central nervous system, depart more and more from linearity. Many cells in the auditory cortex do not respond to simple tones. If the auditory system were linear, so that we could justify the exclusive use of pure tones, then we might expect that these cells would respond to simple sinusoidal stimuli in some obvious way. And we also find many cells with excitatory tuning curves surrounded on one side, or the other, or both sides by inhibitory tuning curves. The spike pattern to the simultaneous presentation of an excitatory tone and an inhibitory tone can be quite different from any simple summation of the excitatory and inhibitory responses taken separately. There are many auditory cells that show little or no spontaneous activity. Their response to an excitatory tone can be suppressed by the addition of an inhibitory tone. But the inhibitory tone by itself may have no obvious effect.

Nevertheless the widespread, exclusive use of pure tones and clicks in auditory neurophysiology perpetuates. The influence of an engineering approach to studies of the auditory system has motivated their use, namely measurement of frequency response with tones and impulse response with clicks. This has been a powerful engineering approach in designing and

characterizing man-made linear systems. But this approach may be very misleading if a system in non-linear. Unfortunately very few auditory neurophysiologists have confronted this question, particularly in the central nervous system. I think we should pay more attention to this question - do the cells that you record from act as linear elements? Does superposition apply? When you plot a tuning curve, does the area enclosed represent a linear response region or a non-linear response region? Some of you might argue that, if the auditory system is non-linear, then it could be approximated by a piecewise-linear system. But such a casual explanation is mere hand waving unless you justify your assumption.

In pursuing our electrophysiological studies of neural processing in the auditory system, I feel we should be more aware of the restrictions imposed by the property of linearity. I think that it is unrealistic to presume that individual neurons in the auditory nervous system behave as linear elements. The use of simple stimuli, such as pure tones, therefore may not tell us much about how the auditory system processes sounds of biological significance.

Most animals are not interested in listening to pure tones; these signals convey little information. To be sure, various animals have been trained (often with considerable effort) to discriminate between tones of different frequencies. But it would seem to me that their auditory system was not intended for signals of this type. Instead their auditory system has become selectively specialized for discrimination of more appropriate natural sounds. While these sounds may be species-specific, it seems possible that the manner in which they are encoded involves a common strategy among many animal species. That is, it may well be that there is an underlying principle of sensory encoding at the level of single cells in the auditory system, and it's conceivable that this principle is shared by many different species. I find it hard to believe that each species might have evolved a completely different encoding scheme in its auditory nervous system. Instead I would expect that the way a complex sound is encoded in the auditory system is similar in different mammals, perhaps similar in birds, and maybe even in amphibians. But to explore this question, I doubt that the predominant use of pure tones will necessarily lead us to an answer. It perhaps would if the auditory system were composed of elementary linear elements. But this does not seem to be the case.

If we wanted to understand how speech is processed in the human auditory system, I doubt that many of us would restrict ourselves to pure tones. Instead we might use natural or synthetic speech sounds. But I would venture to say that the response properties of single neurons to pure tones in our auditory system may not be too dissimilar from those, say, in the auditory system of a guinea pig. Indeed we would find that the auditory cells in both animals possessed tuning curves. But I doubt that the simple comparison of tuning curves in these two animals would reveal how speech is processed in the human's auditory nervous system.

As a matter of fact, until rather recently, a major portion of auditory neurophysiological research had been conducted with guinea pigs and cats. These are animals that one can obtain rather easily and, perhaps for this reason, they became animals of experimental choice. Now if one is only interested in the mechanistic aspect of sound transduction in the peripheral auditory system, then these animals are suitable subjects. But it always comes as a surprise, at least to me, that we really don't know what kinds of sounds a guinea pig or a cat is interested in hearing. Here we have an extreme example of the auditory neurophysiologist's lack of concern in why the animal they are studying even has a sense of hearing in the first place. Of course it depends on the kinds of questions that you ask. But if you are interested in relating your electrophysiological data to its functional significance, then you might ask what is intended in auditory processing. Surely it is not to process pure tones. Does the auditory system of the guinea pig serve only to mediate a pinna reflex when it hears a loud sound? And is the elaborate auditory system of the cat designed just to detect the "squeaks" of mice and the "meows" of other cats? I doubt it. But even if it were so, then doesn't it make sense to ask ourselves how these sounds are being encoded and what physical properties they possess?

I think our persistent concern with pure tones and clicks, especially in higher centers in the ascending auditory system, should be questioned. What is it that we ultimately hope to learn? I suggest we pay more attention to the sounds that occur in a natural environment and the behavioral significances that these sounds convey for the animal we intend to study. And once we've established the significance of these signals and how they play a role in sound communication, then perhaps we can begin to ask more meaningful questions of sensory encoding in the auditory nervous system.

NEWS FROM SENIOR PHYSIOLOGISTS

The following letters and notes were received by members of the APS Senior Physiologists Committee after sending birthday greetings on cards having a picture of Beaumont House.

Wilder Penfield wrote to Hal Davis:

"How nice to receive your charming birthday greeting and to be able to feel that it comes from the American Physiological Society and from that magnificent residence, Beaumont House. How rarely we have the discretion to build like that in these days. You ask if I have any news this year for The Physiologist. Although I am classified as a lowly surgeon, I like to be considered a physiologist. I would like to say that I have made some recent great forward strides in the understanding of the living, functioning, human brain but, like some other physiologists. I find that my mind begins to turn more readily to the philosophical side of man's being. Looking back at my last titles, I realize that this is so - Lights in the Great Darkness (The Harvey Cushing Oration); Remarks on Incomplete Hypotheses for the Control of Cerebral Circulation; Serbelloni Soliloquy; Science, the Arts and the Spirit."

Dennis Jackson wrote to Bruce Dill:

"Thanks so much for your nice card and its cheering message. And I am happy to congratulate you on your accession to the birthday group. That is an occasion when one must be both glad and sorry at the same time. I am sure you and your friends and colleagues all got a great thrill out of the symposium. And that was an ideal place to hold it. It reminded me of the old days when we all used to sit around and talk and get acquainted for an hour or two after the dinner and the speeches were over at the meetings." At age 93, Dennis has completed work for a paper that he hopes will be published.

Henry Laurens wrote to Bruce Dill:

"Thank you for good wishes on my 86th. Welcome to the Octogenarian organization. May you long be a member of it."

Edward Boyden wrote to Bruce Dill:

Boyden celebrated his 86th birthday on March 30. He may hold the record for continued activity among our birthday card group. A member of the Department of Biological Structure at the University of Washington, he noted the tribute in the Physiologist to Frank Mann and continued, "The years at Minnesota when I was working on the physiology of the biliary system recall stimulating memories of Frank Mann with whom I often discussed these problems. The lung has taken another 25 years. Just recently, work on the anatomy of the complex pulmonary acinus has been published and, hopefully, one can look forward to another year or two working with the pediatricians on the prenatal lung."

The reply by Karl Von Frisch (honorary member) freely translated reads:

"Many thanks for your friendly good wishes on the occasion of my 85th birthday and for the lovely picture of the old and so comfortably attractive house where you hold your meetings; these I would enjoy attending. Please give my greetings to colleagues; my best wishes to you personally."

Included were two verses which have been translated by APS Poet Carl Dragstedt:

"The gifts and kind words that have come
From oh so many friends,
Imply a warm affection
My grateful heart commends.

"Life's span for me is now too short
For me to write each friend;
I merely ask each friend to stay
Bound to me to the end."

The highlight of his greeting was an excellent photograph of Karl in his study.

Fred Hitchcock replied to Hiram Essex in colorful fashion. Excerpts follow:

"It was a real pleasure to get your letter the other day. During my term on the Council of the APS I particularly enjoyed my association with you particularly your comment on the Paul Bert translation. You must have known about the translation at the time Alice and I did it. We worked on it for nearly three years. When I got home in the evening I would take the typed pages that she had translated during the day and read them aloud while she lay on the couch and followed in the French volume. When I came to a phrase that I didn't like I would say 'That doesn't make sense.' She had no training at all in science, and would reply, 'That's what it says in the book,' and then we would discuss it back and forth until we got a wording that satisfied us both. When I think of the translation I can't help remembering Leslie Nims; he was running the Yale Aeromedical unit for John Fulton at the time. Leslie once introduced me to a friend and then added, 'Fred's chief claim to fame lies in the fact that he persuaded his wife to translate Paul Bert's book.' My answer was, 'Leslie, that is so damn near the truth that it hurts just a little.' Leslie died last Spring of a sudden heart attack in the Pennsylvania Station when he was returning from a meeting. Incidentally I hope I go that way. It may be a bit hard on the survivors but it is fine for the one most concerned. The hardest part of the translation was to get a publisher. No publisher would believe that a book published in 1877 was of any value in 1943. Williams and Wilkins were at first interested in it. My correspondence was with a man by the name of Gill whom Charles Thomas referred to in a letter to Fulton as 'A damned unintelligent preacher.' Gill wanted me to cut the book to about half its length and then add a second part on Modern Aviation Medicine. This seemed to me like trying to cut out the unimportant part of Shakespeare. So I wrote to Gill and told him that I would tie up the manuscript with a pink ribbon and put it away in a trunk until someone was ready to publish it complete. Just at that time the owner of the local book store got hold of me and offered to publish it. He got out an edition of only a thousand copies, (I had already obtained prepublication orders for several hundred by circularizing the members of the APS). Well in spite of the fact that Mr. Long, the publisher, never spent a penny on advertising the book, the entire edition has been exhausted and the Long's Book Store made a modest profit on it. If Mr. Gill were still alive I should enjoy telling him about it. I bought the last twenty copies that were available and gave them to the physiology section of the Aerospace Medical Association to be used as part of the Paul Bert Award which the section established two or three years ago. Against my wishes, however, they established another award with the book as a prize which they are calling the Fred Hitchcock Award.

"You ask about my activities, well I have started writing my memoirs. I have about fifty pages written and I haven't gotten myself out of college yet. Perhaps I'll never finish it and even if I do it is doubtful if anyone will ever publish it. Perhaps it would be just as well if they don't. I was stimulated to do this because on two occasions I have been asked to write the history of the physiology department here at Chio State University. Much that I knew could not be published, I could

put in only things that were complimentary. I couldn't help feeling that it would be valuable to tell the truth about the persons concerned and the events that had happened. So everything in my memoirs will be true except, of course, names and places.

"I was at the Federation meeting in Chicago last April and from there I went out to Las Vegas to attend the symposium given in honor of Bruce Dill's eightieth birthday. I got there on Sunday and I was talking with Bruce's wife when she said, 'Fred, you must be pushing sixty yourself.' I put my arms around her and said, 'I just love you. Actually I am nearly two years older than Bruce. My 82nd birthday was last Saturday, October 30th. Beggars night. One of my friends had a Beggars Night party and I went dressed as Mephistopheles, my favorite character. Haven't you noticed that virtue isn't very interesting?

"After being home for about a week I went to Houston to the meeting of the Aerospace Medical Association where I had been invited to give the principal address to the Physiology section. My subject was 'Paul Bert and the beginnings of Aviation Medicine.' (More Paul Bert stuff). That paper has just been published in the October number of Aerospace Medicine.

"I am sure you know that shortly after I retired, Hiden Cox induced me to go to Washington to be acting educational director of the AIBS. I took the job on a half-time basis largely because I had always said that after I retired I wanted to be a Biological Missionary, for I had always felt that no one could have a satisfactory philosophy of life without a background of biological science. Cox had told me that I would have three million dollars for education and so I thought here is my chance to be a missionary. When I got to Washington I found that the three million dollars was all contract money and had already been allocated and that in reality I didn't have a damn cent. So after a few months I came back to Columbus to loaf. Then in July of 1962 the University of Pennsylvania asked me to be Adjunct Professor of Physiology in order that they might send me to Shiraz, Iran, to be Visiting Professor at a medical school that was being organized on American lines. With a good deal of reluctance, I finally accepted and went to Shiraz in February of 1963. I was there for about eighteen frustrating months. I came back in August 1964, shortly after that the University awarded me the OSU distinguished service award. Then in 1970 the Physiology section of the Aerospace Medical Association gave me the Paul Bert Award. I had previously received the Arnold D. Tuttle Award for distinguished research achievements in aviation medicine, and way back in 1958 I had been made a life member of the scientific council of the Interplanetary Society of Brazil. But this is enough bragging, next time you'll know better than to ask me about my activities."

VIIth INTERNATIONAL CONGRESS ON CYBERNETICS

The International Association for Cybernetics is organizing the Seventh International Congress on Cybernetics in Namur (Belgium) from 10 to September 15, 1973.

This Congress is open to everyone interested in the development and applications of Cybernetics.

The official languages of the Congress will be English and French.

All those wishing to take part in the Congress are invited to write to the Secretariat of the International Association for Cybernetics, Palais des Expositions, Place André Rijckmans, Namur (Belgium).

Authors of papers are requested to send the title and a summary of the paper to the Secretariat as soon as possible (and not later than January 1, 1973).

INTERNATIONAL PRIZE

The "Fondation de Physiopathologie Professeur Lucien Dautrebande" will award during the year 1973 an international prize of about 500,000 Belgian Francs ($10,000 U.S.).

It will be a reward for work on human or animal physiopathology, such work preferably having therapeutic implications. For further information about this prize, please write to the office of the Foundation: 35, chaussée de Liège, 5200 HUY (Belgium).

ENVIRONMENTAL HEALTH ASPECTS OF LEAD

An International Symposium of the Environmental Health Aspects of Lead will be held in Amsterdam, October 2-6, 1972. The Symposium is jointly sponsored by the Commission of the European Committees and the United States Environmental Protection Agency. The aim of the Symposium is to examine ways through which the recent data supplied by studies on environmental lead can be used to increase the protection of man and his environment. For further information write Dr. J. Smeets, Environmental Protection Agency, Washington, D. C. 20460.

ENVIRONMENTAL CONSULTANTS

An annual Directory of Environmental Consultants will be published. Environmentally concerned professionals interested in having their name and short resume appear in the Directory should send a No. 10 self-addressed, stamped envelope to: Directory of Environmental Consultants, P.O. Box 8002, University Station, St. Louis, Mo. 73108.

SLEEP CONGRESS

From October 3-6, 1972 the First European Congress on Sleep Research will take place in Basel, Switzerland, under the auspices of the newly founded European Sleep Society. It is planned to have presentations by 3 or 4 principal speakers, to arrange 4 or 5 symposia and to organize a number of sessions for 10-minute communications. For further information contact:

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