THE AMERICAN PHYSIOLOGICAL SOCIETY

Founded in 1887 for the purpose of promoting the increase of physiological knowledge and its utilization.

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The Physiologist

A Publication for Physiologists and Physiology
Orr E. Reynolds, Editor

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Please Note: Society Business and Notices are on gray-edged paper.

RESULTS OF ELECTION OF OFFICERS

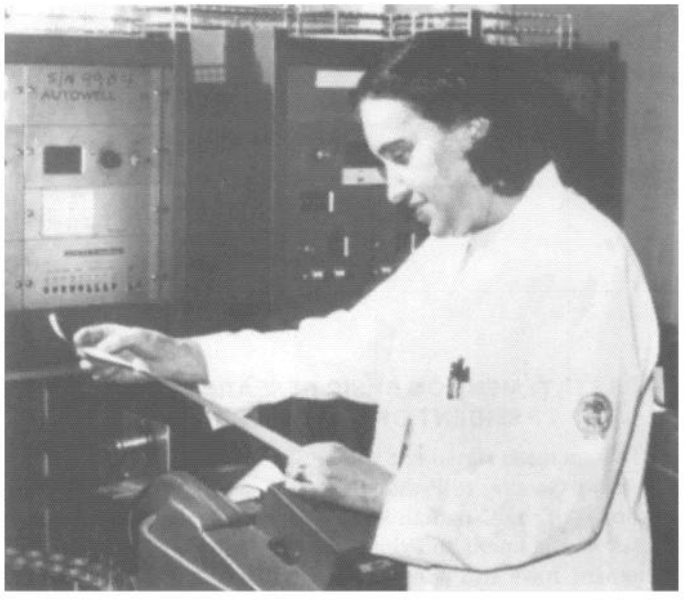
The balloting for President Elect and a Councilor was conducted by mail on March 20, 1978. As a result the following were elected:

President-Elect – Ernst Knobil
Councilor – Paul C. Johnson (term ends 1982)

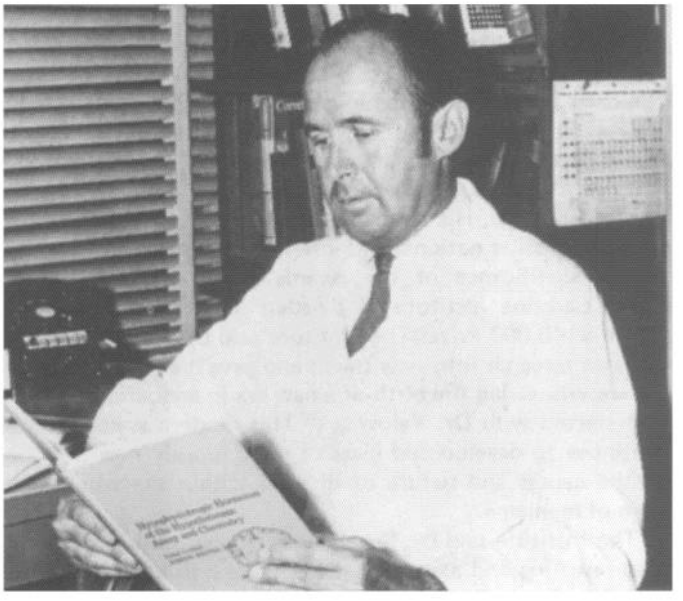
CURRENT SCHEDULE OF FUTURE MEETINGS

1978 Fall – St. Louis, Missouri – October 22-27
1979 Spring – Dallas, Texas – April 6-10 (Total FASEB meeting 1-10)
1979 Fall – New Orleans, Louisiana – October 14-19
1980 Spring – Anaheim, California – April 13-18
1980 Fall – Toronto, Canada – October 12-17
1981 Spring – Atlanta, Georgia – April 12-17
1981 Fall – Boston, Massachusetts – November 1-6
1982 Spring – New Orleans, Louisiana – April 18-23
1982 Fall – San Diego, California – October 10-15

VA HONORS
NOBEL LAUREATES YALOW AND SCHALLY



Dr. Rosalyn S. Yalow



Dr. Andrew V. Schally

The Veterans Administration held a reception to honor two recent Nobel prize winners associated with the VA research program.

Drs. Rosalyn S. Yalow and Dr. Andrew Schally are both members of the APS as is Dr. Roger C. L. Guillemin who also shared the prize.

The Society was extended an invitation and was attended by Dr. F. J. Haddy, a member of the APS Council and Chairman of the Department of Physiology at the Uniformed Services Medical School, and Orr E. Reynolds, Executive Secretary-Treasurer of APS.

The following tribute to Drs. Yalow and Schally is reprinted from the Reception Program.

The Honorable Max Cleland
Administrator of Veterans Affairs
Invites You To Join In Honoring
Dr. Rosalyn S. Yalow
and
Dr. Andrew V. Schally
Winners of the 1977 Nobel Prize in Medicine
March 13, 1978
Caucus Room 345 Cannon House Office Building

Dr. Rosalyn S. Yalow and Dr. Andrew V. Schally, both career Veterans Administration research scientists, received the Nobel Prize in Medicine at ceremonies in Stockholm, Sweden, December 10, 1977.

Their selection was the first time two scientists employed by the Federal government have shared this pre-eminent award in any one year. They join a select group of only four other Federal civil servants who have been named Nobel laureates for discoveries in medicine or physiology.

Dr. Yalow is a senior medical investigator at the Bronx, N.Y., VA Hospital, and Dr. Schally is also a senior medical investigator, at the New Orleans, La., VA Hospital.

Dr. Yalow was awarded half the Prize for her pioneering work in endocrinology, the study of glandular secretions, using the technique of radioimmunoassay which she and the late Dr. Solomon A. Berson, also of the Bronx VA Hospital, devised and introduced.

Dr. Schally shared the other half of the Prize with Dr. Roger Guillemin of the Salk Institute. Dr. Schally has made many pioneering discoveries in peptide hormone chemistry.

Dr. Yalow has won numerous other honors for her scientific contributions. She was the first woman to be appointed a VA senior medical investigator. She holds the rank of Distinguished Service Professor at Mt. Sinai School of Medicine, in addition to serving as Chief of the Nuclear Medicine Service and Director of the Solomon Berson Research Laboratory at the Bronx VA Hospital.

Dr. Yalow established the first radioisotope laboratory in the VA system, in 1947. She was one of the first winners of the annual Federal Women's Award for outstanding achievement. She and Dr. Berson were jointly honored with the first presentation of the VA's highest research recognition, the William S. Middleton Award. In 1976 Dr. Yalow received the Albert Lasker Basic Medical Research Award, the first woman to be so honored. She is a member of the National Academy of Sciences.

Her research has been associated with the technique of radioimmunoassay and extending its use. This important research methodology has led to numerous advances in physiology and clinical medicine. Its precision makes it of great value in measuring minute quantities of many pharmacologic and biologic substances in tissues, including drugs, hormones, viruses and enzymes.

The discoveries of Dr. Schally also are examples of basic research that has direct application to patient care. His findings have potential value in treating infertility, diabetes, acromegaly, arthritis and kidney disease.

Dr. Schally has been Chief of the Endocrinology and Polypeptide Laboratory at the New Orleans VA Hospital since 1962. He holds the academic rank of Professor of Medicine at Tulane University School of Medicine. He also was awarded the Albert Lasker Basic Medical Research Award, in 1975, and the William S. Middleton Award of the Veterans Administration, in 1970. His contributions also have been recognized with many other national and international honors.

The significance of the awards was emphasized by the Royal Caroline Institute of Sweden in announcing winners of the $145,000 Prize. The Institute said Dr. Yalow "directed diabetes research into new tracks and gave it a new dimension. We are witnessing the birth of a new era in endocrinology, one that started with Dr. Yalow . . ." This modern endocrinology continues to develop and gives us continuously new outlooks on the causes and nature of diseases within the whole spectrum of medicine."

The Institute said Dr. Schally was recognized for his discoveries revealing and exploring the peptide hormone production of the brain, laying the foundation for modern hypothalmic research.

Science Magazine, the official journal of the American Association for the Advancement of Science, said:

"It is doubtful that any two discoveries in the past 40 or more years have had as great an impact on basic and clinical endocrinology at the development of radioimmunoassays (RIA's) and the discovery that the hypothalmic region of the brain secretes hormones that control the secretion of hormones by the anterior pituitary gland . . ."

"The greatest recognition ever accorded the VA Medical Research Program. . . . Dr. Yalow and Dr. Schally have added greatly to the stature of American Medicine."

Dr. John D. Chase
Chief Medical Director
U.S. Veterans Administration

APS STATEMENT ON BASIC RESEARCH SENT TO THE PRESIDENT OF THE UNITED STATES

The enclosed statement and covering letter was sent by APS President Ganong to President Carter, and Dr. Oliver Heroux, President of the Canadian Physiological Society, has forwarded the same statement to Prime Minister Trudeau. Copies of this statement have also gone to all members of Congress and the Canadian Parliament.

24 February 1978

President Jimmy Carter
The White House
Washington, D.C. 20500

Dear President Carter:

Enclosed is a statement on the importance of basic research being jointly released by the Presidents of the Canadian and American Physiological Societies. We appreciate your recent comments in favor of strengthening basic science, and the increase in support for fundamental research recommended in the budget you have just submitted to Congress. However, President Heroux and I both feel that we must call the attention of all branches of government to the fact that additional, ongoing support for research and training is of great importance to the welfare of both our countries.

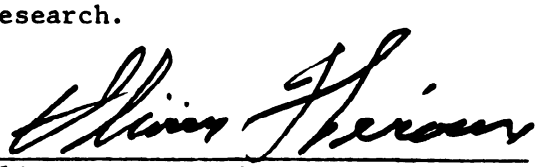
Sincerely,

William F. Ganong, M.D.

President, The American Physiological Society

JOINT STATEMENT BY THE PRESIDENTS OF THE CANADIAN AND AMERICAN PHYSIOLOGICAL SOCIETIES ON SUPPORT OF FUNDAMENTAL RESEARCH

We wish to express our concern on behalf of the physiologists and other scientists of the United States and Canada at the dwindling support of fundamental research into the way the body functions. The importance of basic research to the solution of the medical and technical problems that face us is apparent in many ways. For example, there are many presently incurable diseases which we cannot treat because we do not understand the disordered function underlying them, and we cannot understand the disordered function until we understand the normal function of the organs, tissues and systems involved. It has been repeatedly documented that the main breakthroughs in therapeutics and preventive medicine have come not only from applied studies but even more often from basic investigation of biological function. This point has been made before and undoubtedly will be made again. However, it seems particularly important to emphasize it at this time, when support for untargeted, fundamental research is being seriously eroded by inflation, cost containment goals, programs to conquer specific diseases, and other factors. Active investigation of biological function by imaginative productive investigators is essential to the progress of science and the conquest of disease. Considering the role of basic research in higher education, in maintaining standards of excellence in research, in providing background information for solutions to future problems and in contributing to the world pool of knowledge, our countries can ill afford the low level of financial support that is presently provided and projected for basic research.



Oliver Heroux, Ph.D.
President
The Canadian Physiological Society

William F. Ganong, M.D.
President
American Physiological Society

Jan 9th 1979

HELP US LOCATE CURRENT PHYSIOLOGICAL RESEARCH OF GENERAL PUBLIC INTEREST

The goal of the Public Information Committee of the FASEB is to inform the public of discoveries and advances in biomedical research and to educate the public to the idea that science is not a series of random saltations and "breakthroughs" but a continuous process of small steps fed from many directions and in need of nurturance consisting of a steady supply of money from year to year. One of the ways in which the Public Information Committee tries to achieve these goals is through the publication of the FASEB Feature Service, a bimonthly publication sent to newspapers and magazines nationwide. Current journal articles, frequently authored by members of FASEB's member societies, are translated into "lay language" and written up in a form suitable for publication in newspapers or magazines. The translated articles complete with the authors name, institution and telephone number, are reviewed by a member of the FASEB Public Information Committee and read by the senior author of the scientific publication from which the "lay translations" were taken. The articles can be easily shortened for use in newspapers as "filler" articles or amplified for use as "special" articles. As your APS representative to the FASEB Public Information Committee I am asking for your assistance in locating current research, newly published or already accepted for publication, whose content is of interest to the general public. Such articles might include basic research, some of whose hypothetical applications can be already envisaged, basic and theoretical research which attempts to answer questions of wide interest, and applied research whose objectives are already realized. Our work would be assisted greatly if you would send me preprints or references to pertinent articles as they come to your attention.

Marian S. Kafka, Ph.D.
Bldg. 10, Rm 2N315
National Institutes of Health
Bethesda, MD 20014

CONTRIBUTIONS TO APS ENDOWMENT FUND

The Endowment Fund consists of bequests, gifts and contributions to the Society for specific or general purposes. These contributions and bequests may be made in honor of an individual for specific or general purposes as the donor wishes. The Society welcomes donations and encourages bequests of all kinds to help carry out its programs and achieve its goals.

As announced in the December 1977 issue of *The Physiologist,* the Endowment Fund currently includes sums to support the Perkins Memorial Fellowship program, the Bowditch Lectureship and the Ray G. Daggs Award. Gifts to the Fund may be in the form of securities, bequests or checks payable to APS. The Executive Secretary-Treasurer is prepared to assist any person or organization in making a contribution.

Council wishes to recognize and publicly thank the following who recently made contribution to the Fund in memory of John F. Perkins, Jr., for use in supporting the Perkins Memorial Fellowship program. Prior to this time, primary support for this program came from the Perkins family.

Mr. Thomas D. Cabot, Boston, Massachusetts
Mr. Theodore Chase, Brookline, Massachusetts
Mrs. Malcolm Donald, Brookline, Massachusetts
Mr. John W. Hallowell, Cambridge, Massachusetts
Dr. Phillips Hallowell, Dover, Massachusetts
Mr. Henry S. Howe, Canton, Massachusetts
Dr. J. M. Kay, Hamilton, Ont., Canada
Mr. James Lawrence, Brookline, Massachusetts
Mr. Geoffrey W. Lewis, Cushing, Maine
Mrs. Robert Saltonstall, Wayland, Massachusetts
Mrs. Richard Warren, Dedham, Massachusetts
Mr. Samuel D. Warren, Essex, Massachusetts
Mrs. Sylvia H. Watson, Milton, Massachusetts
Mr. and Mrs. Philip Weld, Gloucester, Massachusetts

NSF ROTATOR PROGRAM

The National Science Foundation wishes to bring the Rotator Program to the attention of women, minorities and handicapped individuals who qualify for the multiple purposes of the program.

NSF augments its permanent staff of scientists and other professional employees with qualified individuals from the faculties of colleges and universities across the country who serve in non-career positions for periods of one or two years. A one or two year association with the Foundation in administering on-going national programs will prove most valuable to educational institutions on return of the rotators to their regular assignments.

Rotators selected in the current competition will begin their assignments in September 1978. For more information regarding the science programs covered, qualifications and salary, write to: Herbert Harrington, Jr., National Science Foundation, 1800 G. Street, NW, Washington, DC 20550. Applicants should forward their vitae and statements of interest to the same address.

APS FALL MEETING

The Fall Meeting of the American Physiological Society in conjunction with the American Society of Zoologists Division of Comparative Physiology and Biochemistry will be held in St. Louis, October 22-27. The Undersea Medical Society will also participate as a guest society. Meeting announcements will be mailed to members of participating societies in early April; deadline for receipt of abstracts is Friday, June 16, 1978.

In addition to sessions of contributed scientific papers, the program will include tutorial lectures and the following sessions of invited papers listing titles and organizers.

Biology of the Chloride Cell (2 days) Jean Maetz Memorial Symposium – Frank Conte

Electrophysiology of Epithelial Transport – Luis Reuss

Physiological Effects of Angiotensin – Richard Malvin

Metabolic Aspects of Thermeogenesis – Barbara Horwitz

Physiological Effects of High Ambient Pressures – Hermann Rahn & H.A. Saltzman

Identification and Physiology of Circadian Pacemakers – Arnold Eskin

Refresher Course: Smooth Muscle Physiology – Fred Fay

Bowditch Lecture – Brain Mechanisms for Integration of Growth Hormone Secretion. Joseph B. Martin, McGill University, Montreal Neurological Institute and Hospital, Montreal, Quebec.

LEARNING RESOURCES CENTER AT THE FALL MEETING

The Education Committee has experimented for several years in ways of giving members of APS an opportunity to exchange information on education matters (materials, concepts, tests, etc.) at the Society's meetings.

One experiment, first made at the International Physiological Congress in Paris, 1977, involved providing space in the exhibit hall for individual educational exhibits. This was quite successful in attracting interest and stimulating discussion. Encouraged by this experience, the Education Committee is sponsoring a "Learning Resources Center" at the Spring and Fall Meetings of the Society starting with the Fall of 1978 in St. Louis, Missouri.

The following facilities will be made available:

1. Poster boards scheduled as in regular poster sessions but set up in the exhibit hall area.
2. Table space – nominally a table 3' x 6' for three-dimensional displays; books, models or special projection equipment.
3. Telephones for computer terminal link.
4. A library of video tapes (¾ inch cassettes) and video cassette players (1 or more depending on volume of use).
5. A library of slide tape units and several Caramate display units.

Individuals or institutions wishing to avail themselves of an opportunity to present educational papers or materials may specify the "Teaching of Physiology" topic, provide an abstract on the regular abstract form for publication and write an accompanying letter describing the requirements for presentation from among the optional facilities listed in the preceding paragraph. (Motion pictures must be provided in video tape form for inclusion in the library or the presenter must arrange for his own table size projection equipment.)

Presentation of an abstract in the Teaching of Physiology category will not constitute use of a franchise for submitting abstracts for research papers for slide or poster sessions, however, the abstract form must bear the signature of a member of one of the participating societies.

ANNUAL MEETING AMERICAN SOCIETY OF ZOOLOGISTS SOCIETY OF SYSTEMATIC ZOOLOGY AMERICAN MICROSCOPICAL SOCIETY

Wednesday, December 17 – Saturday, December 30, 1978
Hotel John Marshall
Richmond, Virginia

Call for contributed papers will be issued April, 1978

For more information write to:
Ms. Mary Wiley
American Society of Zoologists
Box 2739 California Lutheran College
Thousand Oaks, CA 91360

JOINT MEETING WITH CANADIAN PHYSIOLOGICAL SOCIETY

Council, after scheduling its Fall 1980 Meeting for Toronto, invited the Canadian Physiological Society to participate in a joint meeting. APS has been notified by D. B. Jennings, Secretary of the CPS that overwhelming support was voiced for a joint meeting in 1980. In addition, the CPS supported holding subsequent joint meetings with APS at four year intervals pending a review of such arrangements subsequent to each joint meeting.

NASA SOLICITS LIFE SCIENCES SPACE SHUTTLE EXPERIMENTS

The National Aeronautics and Space Administration's Office of Space Science has released an Announcement of Opportunity for Life Sciences Investigations on Space Shuttle/Spacelab missions. This Announcement invites scientists to submit proposals for the Life Sciences Space Flight Research Program from 1981 through 1983.

Life Sciences investigations to be performed onboard the Space Shuttle are solicited through the National Aeronautics and Space Administration Office of Space Science's Announcement of Opportunity No. OSS-AO-1-78, dated February 7, 1978. Experiment proposals are sought to meet the following Life Sciences Space Program objectives: to investigate and understand physiological, performance, and biochemical changes which has been observed in humans who have flown in space; to identify and investigate significant biological phenomena which may occur after exposure to the space environment; to test and demonstrate, under operational conditions, equipment and procedures which are needed by the National Aeronautics and Space Administration Life Sciences Program in Space.

Flight opportunities are planned for the Shuttle/Spacelab during 1981, 1982, and 1983. As a result of this Announcement, agreements will be entered into for definition of the selected experiments. On completion of the definition phase, those experiments which can be suitably accomodated on a planned flight will be funded for development, integration into spacecraft systems, operations, and data analysis.

Letters of intent to propose should be sent as soon as possible. They should include the name of the investigator(s), address and telephone number, institution, proposal title, a 100-word synopsis of experiment and discipline specialty.

The Announcement of Opportunity will be sent upon request. Instructions for proposal preparation will also be provided. The final date for receipt of proposals is June 30, 1978.

Requests should reference AO No. OSS-1-78 and should be forwarded to Life Sciences Program, Attn: Dr. Stanley Deutsch, SBE-3, NASA Headquarters, Washington, DC 20546.

WHERE ARE THEY NOW?

A survey of our member mailing list identified a number of individuals who had been assigned bad address tags because the Postal Service had returned their mail marked "undeliverable, no forwarding address." As a result these members have been dropped from the mailing list until the new addresses can be obtained.

We are of course anxious to reestablish communication with these "lost" members. If readers of *The Physiologist* know the whereabouts of any of the following, please advise the individual that we have been looking for them, or, notify the Executive Secretary's office of their current whereabouts.

Cosimo Ajmone-Marsan	Thomas A. McMahen
Walter C. Alvarez	Arthur W. Merrick
Nasir A. Bashir	Frederick R. Miller
Vivian L. Beach	F. Joseph Mullin
Carlos Beyer	Seward E. Owen
James T. Bradbury	Narendra B. Oza
Robert H. Davis	Edouard Page
Frederick L. Dey	David Rapport
Giraud V. Foster	Grace M. Roth
Norman E. Freeman	Otakar V. Sirek
H. Bernard Hartman	Harold J. Swan
Charles Hendley	Constantin V. Teodoru
Victor Johnson	Ira G. Wool
Peregrina N. Labay	Rosalind Wulzen
Charles E. McCormack	Tony L. Yaksh
Joel R. McKenney	Isolde T. Zeckwer

We would like to take this opportunity to thank those who responded to the list published in the October 1977 issue. As a result of these responses a number of "lost" members have been "found."

THE PHARMACOLOGY OF THERMOREGULATION FOURTH INTERNATIONAL SYMPOSIUM

The fourth in this series of symposia will be held at St. Catherine's College, Oxford, England from July 30 to August 3, 1979.

The meeting will include review lectures and free communications. For further details and reservation forms write to:

Professor A. S. Milton
Department of Pharmacology
University Medical Buildings
Foresterhill
Aberdeen AB9 2ZD, Scotland

Dr. P. Lomax
Department of Pharmacology
UCLA School of Medicine
Los Angeles, CA 90024
USA

NEW FEATURES OF APS RESEARCH JOURNALS

One of the more provocative aspects of the reorganization of the *American Journal of Physiology* and *Journal of Applied Physiology* is the allocation of up to 100 pages per year to each editor for use at his discretion. Each editor has used these pages in a way that provides something for readers in each special area that is not produced by the regular submitted articles. Most editors have invited contributions, subjected to careful review, but the way that the pages have been used varies. Below is a list of such material published between January 1977 and June 1978. If you were not aware of this new feature of the journals, please examine recent issues and familiarize yourself with it. Each of the editors would like to have comments from you on this feature and suggestions for other ways in which the content of the journals can be improved.

AJP: Cell Physiology

An invited review: "Sodium ions, calcium ions, blood pressure regulation, and hypertension: a reassessment and a hypothesis" by M. B. Blaustein was published in May 1977.

AJP: Endocrinology, Metabolism and Gastrointestinal Physiology

Four articles on models for intestinal transport were published:

1. Sodium-coupled solute transport by small intestine: a status report by S. G. Schultz. (October 1977)
2. Energetics of Na^+-dependent sugar transport by isolated intestinal cells: evidence for a major role for membrane potentials by G. A. Kimmich, C. Carter-Su, and J. Randles. (November 1977)
3. Isolated membrane vesicles as tools for analysis of epithelial transport by U. Hopfer. (December 1977)
4. Some characteristics of kidney Na^+-dependent glucose carrier reconstituted into sonicated liposomes by R. K. Crane, P. Malathi, H. Preiser, and P. Fairclough. (January 1978)

AJP: Heart and Circulatory Physiology

Toward the end of 1977 a series of reviews on cardiac electrophysiology was started. The series is continuing in 1978.

1. Cardiac electrophysiologic alterations during myocardial ischemia by V. Elharrar and D. P. Zipes. (September 1977)
2. Cardiac automaticity and its control by M. Vassalle. (December 1977)
3. Ionic basis of electrical activity in cardiac tissues by E. Coraboeuf. (February 1978)
4. Reentrant excitation as a cause of cardiac arrhythmias by A. L. Wit and P. F. Cranefield. (June 1978)

The series is to be completed in 1978, and additional topics begun, on excitation-contraction coupling and on hypertension.

AJP: Regulatory, Integrative and Comparative Physiology

The meaning of the title of the journal is being examined in a series of invited papers. M. Bunge wrote on "Levels and reduction" (September 1977) and A. S. Iberall wrote three papers on "A field and circuit thermodynamics for integrative physiology." (November 1977, January 1978, March 1978)

The May 1978 issue contains an article entitled "Contributions of the communication sciences to physiology" by W. M. Siebert. Each of these articles has been preceded by a thought-provoking editorial written by the editor, F. E. Yates.

AJP: Renal, Fluid and Electrolyte Physiology

Editorial Reviews began in February 1977 and have been published in each succeeding month:

Freeze-fracture electron microscopy: relationship of membrane structural features to transport physiology.
J. B. Wave, W. A. Kachadorian, and V. A. DiScala (February 1977)

A reinvestigation of the function of the mammalian urinary bladder.
S. A. Lewis (March 1977)

Use of inhibitors in physiological studies of carbonic anhydrase.
T. H. Maren (April 1977)

Electron probe microanalysis: its present, its future.
C. P. Lechene (May 1977)

An analysis of the determinants of nephron filtration rate.
B. J. Tucker and R. C. Blantz (June 1977)

Feedback regulation of glomerular filtration rate.
F. S. Wright and J. P. Briggs (July 1977)

Neurogenic regulation of renal tubular sodium reabsorption.
G. F. Di Bona (August 1977)

Prostaglandins and the kidney.
M. J. Dunn and V. L. Hood (September 1977)

Phosphate transport along the nephron.
F. G. Knox, H. Osswald, G. R. Marchand, W. S. Spielman, J. A. Haas, T. Berndt, and S. P. Youngberg (October 1977)

Ion pumps in the renal tubule.
G. Sachs (November 1977)

Structural and functional heterogeneity of mammalian nephrons.
H. Valtin (December 1977)

The sodium transport pool.
A. D. C. Macknight and A. Leaf (January 1978)

Transport in isolated plasma membranes.
U. Hopfer (February 1978)

Current concepts on the pathophysiology of acute renal failure.
J. H. Stein, M. D. Lifschitz, and L. D. Barnes (March 1978)

Intracellular activities of sodium and potassium.
M. Civan (April 1978)

Renal autoregulation: perspectives from whole kidney and single nephron studies.
L. G. Navar (May 1978)

Glomerular permselectivity: barrier function based on discrimination of molecular size and charge.
B. M. Brenner, T. H. Hostetter, and H. D. Humes (June 1978)

JAP: Respiratory, Environmental and Exercise Physiology

"Abstracts from Current Literature" is a unique feature that appears in each issue of the journal. N. R. Anthonisen is presently selecting abstracts of important articles that have appeared in journals frequently cited in JAP articles. Two sides of a controversy were expressed in articles by G. H. Gurtner and R. E. Forster in answer to the question "Can alveolar P_{CO_2} exceed pulmonary end – capillar CO_2?" (March 1977)

Publications Committee
A. P. Fishman, *Chairman*
R. W. Berliner
R. M. Berne

STATISTICS ON APS MEMBERSHIP

(As of February 1978)

DISTRIBUTION BY EMPLOYMENT*

		%
MEDICAL SCHOOLS	2,926	63.4
Physiology Departments	(1,448)	(31.4)
Other Preclinical Departments	(422)	(9.2)
Clinical	(1,000)	(21.7)
Administration	(56)	(1.1)
HOSPITALS AND CLINICS	209	04.5
VETERINARY SCHOOLS	94	02.0
DENTAL SCHOOLS	43	00.9
PUBLIC HEALTH AND GRADUATE SCHOOLS	223	04.8
UNDERGRADUATE SCHOOLS	301	06.5
COMMERCIAL COMPANIES	100	02.1
GOVERNMENT	313	06.8
INSTITUTES AND FOUNDATIONS	202	04.4
PRIVATE PRACTICE	58	01.3
OTHER, EMERITUS OR INACTIVE	143	03.1

*4,612 Respondents

DISTRIBUTION BY "PRIMARY" DEGREE*

	%
Ph.D.	63.6
M.D.	33.9
D.Sc.	00.7
D.V.M.	01.0
D.D.S.	00.1
Other Degrees	00.7

*4,590 Respondents

DISTRIBUTION BY SPECIALTY*

	%
Cardiovascular	18.3
Neurophysiology	14.8
Endocrines	10.5
Electrolyte and Water Balance	4.5
Respiration	7.6
Renal	5.1
Muscle and Exercise	4.6
Gastrointestinal, Food and Nutrition	4.7
Environmental	3.7
Cellular and Tissue	3.9
Blood	3.0
Comparative	2.7
Energy, Metabolism and Temperature Regulation	2.1
Pharmacology	2.7
Reproduction	2.2
All other Categories (none above 0.9%)	9.6

*4,596 Respondents

DISTRIBUTION BY RACIAL BACKGROUND AND HERITAGE

American Indian or Alaskan Native	6
Asian or Pacific Islander	146
Black	25
White	3,253
Hispanic Heritage	67

DISTRIBUTION BY SEX

Female	334
Male	4,831

DISTRIBUTION BY AGE

100	1
90-99	7
80-89	88
70-79	328
60-69	635
50-59	1,437
40-49	1,600
30-39	430
20-29	29

APPORTIONMENT OF REGULAR MEMBER DUES INCOME

(Figures Approximated to Nearest Dollar)

FASEB Assessment		$22.00
Federation Proceedings	$ 7.00	
Membership Directory	4.00	
Public Affairs/Newsletter	7.00	
Placement Service	2.00	
Other Services	2.00	
	$22.00	
Society Operating Fund Expenses		50.00
Council and Committee Support	$ 3.00	
Membership Services	6.00	
Meeting Program Costs	13.00	
Education Office	7.00	
The Physiologist	8.00	
Specialty Group Services	3.00	
Business Office	5.00	
Communications & Miscellaneous	4.00	
Dues to Other Organizations	1.00	
	$50.00	
Total		$72.00
Difference offset by annual meeting income		22.00
		$50.00

INTERNATIONAL SOCIETY FOR CRYOSURGERY

Organized in 1974, the International Society for Cryosurgery was established to foster the continued development and application of cryosurgery for the controlled cryogenic destruction of abnormal tissues.

An integral part of this development and application lies not only in advances in instrumentation and sophistication of technique toward attainment of improved methods of clinical palliation and treatment, but in increased knowledge of the biochemical, physiological, immunological and morphological alterations following freezing.

Presently the Society holds an International Congress every third year where the latest results in multiple disciplines are presented and discussed. "State of the Art" round tables in which leading authorities address the Society has been a major feature at the congresses.

The Society welcomes applications for membership from individuals whose qualifications and interests have been demonstrated by experience and publications in a relevant field. Applications for membership may be obtained from the Society's Secretary, Dr. Marco Laudi, Via Nizza 39, 10125 Torino, Italy. Annual dues are $15.00. Successful applicants will be billed following election to membership.

INTERNATIONAL WORKSHOP ON BIOMEDICAL TRANSDUCERS and MEASUREMENTS

Professor Wen H. Ko, Director of the Engineering Design Center, Case Western Reserve University, Cleveland, Ohio, and Professor Miguel Aguilar of the Laboratorio de Semiconductores, Universidad Politecnica, Ciudad Universitaria, Madrid, Spain, announce a workshop entitled "International Workshop on Biomedical Transducers and Measurements" to be held November 6 through 11, 1978, at the Hotel Meliā Castilla in Madrid, Spain. This workshop is being cosponsored by the Biomedical Electronics Resource, Case Western Reserve University, Cleveland, Ohio; the Universidad Politecnica, Ciudad Universitaria, Madrid, Spain; and the Biotechnology Resources Branch, Division of Research Resources, National Institutes of Health, Bethesda, Maryland, and is designed to stimulate discussion, exchange of ideas and potential collaboration between investigators in North America and Europe, working in the areas of biomedical sensors and instrumentation. The five day program will provide many opportunities for formal and informal discussions of work in progress on both sides of the Atlantic Ocean. Morning sessions including review presentations from invited speakers on (1) Chemically Sensitive Semiconductor Devices, (2) Chemical Electrodes, (3) Optical Techniques, (4) Physical Transducers, and (5) Implant Systems will be held each day with the afternoons available for laboratory tours and informal small group discussions. Early evening sessions will be held in parallel, with each session devoted to a single discussion topic. The session leader will present a survey which will be followed by a discussion among the participants.

Poster sessions will be held, and the opportunity to present a poster will be available to each attendee. One page abstracts of poster topics must be sent to Dr. Michael R. Neuman, Biomedical Electronics Resource, Engineering Design Center, Case Western Reserve University, Cleveland, Ohio 44106, by May 1, 1978.

The workshop will be limited to 150 attendees, and the working language will be English. Group travel arrangements from the United States will be made if there are enough interested participants.

Further information on the workshop can be obtained by contacting

Dr. Michael R. Neuman
Biomedical Electronics Resource
Engineering Design Center
Case Western Reserve University
Cleveland, Ohio 44106

or

Professor Miguel Aguilar
ETSIT – Laboratorio de Semiconductores
Universidad Politecnica
Ciudad Universitaria
Madrid, 3, Spain

The Robert F. Pitts Memorial Fund

Michael Reese Hospital and Medical Center
29th Street and Ellis Avenue
Chicago, Illinois 60616

Dear Colleague:

A few months ago Physiology lost one of its giants – Robert F. Pitts. In his illustrious career he made major contributions to current understanding of hydrogen ion metabolism and the mechanism of action of natriuretic drugs. His many papers and texts were models of clarity in exposition and thought. Two decades of Cornell medical students recall him as an unusually gifted and dedicated teacher who attended all classes of his department. Postdoctoral fellows from all over the world sought training in his laboratories – many are now leaders in medical science and education.

In addition to his scientific legacy, Dr. Pitts established a student prize in his will "to support excellence in Physiology." It is to extend his endowment that we address you. We solicit your aid in building a fund to assist young investigators in Dr. Pitts' former department at Cornell. Income from this trust will be used to supplement a postdoctoral fellowship in his name.

Please join us by sending your tax-deductible check made out to "Cornell University, the R.F. Pitts Memorial Fund." A return envelope is enclosed for your convenience.

Thank you for your consideration.

Sincerely,

Richard H. Kessler, M.D.
Walter F. Riker, M.D.

ANDREW CONWAY IVY (1893 - 1978)

Morton I. Grossman
VA Wadsworth Hospital Center
and UCLA School of Medicine
Los Angeles, California

Andrew Conway Ivy, the seventeenth president of the American Physiological Society, died on February 7, 1978 at his home in Oak Park, Illinois, a suburb of Chicago. He was 84 years old. He had been in ill health for about two years.

He was born in Farmington, Missouri, on February 25, 1893. The family soon moved to Cape Girardeau, Missouri, where his father, Henry McPherson Ivy, was Professor of Chemistry at the State Normal School. Ivy's first research was done while a student at that school. The area was psychology and the topic of one study was "The Effect of Disciplined and Undisciplined Play on Post-recess Conduct in Fifth Grade Students." In 1913, at age 20, he received the Bachelor of Arts and Bachelor of Pedagogy degrees. He already had decided to study medicine but did not have enough money, so he took a position as principal and coach of athletics at a high school in Clarksdale, Mississippi. In two years he saved enough money to resume his education. In 1915 he entered the University of Chicago, a school he selected because his father and brother had attended it and because he thought that he could get a part-time job there.

At the University of Chicago he quickly fell into the orbit of Anton J. Carlson, a legendary figure who was popularly referred to by the appropriately legendary name of Ajax. Carlson directed Ivy's interest to gastrointestinal physiology which was to remain the focus of his career. The research studies for his master's degree (M.S., 1917) and doctorate (Ph.D., 1918) were in gastric physiology. While completing the work toward the M.D. degree (Rush Medical School, 1922) he was Instructor in Physiology at the University of Chicago (1917 to 1919) and Associate Professor of Physiology at Loyola University School of Medicine (1919 to 1923).

He returned to the University of Chicago as Associate Professor of Physiology for two years, 1923 to 1925, and then was called to the chair of Physiology and Pharmacology at Northwestern University as Nathan Smith Davis Professor where he remained until 1946. From 1946 to 1953 he was Vice President of the University of Illinois in charge of the Chicago professional colleges; this was the period of most rapid growth of this great medical center. In 1953, amid the much publicized controversy over his work on Krebiozen, he resigned the Vice Presidency and continued as Distinguished Professor of Physiology and Head of the Department of Clinical Science at the University of Illinois. From 1961 to 1966 he was Research Professor of Biochemistry at Roosevelt University. From 1966 until 1976 he worked, seven days a week as usual, at the Ivy Cancer Research Foundation, a privately supported organization with offices and laboratories in the heart of Chicago's loop. Since 1962 his research has been devoted exclusively to the body's defense mechanisms against cancer.

The pattern of many irons in many fires began early and persisted. In college Ivy played second base in baseball, competed in cross country track, played quarterback and defensive end in football, performed gymnastics, was on the basketball team, played tennis, wrestled, and boxed. ("I could stand up to anyone in my weight, 135 pounds. I defeated 'all comers' in the sixth regiment of Missouri in 1909.") He played violin in the college orchestra and helicon bass in the college band. At the University of Chicago he was on the debating team and sang second tenor in the University choir and glee club. While interning at two hospitals he taught physiology at two medical schools and conducted a large research program. And so it went. Throughout his long career he has often held several major positions simultaneously. He thrived on work.

In 1919 Ivy married Emma Anna Kohman who also received her Ph.D. in physiology from the University of Chicago. She has stood beside him literally and figuratively, always helping when needed, always stalwart. Their five sons are all in medical activities, four as doctors, one with a pharmaceutical company.

Between 1919 and 1955 Ivy and his coworkers published more than 1500 papers, an average of more than 40 papers per year for more than 35 years. Science Citation Index shows that during the period from 1964 to 1971 Ivy's articles were cited more often than any other scientist in the world. His work covered almost every aspect of gastrointestinal physiology. Some contributions have come to be regarded as classics. Examples include the introduction of subcutaneously transplanted organs to prove the existence of humoral mechanisms for gastric and pancreatic secretion, the discovery of the hormone cholecystokinin, the discovery of urogastrone (now known to be identical to epidermal growth factor), and the elucidation of the effects of total gastrectomy in animals. Few know that Ivy had deep and continuing interests in several areas outside of gastroenterology including physiology of the uterus in labor, experimental intersexuality, aviation medicine,

artificial respiration, cardiac pain, preparation of fresh water from sea water, protection from flash burns, and treatment of typhoid carriers. He introduced the "Ivy bleeding time," a procedure still in use for diagnosing clotting abnormalities. His book on "Peptic Ulcer" with M. I. Grossman and W. H. Bachrach, published in 1950, is still regarded as a classic.

Ivy began working on cancer in 1917 and continued to work in this field during his entire scientific career. In 1917, as a result of observations on dogs with cancer of the thyroid, he developed the hypothesis that the body contains anticancer substances which are involved in resistance to cancer and that it should be possible to isolate such substances. In 1946, working with Denton, Ivy extracted from liver a substance that retarded the growth of "Walker carcinoma" in rats. In the early 1950s, Ivy began working with krebiozen, a purported anticancer substance extracted by Steven Durovic from the blood serum of horses that had been injected with Actinomycin Hartz to stimulate their reticuloendothelial cells. In uncontrolled studies on patients with cancer, Ivy and his coworkers claimed that krebiozen retarded the growth of cancers and occasionally caused complete regression. This led to a widely publicized controversy, as a result of which Ivy resigned his position as Vice President of the University of Illinois but continued to work on anticancer substances including krebiozen. In 1965 the Food and Drug Administration indicted Ivy and Durovic on the charge of causing the distribution of krebiozen with the intent of defrauding the public. They were found not guilty after a nine month trial. Ivy asked the Food and Drug Administration to conduct a controlled clinical trial of krebiozen but this was never done. Until his retirement because of ill health in 1976, Ivy continued to work on anticancer substances, which he called carcalons.

Dr. Ivy considered the training of physiologists and gastroenterologists as his greatest contribution. More than 300 of his academic offspring are teaching in medical schools throughout the world; many hold high academic positions. Dr. Ivy always regarded teaching as his first responsibility. ("It is the duty of those who know to teach.") As with all to which he addressed himself, he put everything he had into it. He has inspired many students.

Dr. Ivy held many high positions, only a few of which are mentioned here. He was founder and Scientific Director (1942 to 1943) of the Naval Medical Research Institute, and Executive Director of the National Advisory Cancer Council from 1947 to 1951. He was President of the American Gastroenterological Association in 1940. He engineered the founding of that Association's journal, Gastroenterology, and served a decade (1942 to 1952) as its first managing editor.

Dr. Ivy received many honors. A sampling: five honorary Doctor of Science degrees, one honorary Doctor of Laws degree, the Distinguished Alumni Award of the University of Chicago, and The Certificate of Merit from the President of the United States, the Friedenwald Medal of the American Gastroenterological Association.

A man of action, Andrew Ivy has given more than verbal support to humanitarian causes in which he believes. He was for many years the prime mover and, in many instances, the founder of organizations devoted to humane goals such as eradication of tuberculosis, prevention and treatment of alcoholism, elimination of discrimination in higher education, and protection of animal research against antivivisectionism. He was principal consultant at the Nuremberg Tribunal on War Crimes and he formulated a code of conditions for use of human subjects in medical experiments that foreshadowed the Declaration of Helsinki.

He was Chairman of the Board of Publication Trustees of the Society from 1945 to 1948. In the latter capacity, he was responsible for "discovering" Dr. Milton O. Lee and persuading him in 1947 to become Managing Editor of the Journals of the Society.

Dr. Ivy's term as President was the last undisturbed prewar period. He presided at the meetings in New Orleans in 1940 and in Chicago in 1941.

Dr. Ivy was known to be a man of much determination and courage. Physiologists who worked with him closely had a warm friendship with him and knew him as a man of high ideals and broad vision, with a wide knowledge of physiology and much wisdom and skill as an executive. In Chicago, he was particularly vigorous and effective in the defense of the use of animals for medical research. He worked long and faithfully for the Society and its publications and for the advancement of physiology.

FONDATION DE PHYSIOPATHOLOGIE

The Fondation de Physiopathologie Professeur Lucien Dautrebande will award his next prize of about 900.00 Belgian francs during the year 1979.

It will be a reward for work on human or animal clinical physiopathology, such work preferably having therapeutic implications.

For further information about this prize, write to the Office of the Fondation, 35, chausee de Liege a 5200 Huy, Belgium where candidatures must be sent before December 15, 1978.

INSTRUCTIONS FOR APPLYING FOR APS MEMBERSHIP

At the April 1977 business meeting the proposed Bylaws Amendment for creating a new membership category for Students was passed. This Bylaw Amendment appears under Section 7 of Article III of the Constitution, printed below.

CURRENT APPLICATION FORMS

Published in each issue, the Physiologist shall routinely carry one copy of the current application form (following). This form will serve for all categories of membership. Any member desiring to sponsor more than one applicant may use a Xerox copy of this form. Any application submitted on an out-dated form will be returned to the sponsor to be redone on the acceptable form.

One application form serves all membership categories. There are, however, specific sets of instructions for each category. Therefore it is essential that sponsors and applicants carefully attend to those instructions specific to their desired category.

GENERAL INSTRUCTIONS

FOR ALL CATEGORIES:

Use only the current application form. Check the box indicating the category of membership for which you are applying. Use the SPECIAL INSTRUCTIONS for that category when filling out the form. Type the Application. Fill out all applicable spaces. Only completed applications will be reviewed.

The Bibliography must be submitted in the form found in the Society's journals. An example of the correct form is:

JONES, A.B., and C.D. Smith. Effect of organic ions on the neuromuscular junction in the frog. Am. J. Physiol. 220:110, 1970.

Send no reprints.

Deadline Dates: Completed applications received between February 1 and July 1 are considered for nomination by the Council at the Fall Meeting. Applications received between July 1 and February 1 are considered for nomination by the Council at the Spring Meeting. Applications are not complete until all materials, including sponsor's letters, are received.

QUALIFICATIONS (Except Students):

The Membership Advisory Committee uses the following 5 categories in evaluating an application:

1. Educational History. Academic degree and postdoctoral training are evaluated and assessed with regard to how closely the applicant's training has been tied to physiology.
2. Occupational History. Particular emphasis is given to those applicants who have a full time position in a department of physiology, or are responsible for physiology in another department. Relatively high ratings are given to people with positions in clinical departments and to people functioning as independent investigators in commercial or government laboratories.
3. Contributions to the Physiological Literature. This category is of major importance. The applicant's bibliography is evaluated on the basis of publications in major, refereed journals which are concerned with problems judged to be primarily physiological in nature. Emphasis is given to papers published as the result of independent research. Special note is taken of publications on which the applicant is sole author or first author.
4. Interest in and Commitment to Teaching Physiology. This evaluation is based on: (1) the fraction of the applicant's time devoted to teaching, (2) publications related to activities as a teacher including production of educational materials, and (3) special awards or other recognition the applicant has received for outstanding teaching effectiveness.
5. Special Considerations. This category permits the Membership Advisory Committee to acknowledge unique accomplishments of an applicant. These might be excellence in a specific area, or unusual contributions to Physiology resulting from talents, interest or a background substantially different from the average.

SPONSORS:

Primary responsibility for membership rests with the two sponsors who must be regular members of the Society. Sponsors should discuss the appropriateness of the selected category of membership in this Society with prospective applicants.

Each sponsor should write an independent confidential letter about the candidate using the five categories listed above to evaluate the candidate.

CHECK LIST:

1. Original copy of application signed by both sponsors.
2. Application on a current form, including the bibliography (1 original and 7 copies).
3. Mail the original, which has been signed by the two sponsors, plus 7 copies to:

Executive Secretary
American Physiological Society
9650 Rockville Pike
Bethesda, Maryland 20014

SPECIAL INFORMATION AND INSTRUCTIONS

FOR REGULAR MEMBERSHIP

Bylaws of the Society:

Article III, Section 2 - Regular Members. Any person who had conducted and published meritorious original research in physiology, who is presently engaged in physiological work, and who is a resident of North America shall be eligible for proposal for regular membership in the Society.

IF ALIEN: Please attach a letter and 7 copies stating visa status and type of passport and giving evidence of intent to stay in North America.

Duties and Privileges:

1. Hold Elective Office.
2. Vote at Society Meetings.
3. Serve on Committees, Boards and task forces.
4. Serve on Federation Boards and Committees.
5. Sponsor New Members.
6. Orally present or co-author a contributed paper and sponsor a non-member authored paper at the Fall scientific meeting.
7. Orally present or co-author one contributed scientific paper at the annual Federation meeting or sponsor one paper.
8. Receive The Physiologist.
9. Receive Federation Proceedings, Public Affairs Newsletters and annual Membership Directory.
10. Subscribe to handbooks and periodicals published by the Society at membership rates.
11. Register to attend scientific meetings of the Federation and the APS Fall meeting at membership rates.
12. Participate in FASEB Member's Life Insurance Program, Disability Program and in Hospital Protection Plan. (For Residents of the United States, its territories or possessions).
13. Eligible to receive the Daggs Award.
14. Eligible to be selected as Bowditch Lecturer (members under 40 years of age).

FOR CORRESPONDING MEMBERSHIP

Bylaws of the Society:

Article III, Section 3 - Corresponding Members. Any person who has conducted and published meritorious research in physiology, who is presently engaged in physiological work and who resides outside of North America shall be eligible for proposal for corresponding membership in the Society.

Duties and Privileges:

1. Serve on Society Committees, Boards and Task Forces.
2. Serve as one sponsor of new Corresponding Members (One regular member must be sponsor of a new Corresponding Member).
3. Orally present or co-author a contributed paper and sponsor a non-member authored paper at the Fall scientific meeting.
4. Orally present or co-author one contributed scientific paper at the annual Federation meeting or sponsor one paper.
5. Receive The Physiologist.
6. Receive Federation Proceedings, Public Affairs Newsletters and annual Membership Directory.
7. Subscribe to handbooks and periodicals published by the Society at membership rates.
8. Register to attend scientific meetings of the Federation and the APS Fall meeting at member rates.

FOR ASSOCIATE MEMBERSHIP

Bylaws of the Society:

Article III, Section 5 - Associate Members. Persons who are engaged in research in physiology or related fields and/or teaching physiology shall be eligible for proposal for associate membership in the Society provided they are residents of North America. Associate members may later be proposed for regular membership.

Duties and Privileges:

Same as for Regular Members except for the privilege of:

1. Holding Executive Office, or membership on certain committees.
2. Voting at Society Meetings.
3. Sponsoring New Members.
4. Receiving the Daggs Award.
5. Selection as Bowditch Lecturer.

FOR STUDENT MEMBERSHIP

Not all questions on the application form may be appropriate – Please place NA next to any such question.

Bylaws of the Society:

Article III, Section 7 - Student Members. Graduate students in physiology who have completed their preliminary examinations for the doctoral degree provided they are residents of North America. No individual may remain in this category for more than five years.

Duties and Privileges:

1. Present one contributed paper at the Fall Scientific meeting with the endorsement of the student's advisor.
2. Receive The Physiologist.
3. Subscribe to Handbooks and Periodicals at member rates.
4. Register to attend scientific meetings of the Federation and the APS Fall meeting at student rates.

Submit original and 7 copies of application and supporting documents.

This Form is Valid Only for 1978

APPLICANT'S LAST NAME _____

Date _____

THE AMERICAN PHYSIOLOGICAL SOCIETY

9650 Rockville Pike, Bethesda, MD 20014

MEMBERSHIP APPLICATION FOR:

REGULAR ☐
CORRESPONDING ☐
ASSOCIATE ☐
STUDENT ☐

CURRENT MEMBERSHIP CATEGORY; YEAR ELECTED _____

See Instructions

Name of Applicant: _____
First Middle Last

Mailing Address _____ Birth Date: _____

_____ Citizenship: _____

_____ Country of Permanent Residence:* _____

_____ Telephone No.: _____

*Alien residents of North America attach 8 copies of Alien Registration Card or other evidence of intent to remain in North America.

1. **EDUCATIONAL HISTORY** (Predoctoral students indicate date preliminary examination was passed.)

Dates	Degree	Institution	Major Field	Advisor

Doctoral Dissertation Title:
(if any)

Postdoctoral Research Topic:

2. **OCCUPATIONAL HISTORY**

Present Position:

Prior Positions:

Dates	Title	Institution	Department	Supervisor

SPONSORS

#1. Name: _____

Mailing Address: _____

_____

_____

_____

Telephone No. Zip Code

#2. Name: _____

Mailing Address: _____

_____

_____

_____

Telephone No. Zip Code

I have read the guidelines for applicants and sponsors and this application and attest that the applicant is qualified for membership.

#1 Signature _____ #2 Signature _____

Each sponsor must submit an original and 7 copies of a confidential letter of recommendation to the Society, under separate cover.

APPLICANT'S LAST NAME _____

3. **DESCRIBE YOUR PHYSIOLOGICAL TEACHING** – What percent of your time/effort is spent in teaching Physiology?_____

Describe in the space provided your teaching of physiology including course descriptions (content, format); supervision of pre-doctoral and post-doctoral students; special contributions (films, textbooks, etc.).

4. **INTEREST IN THE SOCIETY** – List any APS Meetings attended by date and check the appropriate box for any papers.

SPRING (FASEB)			FALL (APS)		
Date	Presented	Coauthor	Date	Presented	Coauthor
_____	☐	☐	_____	☐	☐
_____	☐	☐	_____	☐	☐
_____	☐	☐	_____	☐	☐
_____	☐	☐	_____	☐	☐
_____	☐	☐	_____	☐	☐

List other scientific societies of which candidate is a member:

In the space provided state your interest in wanting to join the Society:

5. **SPECIAL CONSIDERATION** – Include any other contributions (Administrative, university, national service, awards and honors) that may be important to physiology.

6. **DESCRIBE YOUR RESEARCH** – What percent of your time/effort is spent in research?_____

Describe the fundamental physiologic questions in your research and how you have answered these questions. Limit the paragraph to the space provided.

7. **BIBLIOGRAPHY** – Attach a list of your publications under the following categories:
   1. Complete physiological papers, published or accepted for publication.
   2. Physiological abstracts (limit to ½ page).
   3. Other papers not primarily physiological (limit to ½ page).

The entire bibliography should not exceed 2 pages. Give complete titles and journal references with inclusive pagination. Use the bibliographic form found in the Society's journals. List authors in the order in which they appear in the publication.

OSLER LIBRARY NEWSLETTER

McGILL UNIVERSITY, MONTREAL, CANADA

No. 27 — FEBRUARY 1978

SIR WILLIAM OSLER AND MABEL PUREFOY FITZGERALD

IN NOVEMBER 1973 the Osler Library received the following message from Mr. R.W. Hunt, Keeper of Western Manuscripts at the Bodleian Library in Oxford. "Among the papers of the late Miss Mabel Purefoy FitzGerald, of 12 Crick Road, Oxford, is a box of letters from Sir William Osler. These letters are to be offered to the Osler Library of McGill University, in accordance with Miss FitzGerald's wishes." The offer was, of course, promptly accepted and shortly thereafter the letters arrived in Montreal. Written during the period 1905 to 1919, they cover a wide variety of subjects. Many concern books and pamphlets of historical interest. Miss FitzGerald was actively involved in searching for and acquiring items for Osler's library.* He in turn kept her informed of books and pamphlets he had found and often presented her with volumes which he knew she would enjoy and treasure. Other letters relate to Miss FitzGerald's scientific career and Osler's attempts to help her in every possible way. Still others are of a purely personal nature. The letters are accompanied by Miss FitzGerald's explanatory notes. These notes, often quite extensive, are perhaps even more interesting than the letters. For example, one of Osler's letters occupies only three lines, merely giving her an appointment for the next day. To this Miss FitzGerald has appended almost a page and a half of notes, describing her meeting with Osler and its effects on her research.

The following account is based largely on these letters and explanatory notes, bequeathed to the Osler Library by Miss FitzGerald. Supplementary material has been generously supplied by Dr. A.H.T. Robb-Smith and Dr. R.W. Torrance of Oxford and useful information has been obtained from an article by Dr. D.B. Dill in *The Physiologist*.** No attempt has been made to provide a complete description of Miss FitzGerald's full and varied life or an analysis of her scientific work. The chief purpose of this account is to throw light on her relationship with Osler.

Miss FitzGerald first met Osler on August 1st, 1905, a few months after his arrival in Oxford. She was then in her early 30's and already launched in a career as a physiologist. But, although launched, she was encountering difficulties due to her sex; prejudice against women in medicine and related fields was strong. She had studied physiology at Oxford University under Professor Francis Gotch in the late 1890's when women were not officially admitted to such programs. She did well in her examinations but, being a woman, was not given a degree. Following this she embarked on a number of studies, including measurements of normal values of alveolar carbon dioxide pressure in adults and children at sea level. In this investigation she collaborated with Dr. John Scott Haldane. She wanted to extend her research to changes in alveolar carbon dioxide pressure in disease, but her sex and the relative novelty of such experimental work made it difficult for her to obtain permission to conduct measurements on patients in the Radcliffe Infirmary. However, as she herself has recorded, "the horizon brightened with the advent of Dr. Osler."

As already mentioned, her first meeting with Osler was on August 1st, 1905. Haldane had asked Osler if Miss FitzGerald could be given access to patients in the Radcliffe Infirmary. The request met with a ready response. Osler wrote Miss FitzGerald, "Could you meet me at the Radcliffe Infirmary tomorrow [August 1st] at 10:30 a.m. There is a very good case of Pernicious Anaemia which might do for your work." In her explanatory note, Miss FitzGerald wrote that it was on a beautiful summer day that the appointment was kept and that Osler was dressed to suit the heat of the day in white and a straw hat, "not as an orthodox Professor of Medicine about to visit the wards." The selected case was produced as promised. In the days which followed, Osler produced many other suitable cases and "everything was made easy" for her to carry out her research, both in the wards and with out-patients. This was not all. Osler arranged for her to undertake clinical laboratory work at the Radcliffe Infirmary and saw to it that she was invited to lectures, clinics, exhibits, medical society meetings, and hospital rounds. As their ways led together — Crick Road, where Miss FitzGerald lived, being the next parallel street to Norham Gardens — she often accompanied Dr. Osler to or from the Infirmary and afterwards was generally among the fortunate ones taken back to tea; a "book talk" frequently followed. Small wonder that she remarked that "the horizon brightened with the advent of Dr. Osler."

With Osler's encouragement, and no doubt with his influential help, Miss FitzGerald obtained a Rockefeller Travelling Fellowship and sailed for the United States in December 1907. Her notes mention a thoughtful act characteristic of the Oslers. She felt sad at leaving Oxford and her sadness was increased by having to spend Christmas in mid-Atlantic on the S.S. Campania with a violent

*Miss FitzGerald continued adding to Osler's library after his death (see *Bibl. Osl.* 4369, 7697, 7697A, 7781).

**D.B. Dill, "Mabel Purefoy FitzGerald: Our second centenarian," *The Physiologist*, 1973, *16:* 247-248.

The historiated letter on this page is reproduced from *The Workes of Lucius Annaeus Seneca, both Morall and Naturall* . . . Translated by Tho. Lodge, D. in Physicke, London, 1614. *Bibl.Osl.* 5085.

storm raging. Lonely and very much under the weather, she was cheered by greetings and gifts from "Wm. Osler and G.R. Osler." These the Oslers had dispatched to the ship's doctor at Liverpool, charging him to deliver them on Christmas Day.

At the Rockefeller Institute in New York she worked with Noguchi in bacteriology and, whilst in North America, went to the University of Toronto to work for a few months with Professor A.B. Macallum on the secretion of gastric acid. Throughout this period in the United States and Canada, encouraging letters, containing news of Oxford, came to her regularly from Osler. In them he sent greetings to his many friends, greetings which when delivered must have greatly enlarged the circle of her own acquaintances and friends.

In May 1910 Miss FitzGerald came back to Oxford and Osler's invitations to all manner of medical events resumed. Then in 1911 she returned to the United States. During that year she made what was probably her most important scientific contribution, a study of blood haemoglobin concentrations and alveolar carbon dioxide pressures at high altitudes conducted when she was a member of an Anglo-American Expedition to Colorado.

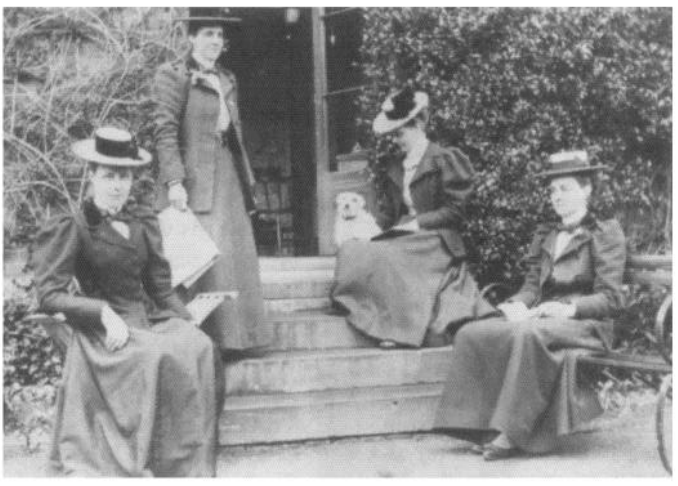
With the outbreak of World War One in 1914, Miss FitzGerald wished to return to Great Britain and sought Osler's assistance. As always, his response was immediate and helpful but her lack of formal qualifications proved to be a handicap. Eventually she was offered the post of Clinical Pathologist to the Royal Infirmary in Edinburgh; she was appointed in June 1915 and held this post for four years. The correspondence with Osler continued unabated, mainly about the acquisition of books and pamphlets for his library, until the autumn of 1919.

With Osler's death in December 1919 the story of this happy and fruitful association comes to a close but a postscript must be added. Miss FitzGerald lived on for many years. After the end of World War One she did bacteriological work in Edinburgh and then around 1930 she returned to Oxford to look after the home in Crick Road where her sisters had continued to live. She rapidly disappeared from view as far as the medical and scientific worlds were concerned. This period of relative obscurity lasted for over forty years except for brief recognition of her past career during the J.S. Haldane Centenary Symposium held at Oxford in 1961. Then, eleven years later, on August 3rd, 1972 she celebrated her hundredth birthday with all the publicity that such an observance often entails. A newspaper account* commenced with the following words — "An Oxford woman who is 100 today never got a degree, but she became the friend and colleague of some of the most eminent scientists of the early twentieth century." It was not long before her lack of a degree was corrected. Oxford University offered her an honorary Master of Arts. On December 14th, 1972 a special Congregation was held for her in Convocation House adjoining the Sheldonian Theatre, a ceremony described at the time as unique in Oxford's 800-year history** and one which surely would have delighted Sir William Osler. At long last she became an Oxford graduate, a distinction she had earned but not received more than seventy years before.

In view of her advanced age it could hardly be expected that she would live much longer and death came on August 24th, 1973, three weeks after her 101st birthday. Thus she outlived Osler by more than half a century. Her care in preserving and assembling his letters with the addition of her own notes and her wish that they should come to the Osler Library showed that, throughout her long life, she remembered and valued that rewarding friendship of her earlier years.

*_The Oxford Mail_, August 3, 1972
**_The Oxford Mail_, December 14, 1972

E.H. Bensley



The FitzGerald sisters outside their home on Crick Road, Oxford. Mabel Purefoy FitzGerald is sitting on the bench at the right. Photograph taken in 1897 or 1898 and kindly supplied by Mabel's grandnephew, Mr. Geoffrey Purefoy.

The Author, Editor of the Osler Library Newsletter is also Emeritus Professor of Medicine and Honorary Lecturer in the History of Medicine, McGill University.

EXCHANGE OF LETTERS WITH PAST-PRESIDENTS

The following letter was recently (February 24, 1978) sent to a group of Past-Presidents of APS.

One of our members, Dr. Lawrence D. Longo, has made the interesting suggestion that the Society publish a compendium of Past Presidential Addresses presented at the Annual Fall Meetings and that the Past Presidents be given the opportunity to prepare an epilogue amplifying or modifying their published remarks. It would appear that the time for publication of such a volume might well coincide with the Society's Centennial in 1987. As a means of collecting the epilogues, I am writing to Past Presidents from the '50s and '60s to ask if they would be interested in preparing such an essay for current publication in *The Physiologist* extending the philosophical points made in their Past Presidential Addresses to the present and adding whatever prognostication they might feel inspired to make on the status of physiology at the Centennial of the Society in 1987.

The decision on publication of the compendium would, of course, have to await a later decision based on material available and congruence with Centennial plans.

As you may have noticed, I have been trying to stimulate the generation of "historical" items for a section in *The Physiologist.* It seems to me that such a philosophic essay from you would be a valuable addition to this section of the Society's newsletter. Please let me know whether you are willing to undertake this task and when I might expect to receive it for publication.

Orr E. Reynolds
Executive Secretary-Treasurer

The replies were so varied and interesting that they are reproduced here (with permission).

Maurice Visscher:

Yes, I think I would be interested in preparing a statement on the status of physiology and the prospects for scientific enterprise as a whole for publication in *The Physiologist.*

Before making any statement as to how soon I might have something prepared for publication I would like to know what you meant by referring in your first paragraph to the "Centennial of the Society in 1987." In other words, I would like to know whether you wish something that would have some bearing on the activities that might be held in connection with that event. Looking forward to hearing from you, I am,

Bruce Dill:

I like your idea and will help if I can. The problem is that my talk was not published. I doubt if I submitted a manuscript and I am certain I was not asked for one. I covered the role of the military in evaluating methods of artificial respiration. This first resulted in adoption by the American Red Cross of the back-pressure arm-lift method and eventually of the biblical method — mouth-to-mouth breathing. The adoption of that came later. Those who collaborated included Jim Waittenberger, Julius Comroe and Archer S. Gordon then at the University of Illinois Medical School in Chicago. Several young men in the Medical Laboratories at Edgewood played important roles. Eventually, emphasis shifted from mouth-to-mouth resuscitation to CPR — Cardio Pulmonary Resuscitation. The national leader in the educational process has been Archer S. Gordon, now affiliated with UCLA. I believe the American Heart Association looks to him as its dominant protagonist in this field. I have kept in touch with him and had a good visit with him in September at his home in Thousand Oaks, CA. The complete role of our laboratory has never been told. With the help of some of my friends, especially Archer Gordon, I could do it if it seems worthwhile to you. I have in my file a letter from a representative of the Red Cross thanking me for my role in this project, including chairing meetings in Washington. On the other hand, there wasn't much physiology involved and what I would write might turn out to be of little interest to readers of *The Physiologist.*

Another area I might suggest is that of *Human Relations in Physiological Research.* I am thinking particularly of the field studies carried out by the Fatigue Laboratory. There wouldn't be much physiology in this either, but it might help to convince young physiologists that skill in human relations may have as great a role in their careers as the number and quality of their papers. I would have quite a little to say about the small village of Ollagüe where Hall, Barron, Talbott and I came to know many of the residents, running from Señor (Major Domo) and Señora Carrasco to a Madam playing her harp in front of her brothel.

Edward Adolph:

In response to your letter of 24 February to the ex-presidents of APS, I rather favor the plan of publishing a volume collecting together the addresses spoken by them in times past.

I prefer that the addresses be kept pretty much in their original form and flavor. And that will necessarily be so for the addresses of those deceased.

I would like to see other addresses included, such as were written by the ex-presidents before 1948, in which year the annual addresses became customary. Some of those ex-presidents are represented by "prefatory chapters" in Annual Reviews of Physiology — Mann, Bard, Wiggers, Erlanger. Others spoke at the 50th anniversary — Cannon, Carlson, Howell, Lombard. Some spoke briefly at the 75th anniversary — Ivy, Bard, Landis. I hope the editor of the collection will search for appropriate essays or remarks published by the ten or so remaining ex-presidents that I have not mentioned.

You also ask for an historical or philosophical essay from me to be published in the "*Physiologist.*" At present I cannot promise to write such an essay; but who knows — maybe next year. I'll keep your suggestion in mind.

I hope to see you at the April meeting.

Alan Burton:

I was glad to hear from you after so many years. I don't think much of the suggestion of Dr. Longo. Most of us retired Presidents — particularly those of the earlier years, are likely to be quite boring and inconsequential, or 'beating a dead horse'. I myself have definitely shot my philosophical bolt. I enclose two reprints — The Royal Society of Canada one borrows some of the things I said in the Past Presidents' address.

I'm busy trying to get out a controversial book on "Under-

standing human cancer, the Physiological and Biophysiological point of view". I've not tried to find a publisher yet.

Hallowell Davis:

I like Dr. Longo's proposal to publish a compendium of Past Presidential Addresses, and particularly to invite the PP's to prepare epilogues for current publication.

My chief difficulty is that until January, 1979, I am completely committed for keynote speeches, organizing and summarizing symposia, etc., etc., in addition to half-time teaching and clinical work. If you will be satisfied with 1 March 1979 I think I can manage it. Anyhow, I'll start thinking about it during some of my future travels, and it just might pop out by the end of October.

Meanwhile I keep up pretty well with my birthday greetings to octogenarian physiologists, but I send the replies on to you with little or no editing, unless they are very personal. I trust your discretion.

Greetings to all at Beaumont House. I'll see you in St. Louis.

Julius H. Comroe, Jr.:

This is in answer to your letter of February 24 regarding the publication of past Presidential addresses presented at the Annual Fall Meetings (incidentally, I think only one or two of the Annual "Fall" Meetings has ever occurred in the Fall). As you probably know by looking through *The Physiologist,* my past President's address never appeared in print. This was because I talked around 50 or 60 lantern slides, each of which was a cartoon that made a particular point that was (to my mind) relevant to science and scientists. It would have been impossible for me to have located all of the artists to get their permission and to have paid their fees, so I never went any further with it. I don't think the words would have any meaning without the cartoons, so I see no way of putting it into print.

About writing an essay now speculating on the status of physiology in 1987, I am not sure that I can do it. I have concentrated my efforts on a *retro*spectroscope rather than on a *pro*spectroscope. Actually, in my looking backwards through the retrospectroscope, I decided to write an article entitled, "The Clouded Crystal Ball" (enclosed). I confess that it would be interesting to have 10 or 20 past Presidents put their speculation into print now so that someone could check their clairvoyance of 1978 with what really happened; he could then in 1987 write another article on the "Clouded Crystal Ball."

Horace W. Davenport:

I haven't the faintest interest in what the Society does with my address, and I have nothing to say that would interest the members.

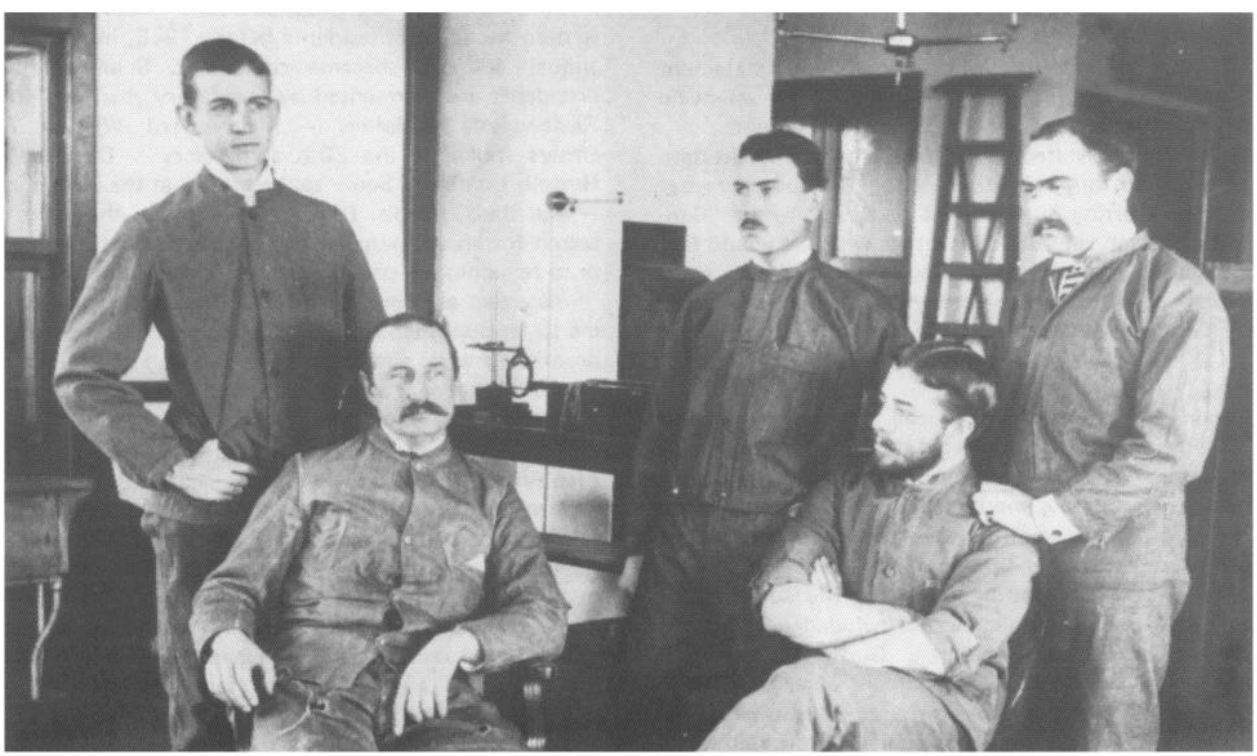
I enclose a photograph of historical interest, found in the course of research for my massive history of this department. It was taken at P&S just about the time the Society was founded there. The senior seated man is J. G. Curtis, and the young seated man is Lombard who became President of the Society. The young man standing in the middle is F. S. Lee, likewise a future President. I don't know who the other two were, and John Taggart, having suffered a severe fracture, is in no state to find out at the minute. [See photo below]

(Editor's Note: We would appreciate identification of the unnamed individuals in the photograph by any reader who recognizes them.)

Hymen S. Mayerson:

The idea of publishing Past-Presidents Addresses for the Centennial, with epilogues, is an interesting one.

My problem with writing an epilogue is that I have been out of the laboratory for about 18 years and while I have tried



to keep up with developments – admittedly, I have lost touch with many facets. But I shall get out my speech and see what I can do, if anything, and let you know shortly.

I'm sure the other men don't have this problem since, as far as I know, they have stayed in the field. I could write in detail about hospital practice, but let me see what I can do. I hope the rest of the crowd will write epilogues – I'm sure they have much to get off their minds about the younger generation and the present situation. The idea is a good one. More later.

John R. Pappenheimer:

Your letter about epilogues prompted me to re-read my 1965 Past-Presidential Essay. There is not much I should wish to change in it except in the last paragraph where it says that my bicycle might be good for another 15,000 miles. In fact it has already gone another 23,000 and I expect this number will be close to 40,000 by the time of the Centennial in 1987.

Seriously, I promise to contribute as best I can to the 1987 celebrations but not in the form of an epilogue to 1965. Our present experimental work is going quite well – aided and abetted by ONR (thanks to you) – and I feel more in the mood for a prologue than an epilogue!

John M. Brookhart:

I think a brief note alluding to the development of interdisciplinary programs in the neurosciences would be relevant. I could not do this before a year from now.

Robert E. Forster:

I have your letter of February 24th concerning the opportunity you're prepared to offer to Past Presidents to retroactively and prognostically alter their Past Presidential Addresses in *The Physiologist.*

This would be fun and I would welcome the opportunity. The critical question is when this would have to be done. I would certainly want six months or a years time and would prefer to have a specific date to make a specific issue of *The Physiologist.*

I also have not forgotten your suggestion, again on historical subjects, that we should prepare a history of the Department of Physiology at the University of Pennsylvania. That is also a good idea, but the need to be "out looking for new territory" rather takes preeminence. A distant deadline on that as well might be helpful if you really want it.

Hermann Rahn:

Thank you for your recent letter concerning the possible publication of Past Presidents' Addresses. I think this is a good idea. Let me say, however, that I have no additional comments that I would like to make fifteen years later.

INTERNATIONAL UNDERSTANDING OF THE HEALTH CARE SYSTEM IN SCANDINAVIA

This continuing education program, sponsored by the Office of Continuing Education, School of Health Related Professions, State University of New York at Buffalo, will be held on June 16-30, 1978.

The program is designed to enhance the health care professional's understanding of the health care delivery system in Scandinavia.

Visits will be arranged to the Ministry of Health, Geriatric Care Facilities, Rehabilitation Centers and Clinical and Public Health Laboratories in Sweden and Finland. As a result of this program, participants will gain knowledge and understanding of innovative methods for delivery of health care services.

Interested persons should contact: Dr. Allan M. Hoffman, Director, Office of Continuing Education, School of Health Related Professions, State University of New York at Buffalo, 202 Foster Hall, Buffalo, N.Y. 14214.

NEWS FROM SENIOR PHYSIOLOGISTS

Lou Pecora to Hy Mayerson:

Since my retirement from the extra-mural program of NIH four years ago, I have had no trouble keeping busy. I try to keep current with a few journals. I have been retained as a consultant with the National Cancer Institute's new research training program. Reviewing applications in this program is scientifically fruitful. It has given me a good insight of the current research in several disciplines such as physiology, general biology, radiation biology, medicine, biochemistry et al. and the multidisciplinary approach to cancer research and treatment.

I am enjoying retirement, particularly in being able to do what I want with a large degree of flexibility. I enjoy my hobbies such as gardening, woodworking and electronics (TV and Hi-Fi). I have special interest in my small vineyard which is quite productive and I enjoy sharing its products with my friends. The care of my vineyard, garden and lawns helps me to keep physically fit. I have become acutely aware of geriatric physiology and am gradually learning to allow the "old body" to work as an "old" machine.

I have three young grandchildren that visit me regularly every weekend and I get a great deal of pleasure in subtly exposing them to general science which they take in stride. I believe they should be exposed to this regardless of their future interests. I am associated with a newly organized Senior Citizens Club and was its first president. Through this group I have also met several very interesting biological scientists and physicians. I am surprised at the numerous social and physiologic problems that exist concerning the average senior citizen and the difficulty in getting them resolved.

I enjoy reading the published letters of the many people I have worked with and also the many acquaintances I have made through the Society.

Emanuel Mandel to Hy:

I am still active in my job at the Kingsbrook Jewish Medical Center as well as at the State University of New York Medical School and have no immediate plans to reduce my activities or retire. However, the decision will evidently have to be made in the not-too-distant future. I shall communicate with you at that time and hope that you will maintain your vigor and good health for many years to come. With kindest regards and best wishes.

Philip Dow to Hy:

After all the admiring remarks I have made about your Committee's success in eliciting responses, I let this one go by so long because there is not much new to add to the last one. I did not get to the Paris Congress because I was off on my first trip to Scandinavia with many of the friends I have toured with before. In April I drove to Ann Arbor for my 50th college class reunion and the trip was one of the year's high points.

Bob Little has asked me to undertake the departmental history project suggested by APS. I have pursued it far enough to discover that there is a wealth of material to cover. All best wishes for the year ahead.

Frank Craig to Hy:

The news reported by the Committee on Senior Physiologists is always interesting. I am grateful for your kind letter of greeting on behalf of the Committee. A similar letter from Phil Bard over a year ago came as something of a shock for I had always regarded myself as very much of a junior physiologist. The changes at the laboratory reported by Charlie Hassett in *The Physiologist* for April 1977 made my future plans rather uncertain and before I could reply Phil had died. I remember a most enjoyable demonstration of his cats that he gave at Woods Hole in 1932. In order to simplify the reply to your letter I retired on January 8. Last year the laboratory gave up the Climatic Facility built in 1954 at the instigation of Bruce Dill and it was unlikely that I would ever be able to get back to work on the treadmill. The Society will continue to be ably represented at the laboratory by Cummings, Stemler and Wilson.

In spite of the advice of so many Senior Physiologists I had made no plans for retirement. Perhaps this is a reaction to the concept of Total Planning of Research so prevalent now. My wife Mary will continue as director of professional training for Planned Parenthood of Maryland. Mary is also taking flying lessons and soloed last Fall. This leaves me with a clear field at home as executive director and total staff of the building and grounds committee. My appetite for high altitude is satisfied by painting the roof. Some of the withdrawal symptoms from the research habit I expect to take care of in the area of genealogy. I have only recently discovered the treasures of the Peabody Library in Baltimore. Would you believe a line back to Lady Godiva. With warm regards.

Elizabeth Painter Marcus to Bruce Dill:

I retired from active research in the mid-1950s. For the past 15 years or more my scientific interests have been limited to talks and conferences on nutrition and to talks of a general science nature for local groups. This is an important need in every community. In addition I was active in organizing the Meals-on-Wheels program out of our local hospital. Our help for the elderly has been so effective over the past 12 years that Chicago and other suburban groups have consulted us and have set up similar programs in the past 6 years.

You have asked about our town, Riverside. Even though we are located just 10 miles west of Chicago, our community is known as the "Village in the Forest." The U.S. Department of the Interior has declared our village a National Historical Landmark, because it is the nation's first planned suburb. The famous landscape architect, Frederick Olmsted, designed the community like a park in the 1860s, around the winding Desplaines River and the many kinds of trees throughout the region. We have retained the gas lamps of long ago. We have a good library system, churches, schools and small shops, but no movie houses and no taverns.

So far my health is good in spite of the time spent in radiobiology during and after World War II. My family, as well as my husband's family, is long-lived and continues to be active in many ways.

Best wishes to you and the Committee for your efforts on our behalf to keep physiologists from becoming just names in the Society register.

John C. Scott to Hy:

I am very glad to know that you are active and enjoying good health and life in general.

I am well and happy also and am enjoying life. At present I am gathering data for a history of the Physiology Department,

to be published in *The Physiologist.* The first 50 years of Hahnemann was published in 1898. I have been here the last 50 years so I will have to concentrate on the intervening 25 years. If anyone has information on Hahnemann Medical College, of historical interest, I would be glad to hear from them. With best personal regards.

Robert A. Kehoe to Bruce:

I am so glad to have heard from you. Thanks very much for your good wishes. I am still able and willing to work and that is the best situation I could hope to be in. My good wishes go with you.

Richard Whitehead to Hy:

My activities are largely limited to writing my biography and to serving as a consultant to the Medical Care and Research Foundation of Denver. This Foundation was established 25 years ago with the aim of increasing opportunities for research and innovative programs in the health care area. Many of their projects involve clinical research on new drugs. I serve as a member of a five-man committee which reviews all projects before they are undertaken.

I have also become interested in the problems of aging which is one of the principal concerns of the above Foundation. I am in general happy with life here and am not seeking employment elsewhere. My health is good, I too enjoy gardening and trips to the Colorado Rockies, which are all too few.

I know the area of Copper Mountain where your son has a condominium, quite well as I was born at Breckenridge near there, and attended grade and high school there. I worked in the mines and mills during vacation times and learned the value of work and earning a dollar. With best personal regards.

Edmund Jacobson to Hy:

I am working at approximately full time, as ever. At the International Congress of Physiology in Paris I was invited to lecture on The Human Mind at the Saltpetriere Amphitheatre on July 20, 1977 and did so. The manuscript should be published soon. I was informed that the French Association for the Advancement of Science specializes on Progressive Relaxation investigations and applications.

I have written a report on Human Energy Expenditures measured in supine position and also a detailed graphic account of a 50-year investigation on the application of progressive relaxation training to fifty hypertensive patients. All other therapeutic approaches, including medicinal, suggestive, and other psychiatric measures, were, as far as possible, excluded. These two articles are scheduled to appear in December in the German medical journal, *Archive Für Arzneitherapie.*

My laboratory investigations concern human energy expenditures in the supine position measuring O_2 intake per minute, cardiac output, and many other variables. All determinations made automatically by computer. I have been blessed with devoted associates. Thank you for your gracious inquiry.

Sid Harris to Hy:

Nancy and I were in Denmark one week and France three weeks in June and July 1977. In Copenhagen, I attended some interesting meetings at the Symposium on Cerebral Function, Metabolism and Circulation. We had two most delicious official buffet dinners, took two tours outside of Copenhagen and visited Danish friends at their home one day.

In Paris at the IUPS we both attended the opening session at the Sorbonne. Later I attended some scientific sessions at Jussieu. The Round Table discussion sessions appealed to me as a lively and interesting method of presenting and analyzing new developments in a given field and placing the new and the old in correct perspective. It is something that societies in the Federation might profitably consider.

The most enjoyable part of our summer perambulations was a thirteen-day bus tour around France: Paris to Rouen, the Normandy beaches, Limoges, Bordeaux, the Loire Valley, Nimes, Avignon, Cannes, Nice, Monte Carlo, Burgundy and back to Paris for local wanderings. It was a tour to remember and to entice one back to some places to stay longer.

My advice to younger physiologists on preparation for retirement is basically as I have written before. Cultivate a variety of interests outside of the profession throughout life, and maintain a strong interest in the scientific aspects of your profession before and after retirement. You will be fortunate if you can feel no financial or moral compulsion to continue in employment after retirement. Then the scientific activities in which you do engage will be voluntary and pleasurable.

My literary activities are varied. I still edit some manuscripts for scientific journals, and have recently aided a foreign former trainee who brought me materials for two manuscripts for help in reorganization of topics and improvement of language. We continue friendly and helpful relationships with many Indonesians who were my students and associates in Jakarta and New Orleans. We saw about twenty of them in Paris in July. I am now studying French, in a third year class, and surviving. We both are as busy as we want to be, and are enjoying life in Carmel.

Roberta Hafkesbring to Hy:

At present, I'm living in a lovely apartment in Claremont Manor. Claremont, California is a town of seven colleges with all sorts of cultural activities. I am no longer doing any scientific work and certainly not interested in any positions. After retirement from Woman's Medical College in 1964 (34 years there) I went to Korea for one year. As Visiting Professor of Physiology, I returned to serve six sessions in Ewha Woman's University Medical College – a most challenging and rewarding experience. Really retired in 1970. My new knee-joint operation last year kept me on a walker for 17 months. Recently I have discarded the walker, cane and brace and walk on my own, rather painfully and slowly but I walk and I'm grateful. California sun still shines brightly for me. I am happy to hear you are enjoying your retirement.

Hayden Nicholson to Bruce:

I'm not doing anything significant. It now has been more than five years since I retired. I have made a few accreditation visits to medical schools for the Liaison Committee on Medical Education but I think I'm getting pretty old for that. I will soon be 74 years old.

Both my wife, Marian, and I are still in reasonably good health although I, at least, am experiencing some of the inevitable effects of advancing age. Last summer we enjoyed a brief trip to Alaska with our daughter and son-in-law and spent time with them and our grandchildren at their home in California. We may spend a little time during the coming winter with our friends in Miami.

Glen Ellyn is a pleasant little suburb of Chicago about 25 miles west. The last few years before I retired I worked for the

American Medical Association in Chicago. When I left Miami I thought we would probably return there to live when I retired but we are enjoying it here and will probably stay. Both my wife and I are midwesterners and the more or less severe winters don't bother us particularly, although along about February, Miami looks pretty inviting. With kind regards.

Jerzy Glass to Hy:

Your kind letter found me fortunately still in good health and in full swing of work. A few weeks ago the Volume III of the Progress in Gastroenterology, which I am editing, has come off the press. It's size is 1,080 pages this time, which represents the bulk of two previous volumes taken together. The book contains 49 chapters written by 77 authors from all over the world. Of these, one is written by myself and the other jointly with one of my colleagues, who is its first author.

Several other papers from our Gastroenterology Research Laboratory have been published during this current year. Of these, the one on Immunology of Atrophic Gastritis has been presented to the Annual Meeting of the New York State Society of Medicine, and published in the N.Y. State Journal of Medicine. Several other papers published together with Drs. B. L. and A. Slomiany describe a new class of components of gastric secretion, the structure of which corresponds to glyceroglucolipids. The physiological role of this class of material is still not understood, and their final structure has not yet been completely elucidated.

On October 14, 1977 I had the great pleasure and privilege to receive from the hands of the President of the University of Nancy I, the third oldest University in France, the diploma and the insignia of the Doctor Honoris Causa of the University. These were given to me with citation of my lifetime work in gastroenterology and 25 years of investigation of gastric intrinsic factor and vitamin B12 metabolism.

The most recent undertaking is the editing of a volume on "Gastrointestinal Hormones." This will represent one of 12 volumes of the most recent international Textbook of Endocrinology, edited by Professor Luigi Martini from the University of Milan. The whole text will be published in English by Raven Press, New York.

Ancel Keys to Bruce:

We returned from our home, "Minnelea," in Italy on November 23 after a three months' stay. There I labored as a statistical consultant working with data from a pilot epidemiological study done by people in the U.S. Department of Agriculture. More interesting was the job of working up the 10-year data on smoking vs. disease for my Seven Countries Study.

I was pleased to put much of the result in 18 graphs (I do all the drawing and lettering) covering deaths and incidence of coronary disease. The data include all-causes deaths in ten years among 12,000 men who were judged free of cardiovascular disease at the entry examinations in the seven countries. Some of the findings were expected, others pose new questions. For example, our data clearly show that cigarette smoking is a major risk factor for premature death in the United States and in our samples of men in northern Europe (in Finland and the Netherlands). But the data just as clearly show that smoking is only a trivial risk factor in southern Europe (Italy, Yugoslavia and Greece) and Japan.

Such professional activities at Minnelea have to compete with the joy of working out of doors in our gardens. We picked our own grapes and made 100 liters of wine which promises to be better than average this year. We picked olives from which we got 40 liters of truly fine oil; last year we got only 17 liters and it was only mediocre in quality.

We return to Italy right after the holidays to stay until March. Besides starting many seeds in our greenhouse, we'll be super-saturated in ascorbic acid from the tangerines and oranges. Minnesota is a great state but coming back to be greeted by -16°F., as this time, is too much.

Otto Edholm to Bruce:

Many thanks for sending me your two papers, one on the Harvard Fatigue Laboratory and the other on L. J. Henderson. I have read both with great care and great profit. I hadn't realized before what a really remarkable man L. J. Henderson was. He must have been a most stimulating person to work with and for.

I have found it fascinating tracing out the scientific ancestry of human physiology both in the UK and now, with your help, in the US, and also in Scandinavia. I was glad also to get the reference to the book by the Horvaths, or rather I should say your daughter and son-in-law.

Circumstances have not changed very much since I last reported to you. I am still working at the School of Environmental Studies although its name is now going to be changed to the Bartlett School of Architecture and Planning. My role is that of a Visiting Professor which means that I do a certain amount of teaching, principally on aspects of thermal comfort and the physiological factors involved. I am now involved in a research programme looking at gait in elderly subjects. The intention of this work is to have a reasonable baseline from which to judge the performance of patients being rehabilitated after cerebral haemorrhage. I am, of course, quite a useful subject – not that I have had a cerebral haemorrhage, but my own gait is somewhat clumsy. I am engaged with Joe Weiner in the editing of a book which is to have the title *Principles and Practice of Human Physiology.* Otherwise I am trying to write up some of the unpublished material from the work done at the Division of Human Physiology at Hampstead.

Bill Foster to Hy:

Thank you for your recent letter. I, too, was born in Providence. We lived on Thayer Street, a stone's throw from the Pembroke campus, now a part of Brown Univesity, as is much of the east side of Providence. Thayer Street Grammar School, which I attended, as did my mother, has been replaced by a college dormitory. As a boy I delivered morning, evening and Sunday out-of-town newspapers in that area. My customers were the "carriage trade," which surrounded the University. At that time I had no thought of going to college. We were as poor as church mice. I dropped out of high school at the end of my first year, but returned a year later due to the persistence of a worldly-wise aunt.

I hope to return to the campus for my 50th reunion in 1979. Last September I was invited to attend a week-end conference at Brown to discuss the recruiting of worthy minority students. No such interest existed when I was a student. In fact, I was the only Negro in my class.

I am now Associate Professor Emeritus. Ron Coburn phoned me to ask if I would be available for the coming teaching year but I declined because of some transient hyper-

tension. I had been a member of the Department of Physiology at the Medical School of the University of Pennsylvania for 20 years, and before that a member of the Department of Physiology at Hahnemann Medical College for 18 years. During the last three years at Penn I conducted two conference groups each week for students who had difficulty with the course. Last year's treasured Christmas card was from a young lady who expressed her appreciation for those conferences. She had failed the mid-term exam miserably, but had passed the final exam, and the course with a high grade.

I continue to be active as Director of the Laboratory of Clinical Chemistry at Jeanes Hospital of Philadelphia, a position I've held since 1964. Many of my former students are staff members here. I am involved in our residency training program, and the Category I Continuing Medical Education program of the AMA. We have a two-year training program, jointly with Hahnemann Medical College, and supported by an HEW grant for outstanding high school graduates for the degree of Associate in Medical Technology. I am coordinator of this program and for my effort Hahnemann has offered me the position of Assistant Clinical Professor.

Much of my time in the Clinical Laboratory is spent documenting quality control of our many procedures, but I find time for research. Years ago Dr. Fuller Albright remarked "do measure something." There is a wealth of clinical material here which makes it possible to "measure something."

In July Betty and I attended the XXVII International Congress. I was Chairman of the Poster Session on Nutrition. We enjoy Paris, and altho we were assigned a hotel where short-stay transients without luggage made up the major part of their business, we were able to transfer to an excellent modern hotel on the outskirts of the city, in a residential neighborhood a bit more acceptable. We also visited London, saw three excellent shows, took advantage of the July store sales, bought our winter coats, and viewed some of the activities of the Queen's Silver Jubilee.

Eleanor Mason to Bruce:

After the April *Physiologist* came with your superb article on L. J. Henderson, I read it right through at once and wanted to write to you immediately my very warm appreciation.

Here and there in your account there are overlappings with my own life and movements — at Harvard Medical, in your own Fatigue Labs in the Business School, a dinner in Cambridge at Alfred Redfield's home when "L. J." was the chief guest, and would you guess — a bit of correspondence with Ancel Keys who might have considered using our labs in Madras as a sea-level base for experiments before that fated planned high-altitude expedition to the Himalayas! Actually his letter explaining what had happened, written from the high Andes, reached me in a remote village in the Himalayas where I was camping on holiday. A nice physiological fun-touch across distant mountain tops.

As for myself, I'm no longer doing any scientific work but am glad for keeping in touch with former students and their students who are carrying on the torch in their own places and spheres.

I always look first for news of senior physiologists. Two items in the October 1977 issue were of special interest: the death of Prof. A. V. Hill, whom I had first met when he visited Alfred Redfield's labs at the Harvard Medical School, and later met again in India, at a lecture at the University of Madras, and at New Delhi at the Indian Science Congress, when Prof. Hill, as Secretary of the Royal Society, conferred membership on an Indian scientist for the first time outside of the Society's chambers. He distributed to all who were present at that meeting a beautiful brochure "Pavlov's bequest to the young scientists of his country." Earlier, I had had the good fortune to be in Cambridge (England) when Pavlov himself gave a lecture — very vivid — to the medical students, and Dr. Adrian was his interpreter. The other item was that Service of Thanksgiving for Lord Adrian in Westminster Abbey. I have been to many services and special occasions in the Abbey, but never to one for a scientist. That is glorious. It is good to keep in touch.

Jeanne F. Manery to Dr. Adolph:

After reaching retirement age I was given a part-time appointment which meant a lower salary but full time for research and graduate training. Now I am Professor Emeritus — hard to believe, isn't it? Fortunately I am endowed with excellent health and boundless energy so that I rarely stop to realize that I am slightly older than I used to be.

At the moment my well-equipped laboratory is being put to good use by myself, one graduate student and two very experienced technicians who have worked with me for many years. We are still investigating the role of Ca^{2+} in the structure and function of RBC membranes. As well, I am trying to relate our muscle ecto-enzymes to the enzymes which are truly bound to muscle sarcolemma and/or sarcoplasmic reticulum. This is difficult research and I have much unpublished data which I hope will help to clarify this confusing field in another year.

I am publishing, writing reviews and taking part in Workshops and Symposia. If and when the time comes that grant money is no longer available and my scientific activities here lessen, I should be very pleased to do something constructive for the Society. I read the letters in *The Physiologist* avidly and the obituaries with sadness. I was grieved to note that my good friend William Amberson is gone.

On a more personal note, I still live alone in the house in which Ken and I raised our two children. It is a big old house on a dead end street and I love it. I also enjoy our summer retreat on Lake Boshkung in Northern Ontario. I need hardly say that life is, and always will be, very lonely without Ken*. Ken Jr. is somewhat closer now, however. He is assistant professor of Developmental Biology in the Veterinary College at Guelph, Ontario. Marjorie is a French specialist and works for Manpower in Edmonton, Alberta. Each has one small child. You will realize, then, that freedom to move to another area for any appreciable length of time might be somewhat curtailed by the ties of family and property.

I was happy to hear from you and look forward to seeing you again at a FASEB meeting, perhaps.

*Kenneth Clarke Fisher, former member of long standing of APS, deceased January 1970.

Hubert Catchpole to Bruce:

I am sure that a lot of us have a real interest in "Senior Members" corner of The Physiologist, not limited to vital statistics or mortal statistics.

I have never had the pleasure of meeting you. A possible bond is Robert (Bob) Forster III of Philadelphia who, as a student at Yale did his first piece of scientific work with me on a topic which he has probably not touched from that day

to this. Some year I shall drive West – the road has to go through Boulder City and I shall rectify the above omission.

I retired after nearly thirty years in the Department of Pathology at Illinois where I had been Research Professor. My scientific background had been a little off beat and was essentially as follows:

F.H.A. Marshall of Cambridge; H.M. Evans of Berkeley; J.F. Fulton of Yale; A.H. Behnke of the U.S. Navy and I. Gersh, then of the U.S. Navy, and finally a fairly independent career at Illinois.

Statutory retirement was followed by becoming a (volunteer) Professor of Histology in the University of Illinois Dental College where I share a lab and office and have pleasant teaching associations with first year students.

I am still publishing in *Science* and hopefully in some other fields and do not expect to disappear immediately from that arbitor of human value, The Citation Index.

I expect to stay in this area, next door from the Newberry Library, with no thought of permanent removal. I have somewhat of a general allergy to administration and a specific one to scientific administrators and do not seek such occupation.

Walter S. Wilde wrote to Orr Reynolds on September 27, 1977:

I am coming to the Fall Meeting of the APS at Hollywood by a 3-hour bus ride.

The $40.00 registration fee was a blow! Why does not Council consider placing retired people on the student rate, except perhaps when they are working with grant monies. It would encourage our coming to see former students.

Note: Based on this letter and others received, Council approved the suggestion beginning with the Fall 1978 Meeting.

At the request of the Board of Directors and Council of AAAS, the following resolution was adopted at their meeting on February 16, 1978.

CHAUNCEY DEPEW LEAKE, 1896–1978

As an experimental scientist, Dr. Leake made important contributions to anesthesiology and therapeutics. As an administrator, he founded new departments of pharmacology and gave leadership to the development of institutions for medical education and medical services. As an always popular lecturer and author, he illuminated not only his own areas of pharmacological specialization but also ancient Egyptian medicine, the lives of pioneer physiologists, the history of science, medical ethics, and human values. As a man, he brought to all of these activities an ebulient optimism, and to his colleagues, the joy of shared endeavor.

As one of the beneficiaries of his talents and energy, the American Association for the Advancement of Science was fortunate to have Dr. Leake as an active participant in many programs, as Vice President for the Section on the History and Philosophy of Science, as a member of the Board of Directors, and as the Association's President and Chairman.

Be it therefore resolved that the Board and the Council of the American Association for the Advancement of Science record this memorial statement in grateful recognition of Dr. Leake's many contributions to humanity, science, and to this Association.

Note: Dr. Leake became a member of APS in 1923.

CHAUNCEY D. LEAKE – PHARMACOLOGIST, PHILOSOPHER

Friends of Chauncey Leake will be sad to learn of his death on January 11, 1978. He leaves behind a wide circle of friends. He had been my friend for a long time. Our friendship had been strengthened in recent years through my greetings on behalf of the Society. He always replied, keeping me up to date on his activities. Last year one of my good friends attended two series of his lectures at the University of San Francisco. One series was entitled, *Practical Philosophy* and the other, *Nineteenth Century Greats: Literature, Art, Music, Drama, and Science.* Among those considered were Cezanne, Wagner, Wilde, Beaumont, Blake, Verdi and Darwin.

Chauncey and this student became well acquainted, the two of them joined in sending me a birthday greeting last year.

The editors of *Science* paid a fitting tribute to Chauncey, a former president of AAAS by publishing on 24 February, a four-page excerpt from his book, *Letheon: the Cadenced Story of Anesthesia.*

Bruce Dill

Yas Kuno, Pioneer in Climatic Physiology
March 30, 1882–December 30, 1977

Bruce Dill

Yas Kuno, elected honorary member of the Society in 1959, held appointments in physiology in Tokyo and Kyoto Imperial Universities until 1911 when he was appointed Professor of Physiology at Manchu Medical College in Manchuria, now in China. Here much of the research was completed on which his first wellknown book, published in 1934, was based (1). In 1935 he returned to Japan (he wrote me, "Unfortunately I got the banishment") as a lecturer at Kyoto. From 1937 until his retirement in 1955 he was professor of physiology at Nagoya University School of Medicine. Then he started a seven-year post-retirement career as professor of physiology at the Mie Prefectural University's Medical School. Much of his research was brought up to date by publication in 1956 of his second book on human perspiration (2). Great honors have come to him: Member, Japan Academy of Science, award of the Order of Cultural Merit, the highest Japanese decoration for achievements in the arts and sciences, and election as honorary president of the International Physiological Congress in Tokyo. Indirectly much honor came to him through the achievements of his many brilliant students. His leadership in Japan was manifested in 1950 by his role in founding the Japanese Journal of Physiology.

It is customary in Japan to recognize especially birthdays of 66, 77, 88 . . . years. Several of his former students recognized his 77th birthday by contributing chapters that made up *Essential Problems in Climatic Physiology* (3). Among the contributors were H. Yoshimura, K. Ogata and S. Itoh. I shared with his former students and with some of my American colleagues the honor of contributing a chapter to the volume honoring his 88th birthday (4). I enjoyed reminiscing with Kuno in 1964 at a conference on bioclimatology at Sapporo, Japan. He was in good health and spirits at age 84. Memorabilia of that conference and Christmas cards I have received from Kuno are being sent to the Society Archives.

1. KUNO, Yas. (1934): *The Physiology of Human Perspiration.* J. and A. Churchill, London.
2. KUNO, Yas. (1956): *Human Perspiration.* Chas. C. Thomas, Springfield, Ill.
3. YOSHIMURA, H., K. OGATA and S. ITOH (eds.). (1960): *Essential Problems in Climatic Physiology.* Nankodo Publishing Co., Ltd. Kyoto, Japan.
4. YOSHIMURA, H., K. OGATA and S. ITOH (eds.). (1972): *Advances in Climatic Physiology.* Igaku Shoin Ltd. Tokyo.

THE PHYSIOLOGY TEACHER

Editor: Orr E. Reynolds, Education Office, APS
Associate Editors: Robert E. Fellows, Dept. of Physiology and Biophysics, University of Iowa
Michael J. Greenberg, Dept. of Biological Science, Florida State University
Mary Forsling, Middlesex Hospital Medical School, London, England
Executive Editor: Mary Dittbrenner, Education Office

Dear Subscriber:

During the past year, The Physiology Teacher was sent to all members of the American Physiological Society as a separate section of The Physiologist. By making The Physiology Teacher available to the entire membership of the Society, it was hoped to bring the articles in this publication to the attention of teachers of physiology and, consequently, to encourage them to submit manuscripts for publication. This symbiosis did not develop. In addition, since the greater proportion of the original list of subscribers consisted of Society members, the paid circulation of the newsletter declined considerably.

At a recent meeting, the Council of the American Physiological Society decided to discontinue The Physiology Teacher as a separate publication. Instead, a section in The Physiologist will be devoted to educational articles and material. It is expected that the number of pages devoted to educational material in the new section of The Physiologist will remain about the same as that previously published in The Physiology Teacher. Also, the present Editorial Board will continue to serve as Editors of the new section.

For the remainder of 1978, current subscribers to The Physiology Teacher will receive The Physiologist without additional charge. We know this new section will continue to fulfill your needs and hope you will find material in The Physiologist of interest.

Sincerely,

Orr E. Reynolds

OER:kb

Orr E. Reynolds
Editor

TWO TAKE-HOME PROBLEM SETS FOR USE IN TEACHING ELEMENTARY FLUID AND ELECTROLYTE PHYSIOLOGY TO 1st YEAR MEDICAL STUDENTS IN AN INTEGRATED CELL BIOLOGY COURSE

E. M. Renkin and Peter Cala
Department of Human Physiology
University of California, Davis
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We have found these two tests useful in introducing this material to students with widely divergent backgrounds in biological and physical science. The first provides a quick refresher to those who have studied these topics before, and serves to identify those who need additional instruction in elementary physical chemical concepts.

The second problem set is designed to give practice in using the concepts taught in this course. The last problem is an application to man, which is elaborated upon later, in the integrated Organ Systems course. The students are asked to do these problems at home, and bring them to a 2 hour conference on this part of the course. Each conference instructor reviews the topics, answers questions and goes through the problems with his group.

A PRE-TEST FOR BODY FLUIDS AND CELL TRANSPORT

This is intended as a quick check of your ability to handle the basic chemistry concepts needed to understand the transport of water and other materials in the body. It is okay to consult a textbook before or while you work out these sample problems (Consult GANONG, Ch. 1, p. 7 for a very brief review, VANDER, Ch. 1, p. 6-15, for a more elementary starting point). If you can do these problems with reasonable facility, you have nothing to worry about. If you have trouble, please attend the scheduled briefing session. An instructor will go through all the problems on this sheet in detail, explain the principles involved, and answer your questions about them.

TABLE OF ATOMIC WEIGHTS:

H = 1, C = 12, N = 14, 0 = 16, Na = 23, Mg = 24, S = 32, Cl = 35.5, K = 39, Ca = 40.

1. Calculate the formula weights of the following:

   a) H_2O c) $CaCl_2$ e) urea, $(NH_2)_2CO$
   b) NaCl d) K_2SO_4 f) glucose, $C_6H_{12}O_6$

2. The *molar* concentration (M/L, molarity) of a solution is the number of formula weights in grams per liter of solution. Calculate the weights required to make 1 liter of a 1 molar solution of (b), (c), (d), (e) and (f) in problem 1, above.
3. How much of each is required for a liter of 100 millimolar (mM/L) solution?
4. A liter of water weighs 1,000 grams. What is its concentration in moles per liter?
5. Some solutes, when dissolved in water, dissociate into their component ions. Which of the solutes listed in problem 1 dissociate, and into what ions?

   a) H_2O d) K_2SO_4
   b) NaCl e) $(NH_2)_2CO$
   c) $CaCl_2$ f) $C_6H_{12}O_6$

6. The equivalent concentration (Eq/L, mEq/L) of an ion in solution is the number of combining weights per liter. Combining weight is defined as ionic weight divided by numerical valence. In a 100 millimolar solution of each of the following compounds, give the concentration in milliequivalents of each of the ions:

   (a) NaCl: Na^+ ____mEq/L, Cl^- ____mEq/L
   (b) K_2SO_4: K^+ ____mEq/L, SO_4^{--} ____mEq/L
   (c) $CaCl_2$: Ca^{++} ____mEq/L, Cl^- ____mEq/L

7. The osmotic concentration (osmolar, OSM/L; milliosmolar, mOSM/L) is the concentration in formula weights of all solute particles: undissociated molecules, anions and cations. The osmolarity of

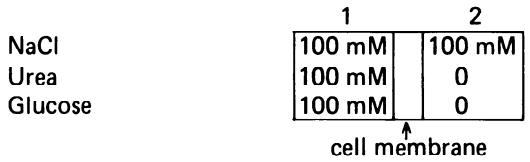
   (a) 100 mM/L NaCl = _____ mOSM/L
   (b) 100 mM/L K_2SO_4 = _____ mOSM/L
   (c) 100 mM/L $CaCl_2$ = _____ mOSM/L
   (d) 100 mM/L glucose = _____ mOSM/L
   (e) 100 mM/L glucose + 100 mM/L NaCl = ____ mOSM/L

8. The following table gives the composition of (i.e. recipe for) three widely used parenteral (e.g. intravenous) fluids. Calculate the concentrations 1) of their components (except water) in mM/L, 2) of the ions in mEq/L, and 3) the total osmolarity.

   a) "ISOTONIC" glucose solution
      glucose 60 grams
      water to 1 liter
   b) "ISOTONIC" saline solution
      NaCl 9.0 grams
      water to 1 liter
   c) Lactate – Ringer's Solution (Lactate = $CH_3CHOHCOO^-$)
      NaCl 6.0 grams
      Na-Lactate 3.05 grams
      KCl 0.40 grams
      $CaCl_2$ 0.10 grams
      $MgCl_2$ 0.10 grams
      water to 1 liter

PROBLEM SET FOR BODY FLUIDS CONFERENCE

1. A 65 kg patient is given an i.v. injection containing 200 mg INULIN and 1,000,000 counts/min ^{125}I-serum albumin. After 15 minutes, a sample of venous blood is taken and plasma separated. Concentration of INULIN = 0.01 mg/ml, ^{125}I-radioactivity = 250 counts/min above background. Assume no excretion of either indicator. Calculate plasma, extracellular fluid and interstitial fluid volumes, and compare with normal values.
2. The diagram shows two fluid compartments separated by a membrane having typical cell membrane permeability.



(a) Which way will water move (circle)?
1⟶2, 2⟶1, no net movement

(b) What is the magnitude of the osmotic driving force for water (in mOSM)?

(c) Which way will NaCl move? _____

(d) Which way will urea move? _____

(e) What pressure difference (magnitude and direction) would have to be applied to stop the movement of water?

3. An infinitely distensible cell is placed in a very large volume of a solution of NaCl which is half isotonic with its contents. What will be its equilibrium volume?

4. A man has normal body fluid volumes, and a normal Na^+ concentration of 145 mEq/L. He ingests 20 grams of NaCl. Assuming he absorbs all the salt, does not drink any water, and does not excrete any salt, calculate the resulting increase in his plasma $[Na^+]$. (Do this stepwise, and indicate principles involved).

ANSWERS

Pretest

1. a) H_2O: 2 + 16 = 18
   b) NaCl: 23 + 35.5 = 58.5
   c) $CaCl_2$: 40 + 2 x 35.5 = 111
   d) K_2SO_4: 2 x 39 + 32 + 4 x 16 = 174
   e) urea, $(NH_2)_2CO$: 60
   f) glucose, $C_6H_{12}O_6$: 180

2. Same numbers as (1), in *grams.*

3. Same numbers as (1), divided by 10.

4. 1000 g/L ÷ 18 g/M = 55.5 M/L

5. a) H_2O: –
   b) NaCl: $Na^+ + Cl^-$
   c) $CaCl_2$: $Ca^{++} + Cl^- + Cl^-$
   d) K_2SO_4: $K^+ + K^+ + SO_4^{--}$
   e) $(NH_2)_2CO$: –
   f) $C_6H_{12}O_6$: –

6. (a) NaCl: Na^+ 100 mEq/L, Cl^- 100 mEq/L
   (b) K_2SO_4: K^+ 200 mEq/L, SO_4^{--} 200 mEq/L
   (c) $CaCl_2$: Ca^{++} 200 mEq/L, Cl^- 200 mEq/L

7. (a) 100 mM/L NaCl = 200 mOSM/L
   (b) 100 mM/L K_2SO_4 = 300 mOSM/L
   (c) 100 mM/L $CaCl_2$ = 300 mOSM/L
   (d) 100 mM/L glucose = 100 mOSM/L
   (e) 100 mM/L glucose + 100 mM/L NaCl = 300 mOSM/L

8. (a) "ISOTONIC" glucose solution
   60 g/L ÷ 180 g/M = 0.333 M/L
   1) _____ = 333 mM/L
   2) _____ =
   3) _____ = 333 mOsm/L

   (b) "ISOTONIC" saline solution
   9g/L ÷ 58.5g/M = 0.154 M/L
   1) _____ = 154 mM/L
   2) _____ = Na^+ = 154 mEq/L Cl^- 154 mEq/L
   3) _____ = 308 mOsm/L

   (c) Lactate - Ringer's Solution (Lactate = $CH_3CHOHCOO^-$)

1)	g/L	÷ g/M	= M/L	= mM/L
NaCl	6.0	58.5	0.103	103.0
NaLac	3.05	112.0	0.027	27.0
KCl	0.40	74.5	0.0054	5.4
$CaCl_2$	0.10	111.0	0.0009	0.9
$MgCl_2$	0.10	95.0	0.0011	1.1

2)	mEq/L		
Na^+	103 + 27 = 130	Cl^-	112
K^+	5	Lactate$^-$	27
Ca^{++}	1.8		
Mg^{++}	2.2		
Total	+139.0		-139

3)	mOsm/L		
Na^+	103 + 27 = 130	Cl^-	112
K^+	5	Lactate$^-$	27
Ca^{++}	0.9		
Mg^{++}	1.1		
Total	137.0	+	139 = 276 mOsm/L

Body Fluid Problems

1. Volume = injected mass ÷ equilibrium concentration.

$$V_{IN} = \frac{200\text{ mg}}{0.01\text{ mg/ml}} = 20{,}000\text{ ml or } 20.0\text{ liters Extracellular Fluid}$$

$$V_{SA} = \frac{1000000}{250} = 4{,}000\text{ ml or } 4.0\text{ liters Plasma}$$

Interstitial Fluid Volume = 20.0 - 4.0 = 16.0 liters
Extracellular fluid is 7 liters above normal; 1 liter of the excess is in the plasma, 6 liters in the interstitium.

2. (a) 2 → 1

(b) 100 mOsM (+ σ_{urea} x 100). σ = membrane reflection coefficient.

(c) no movement.

(d) 1 → 2 (by diffusion).

(e) $P_1 - P_2 = RT\ [\sigma_{NaCl}\ (\Delta C_{NaCl}) + \sigma_{gluc}\ (\Delta C_{gluc}) + \sigma_{urea}\ (\Delta C_{urea})]$

$$= 25.4\ \frac{\text{atm}}{\text{mol/L}}\ [\ (1.0 \times 0) + (1.0 \times .100) + (0 \times .100)\ ]$$

$$= 25.4\ \frac{\text{atm}}{\text{mol/L}} \times 0.100\ \frac{\text{Mol}}{\text{L}} = 2.54\text{ atm.}$$

Extra question: If $P_1 - P_2$ is 2.54 atm, what effect will this have on the movement of urea?

3. Cell water volume (about 2/3 total volume) will double.

4. (a) Osmoles in 20 g NaCl:

$$20\text{ g} \div 58.5\text{ g/M} = 0.342\text{ M} = 342\text{ mM} \begin{cases} 342\text{ mEq } Na^+ \\ 342\text{ mEq } Cl^- \end{cases} \overline{684\text{ mOsM}}$$

(b) Distribution of Na^+ in 13 L ECF:

present: 13 L x 145 mEq/L =	1885 mEq
added:	342 mEq
total:	2227 mEq
per liter: 2227 mEq/L ÷ 13 L =	171 mEq

(c) BUT total osmolarity of ECF will be increased:

present: 13 L x 310 mOsM/L =	4030 mOsM
added:	684 mOsM
Total:	4714 mOsM
per liter: 4714 mOsM ÷ 13 L =	363 mOsM

(d) Increased osmolarity in the ECF compartment will cause water to move from cells to ECF until the osmolar concentrations are equal in both compartments.

START

CELL WATER	water	ECF
27L x 310 mOsM/L = 8370 mOsM	→	13L x 363 4714

Total Body Water = Cell water + ECF
= 27 L + 13 L = 40 L
Total Osmoles = 8370 mOsM + 4714 mOsM

Osmoles per liter: $\frac{8370 + 4714}{40} = 327\text{ mOsM/L}$

END

8370 ÷ 327 = 25.6L ΔV = -1.4L	⇄	4714 ÷ 327 = 14.4L ΔV = +1.4L

1.4L water moves out of cells into the ECF compartment.

(e) Assuming no Na^+ enters the cells, ECF Na^+ conc = total ECF Na^+ distributed in 14.4L.

2227 ÷ 14.4L = 154.7 mEq/L.

(f) A quick approximation (which obscures the mechanisms of the process but gives a nearly correct answer) is to distribute the added Na^+ in total body water.

$\frac{342\text{ mEq}}{40\text{L}}$ = 8.5 mEq/L + 145 (originally present) = 153.6 mEq/L.

BOOK REVIEW

Studies in Biology #60-75, Published by Edward Arnold, Ltd., London

It is not unusual in the teaching of physiology courses to assign students reading on special topics. The purpose of such assignments is more often to illustrate particular principles of physiology in a well-defined system, than it is to convey all the information available about the particular plant or animal.

A particularly fine series of short monographs on special topics dealing with biological subjects is published by Edward Arnold, Ltd. in London. They are available in the USA through Crone Russak and Company, 347 Madison Avenue, New York, New York 10017 for prices of $3.50 to $3.95. Most of them are sixty to seventy pages in length and are well and generously illustrated with black and white photographs and line diagrams.

I have examined the following volumes, published as numbers 60 through 75 of the "Studies in Biology" series:

Title	Author	Number
THE SECRETION OF MILK	Ben Mepham	60
BIOLOGY OF EUCALYPTS	L.D. Pryor	61
MARINE ZOOPLANKTON	John H. Wickstead	62
HOMEOSTASIS	Richard N. Hardy	63
DISEASES IN CROPS	B.E.J. Wheeler	64
PLANT TISSUE CULTURE	Dennis N. Butcher & David S. Ingram	65
LICHENS AS POLLUTION MONITORS	David L. Hawksworth & Francis Rose	66
ANIMAL ASYMMETRY	A.C. Neville	67
PHYTOCHROME & PLANT GROWTH	Richard E. Kendrick & Barry Frankland	68
GENETICS AND ADAPTATION	E.B. Ford	69
POPULATION CYTOGENETICS	Bernard John	70
A BIOLOGY OF LOCUSTS	R.F. Chapman	71
THE DYNAMICS OF COMPETITION & PREDATION	Michael P. Hassell	72
MAMMALIAN ODOURS & PHEROMONES	D. Michael Stoddart	73
DECOMPOSITION	C.F. Mason	74
VIVIPARITY	Peter J. Hogarth	75

The level of discussion of scientific material is reasonably sophisticated; many of the monographs would be suitable for use in first courses in organismic biology, physiology, genetics or plant physiology. The volumes especially useful to instructors in animal physiology are Mepham's book on "Secretion of Milk", Hardy's on "Homeostasis", Stoddart's on "Mammalian Odours and Pheromones" and Hogarth's on "Viviparity". I found the book on lactation particularly well written.

Mepham treats milk secretion as a special example of all glandular secretions at the same time, he places the process in the general context of events during reproduction which are under hormonal and neural control. A brief review of protein and lactose synthesis is offered along with a description of the changes in cell structure and function that occur in mammary gland cells during lactation. Changes in water and ion balance which occur when animals lactate are explored. Experiments with animals from which endocrine and neuroendocrine tissues and glands have been removed are cited as well as experiments with isolated and perfused mammary glands. The exposition is clear; the story develops logically and in an interesting way.

The student is lead to a rather complete understanding of lactation. In addition, he or she will have learned about some experimental methods in organ physiology, biochemistry, membrane physiology, neuroendocrinology and even some animal behavior. The volumes on Homeostasis, Viviparity and Pheromones are equally interesting and will challenge students in secondary or elementary physiology courses to read further in the field.

For botanists and plant physiologists, *The Biology of the Eucalypts* illustrates the special adaptations of structure and physiology to habitats which are very dry for much of the year. The role of fire in the evolution of this group, and easy hybridization of some species and the existence of barriers to breeding in others are discussed. This volume along with *Diseases in Crops, Plant Tissue Culture,* and *Phytochromes and Plant Growth* offer enrichment for courses in botanical sciences. Two related monographs, *Lichens as Pollution Monitors* and *Decomposition* will be useful in botany courses and in courses dealing with environmental sciences.

Animal behaviorists will find Hassel's *The Dynamics of Competition and Predation* and *Mammalian Odours and Pheromones* by Stoddart most helpful to their students. They may also wish to use *Viviparity* by Hogarth and the *Biology of Locusts by Chapman.* Ford's *Genetics and Adaptation* and *Population Cytogenetics* by Bernard John also deserve mention as excellent supplementary material for genetics courses or courses on cells and organisms.

Each of these monographs is written by an authority noted for his research in the particular area treated in his booklet. The editors have encouraged a lively presentation. Because each volume is sharply focused on a single topic, discussion does not wander, nor will the reader's attention. I highly recommend the use of these monographs.

Nancy S. Milburn
Jackson College, Tufts University
Medford, Massachusetts 02155

REVIEW OF AUDIOVISUAL MATERIAL

The following audiovisual units were reviewed by Drs. Phyllis Bogner, Joseph Hoffman and Stanley Schultz. Each unit is rated from 1 to 10 in two categories: content and production; ten indicates a rating of excellent. The descriptive paragraph for each unit is supplied by the producer.

Title: **Biological Potentials**
Name: Iazaro J. Mandei
Media: Videocassette. Color.
Runtime: 34:11 minutes
Description: This videotape introduces the concept of electrical potentials in biological systems, discusses their importance and describes their origin in basic terms with ample examples and the use of animation. The videotape starts from basic principles of diffusion and permeability of ions across artificial membranes and applies these principles to the understanding of biological potentials, both passive and active. Topics covered are: Fick's law, generation of liquid-junction potentials, Nernst equation, introduction to resting and action potentials in nerve, and active transport of sodium in the frog skin.
Rating: Content - 7; production quality - 7.
Recommended: Medical, dental, veterinary, graduate, advanced undergraduate, nursing and allied health students.
Useful as: Primary educational instrument and enrichment material.
Available from: AV/MD, 850 Third Avenue, New York, NY 10022

Title: Intestinal Transport Potentials
Name: Dox W. Powell
Media: Videocassette. Color.
Runtime: 22:04
Description: The purpose of this videotape is to demonstrate the electrical potential difference across the mammalian small intestine, to clarify its origin and to demonstrate how it is altered by agents which either stimulate or inhibit sodium transport. Basically, this is a laboratory demonstration which is combined with animated sequences to clarify how sodium transport is perturbed by these various agents. It is hoped that the combination of animated sequences and an actual laboratory demonstration will bring reality to conceptual knowledge and will demonstrate how modern physiological techniques uncover the mechanism of the action of various phenomena. Topics covered are: the significance and origin of the transport potential in the mammalian GI tract, the difference between active and passive transport, and a description of how several agents alter the transport potential of the intestinal epithelium and why.
Rating: Content - 7; production quality - 8.
Recommended: Medical, dental, veterinary, graduate, advanced undergraduate, nursing and allied health students.
Useful as: Primary educational instrument and enrichment material.
Available from: AV/MD, 850 Third Avenue, New York, NY 10022