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ACTIONS TAKEN AT SPRING MEETING

April 13-17, 1964

ELECTIONS. John M. Brookhart was elected to the position of President-Elect. James D. Hardy was elected to a four-year term on the Council. Loren D. Carlson was elected to fill the two-year unexpired term of John Brookhart on the Council. All candidates nominated by Council were elected to membership (See Newly Elected Members - this issue). All elections are effective July 1, 1964.

APPOINTMENTS. The following new appointments were made to replace persons who had served terms on the various committees, etc. Reappointments are also listed.

Publications Committee - Robert Berliner was reappointed.

Finance Committee - H. S. Mayerson and S. M. Tenney

Education Committee - David Detweiler

Membership Committee - Harry D. Patton

Program Committee - William L. Nastuk

Use and Care of Animals Committee - Bennett J. Cohen was reappointed.

Porter Fellowship Committee - John K. Hampton, Jr. was reappointed.

Representative to AAAS - Robert E. Smith was reappointed.

AMA Council on Medical Education - John Brobeck

NRC - Div. of Medical Sciences - Ralph W. Gerard was reappointed.

NRC - Div. of Biology & Agriculture - Alvin F. Sellers

American Documentation Institute - Milton O. Lee was reappointed.

Federation Public Information Committee - Arthur C. Guyton was reappointed.

PORTER FELLOWSHIP. Mr. Fred E. Wilson of Washington State University was appointed Porter Fellow. He will work under the supervision of Dr. Donald S. Farner of the Laboratories of Zoophysiology, Dept. of Zoology.

SUBMISSION OF ABSTRACTS. The Society voted to retain the ruling for submission of abstracts for the Spring meeting that was in effect this year. That ruling is:

A regular APS member must be one of the authors of each 10-minute paper submitted to the APS for presentation at the Spring meeting. Also a person's name (member or non-member) may appear only once.

Since this ruling was in effect in 1964 and will be in effect in the future it was and will be impossible to accept sponsored papers in transfer from other societies in making up the

APS program. This does not apply to any Intersociety Sessions that may be programmed by APS.

INTERNATIONAL PHYSIOLOGY. The XXIV International Congress of Physiological Sciences will be held in the United States in 1968. Dr. Wallace O. Fenn has been selected as President of this Congress.

Additional copies of the preliminary announcement of the Tokyo Congress, September 1-9, 1965 are available in Executive Secretary's Office, 9650 Wisconsin Avenue, Washington, D.C. 20014. A chartered flight to Tokyo probably will be organized by the Local Committee for the 1965 APS Fall meeting at UCLA. For further information write Dr. Robert E. Smith, Dept. of Physiology, UCLA School of Medicine.

The International Biological Program is being planned (See elsewhere in this issue). Any comments, questions or suggestions should be addressed to Dr. Sid Robinson, Indiana University, Bloomington, Indiana.

FEDERATION MATTERS. The Federation Board voted to delete the Federation Directory from Federation Proceedings. However, the Directory will be published as a separate publication and furnished free of charge to all members of the Societies belonging to the Federation.

The Federation Board also approved the construction of a new wing to the relatively new building at Headquarters, 9650 Wisconsin Avenue, Washington, D.C. This will provide much needed space for Federation and Society activities.



SPRING MEETING STATISTICS

	<u>1963</u>	<u>1964</u>
Total attendance	16, 484	16, 704
Total number of sessions	313	289
Intersociety sessions	52	42
Movies	9	11
Simultaneous sessions	34	31
Total number of papers	3, 138	2, 876

APS Abstracts

Total received	933	736
Transferred to other societies and intersociety	219	221
Received from other societies(including intersociety on endocrines)	56	82
Number of sessions programmed by APS (including intersociety on endocrines)	79	75
APS simultaneous sessions	7	7

Note: The ruling of requiring a member to be one of the authors reduced the number of APS abstracts by 21%.

DUES NOTICES

Members will be receiving dues notices for the year July 1964 to July 1965. Please send separate checks for dues and do not combine payments for journals or other material you may be ordering from the Society or the Federation. Dues payments are to be sent to the APS Central Office whereas subscriptions to journals are to be sent to the Federation Business Office. Members are no longer required to subscribe to one of the Society's journals. Journal subscriptions run from January to January but dues run from July to July.

MEMBERSHIP STATUS

April 1, 1964

Active members	2290
Retired members	128
Honorary members	17
Associate members	169

SUSTAINING ASSOCIATES

Abbott Laboratories, Inc.	Phipps & Bird, Inc.
Ayerst Laboratories	Riker Laboratories, Inc.
Beckman Instruments Co.	A. H. Robins Co.
Burroughs Wellcome & Co.	Sherman Laboratories
Gilford Instrument Laboratories	Smith Kline & French
Gilson Medical Electronics	Laboratories
Grass Instrument Co.	Squibb Institute for Medical
Harvard Apparatus Co.	Research
Lakeside Laboratories	Tektronix
Eli Lilly & Co.	The Upjohn Co.
Merck Sharp & Dohme Research	Warner-Lambert Research
Laboratories	Institute
Norwich Pharmacal Co.	Wyeth Laboratories
Charles Pfizer & Co.	

DEATHS SINCE SEPTEMBER 1963

Frederick M. Allen	Paul Machowicz
William H. F. Addison	Charles F. Morgan
Walter Bauer	John S. Nicholas
Eliot R. Clark	O. Sidney Orth
F. P. Knowlton	Abraham M. Shanes

50-YEAR MEMBERS

Samuel Amberg	Dennis E. Jackson
Aaron Arkin	Israel S. Kleiner
Harold C. Bradley	Edward B. Krumbhaar
Percy M. Dawson	Henry Laurens
Joseph Erlanger	Edward Lodholz
George Fahr	David Marine
Mabel P. Fitzgerald	J. F. McClendon
Alexander Forbes	Hugh A. McGuigan
Charles M. Gruber	Franklin C. McLean
Charles C. Guthrie	Frederick R. Miller
Philip B. Hawk	Victor H. K. Moorhouse
Harold L. Higgins	Sergius Morgulis
R. G. Hoskins	Eugene L. Opie
Paul E. Howe	W. J. V. Osterhout

Alfred N. Richards
George B. Roth
Andrew H. Ryan
Charles D. Snyder

Torald Sollmann
Shiro Tashiro
George H. Whipple

NEWLY ELECTED MEMBERS

The following, nominated by the Council, were elected to membership in the Society at the Spring meeting, 1964.

FULL MEMBERS

AVERY, Mary Ellen: Asst. Prof. Pediatrics, Johns Hopkins Univ.
BECKLAKE, Margaret R.: Asst. Prof., Dept. Med., McGill Univ.
BERGMAN, Emmett N.: Assoc. Prof. Physiol., Cornell Univ.
BOGDANOVE, Emanuel M.: Assoc. Prof. Anat., Indiana Univ.
BURG, Maurice B.: Sr. Res. Staff, Lab. Kidney & Electrolyte Metab., NIH, NIH.
BURKE, Jack D.: Assoc. Prof. Physiol., Med. Coll. of Virginia.
CAMPBELL, James W.: Asst. Prof. Biol., Rice Univ.
CANDER, Leon: Asst. Prof. Med., Dir. Pulmonary Lab., Hahnemann Med. Coll.
COSTA, Erminio: Pharmacologist, Lab. Chem. Pharmacol., NHI.
COTZIAS, George C.: Head Physiol. Div., Brookhaven Natl. Lab.
DAWE, Albert R.: Chief Scientist, Office Naval Res., Chicago, Ill.
ELSBACH, Peter: Asst. Prof. Med., New York Univ. Sch. Med.
ENNS, Theodore: Assoc. Prof. Physiol. Chem., Johns Hopkins Univ.
FABER, Jan J.: Res. Asst. Biophys., Univ. Western Ontario.
FAUST, Robert G.: Asst. Prof. Physiol., Univ. of North Carolina.
GALANSINO, Giorgio: Asst. Prof. Physiol., Chicago Med. Sch.
GANN, Donald S.: Instr. Surg., Med. Coll. of Virginia.
GOLDMAN, Harold N.: Asst. Prof. Psychiat. & Pharmacol., Ohio State Univ.
GOOD, Archie L.: Prof. Vet. Physiol. & Pharmacol., Univ. of Minnesota.
HANDLER, Joseph S.: Sr. Res. Staff, Lab. Kidney & Electrolyte Metab., NHI.
HERNANDEZ-PEON, Raul: Dir. Brain Res. Unit, Mexican Public Health Service.
HERTIG, Bruce A.: Asst. Prof. Dept. Occupational Health, Univ. of Pittsburgh.
HOLMES, William N.: Asst. Prof. Zool., Univ. British Columbia, Vancouver.
HOROWITZ, Herbert I.: Asst. Prof. Med., Cornell Univ. Med. Coll.
HUDSON, Jack W.: Asst. Prof. Biol., Rice Univ.
JOHNSON, Robert L.: Asst. Prof. Med., Univ. Texas Southwestern.
KANDEL, Eric R.: College de France, Paris.
KAWIN, Bergene: Asst. Chief, Radioisotope Service, VA Hosp., Fort Howard, Md.
MAMMEN, Eberhard F.: Asst. Prof. Physiol. & Pharmacol., Wayne State Univ.
McLENNAN, Hugh: Assoc. Prof., Univ. British Columbia.
MORRISON, Ashton B.: Assoc. Prof. Pathol., Univ. of Rochester.

NISHIKAWARA, Margaret T. : Asst. Prof. Physiol., Ohio State Univ.
PECHET, Liberto: Assoc. in Med., Harvard Med. Sch.
POLGAR, George: Asst. Prof. Physiol. & Pediat., Univ. Pennsylvania.
REEVES, John T. : Asst. Prof. Med., Univ. of Kentucky.
REEVES, Robert B. : Asst. Prof. Zool., Cornell Univ.
RINGER, Robert H. : Assoc. Prof. Avian Physiol., Michigan State Univ.
SCHALLY, Andrew V. : Assoc. Prof. Med., Tulane Univ.
SCHRAER, Harald: Assoc. Prof. Biophys., Pennsylvania State Univ.
SCHRAER, Rosemary S. : Asst. Prof. Biophys., Pennsylvania State Univ.
SEKELJ, Paul: Asst. Prof. Physiol., McGill Univ.
SMITH, Charles R. : Prof., Chmn. Dept. Vet. Physiol. & Pharmacol.,
Ohio State Univ.
STEINER, William G. : Chief, Exptl. & Clin. EEG, Galesburg Res. Hosp.
STONE, David: Sr. Scientist, Worcester Fndn. for Exptl. Biol.
SYDNOR, Katherine L. : Asst. Prof. Med., Univ. of Kentucky.
THORNTON, Paul A. : Assoc. Prof. Physiol., Colorado State Univ.
TROUT, David L. : Res. Physiol., Biosciences Dept., Aerospace Med.,
Brooks AFB.

ASSOCIATE MEMBERS

ABRAMS, Robert M. : Asst. Fell. Physiol., John B. Pierce Fndn. Lab.
ALPHIN, Reeves S. : Pharmacologist, Robins Res. Labs., Richmond, Va.
ANDERSON, Lloyd L. : Asst. Prof. Animal Sci., Iowa State Univ.
CREANGE, John E. : Doctoral Candidate, Dept. Zool., UCLA.
FLEMING, Donovan E. : Res. Instr. Neurol., Univ. of Utah.
GENSLER, Helen L. : Graduate Fellow, Roswell Park Memorial Inst.
HOWELL, Barbara J. : Asst. Prof. Physiol., State Univ. New York,
Buffalo.
HOYE, Anna S. : Assoc. Prof. Biol., Mary Washington Coll., Univ. of
Virginia.
JUNGE, Douglas: Doctoral Candidate, Physiol., UCLA.
KATORSKI, Barbara A. : Postdoctoral Fellow, Physiol., Univ. of Pittsburgh.
KOEHLER, Lawrence D. : Asst. Prof. Biol., Central Michigan Univ.
KOENIG, Edward. : Asst. Prof. Physiol., State Univ. New York, Buffalo.
LIEBERMAN, Melvyn: Grad Student, Teaching Asst., State Univ. New York.
McCALL, Dolly C. : Advanced Grad. Student.
SWISLOCKI, Norbert I. : USPHS Predoct. Fell., Zool., UCLA.
UPTON, Gertrude V. : Predoct. Fell., NIH, Yale Univ.

1963 FISCAL REPORTS

SOCIETY OPERATING FUND

INCOME

Regular Membership Dues	\$32,683
Associate Membership Dues	850
Sustaining Associates	6,400
Interest on Savings Accounts	1,944
Fall Meeting, net	836
Reimbursement from Federation Spring Meeting	12,158
Reimbursement from Grants (overhead)	4,673
Miscellaneous Income	7
Total Income	\$59,551

EXPENSES

Dues to Federation	\$13,101
Dues to AIBS	2,133
Dues to National Society for Medical Research	250
Salaries, Soc. Security, Insur. and Pensions	16,325
Travel	1,815
Addressing, Mailing and Shipping	1,668
Telephone and Telegraph	77
Supplies and Duplicating	2,144
Depreciation on Equipment	458
Repairs and Maintenance	155
Rent	1,057
Insurance	205
Bowditch Lecture	500
Legal and Consulting Fees	150
Allotted to Education Committee	4,500
History of APS to Members	5,000
Miscellaneous Expenses	51
Business Office Service Charge	3,673
Total Expenses	\$53,262
Excess of Income over Expenses	\$ 6,289
Amount in Savings as of Dec. 31, 1963	\$50,000

PUBLICATION OPERATING FUND

INCOME

Subscriptions	\$256,222
Sale of Reprints, net	50,758
Other Publication Sales	11,632
Advertizing, net	8,589
Page and Article Charges	66,817
Royalty Income	1,559

Dividends and Interest	575
Other Income	1,014
Total Income	<u>\$397,166</u>

EXPENSES

Salaries, Soc. Security, Insur. and Pensions	\$49,532
Section Editors Expenses	14,564
Professional and Other Personal Services	1,463
Redactorial Expense	32,623
Printing and Engraving	201,396
Supplies and Duplicating	3,337
Communications and Shipping	33,606
Travel	1,875
Promotional Expenses	8,301
Rent	6,311
Miscellaneous Expenses	2,812
Business Office Service Charge	28,425
	<u>\$384,245</u>
Less Allocations to Publication Inventories	\$ 14,658
Total Expenses	<u>\$369,587</u>
Excess of Income over Expenses	\$ 27,579

PUBLICATION CONTINGENCY AND RESERVE FUND

Balance Dec. 31, 1962	\$582,392
Gain on Sale of Securities	14,103
Dividends and Interest Paid to APS	23,190
Balance Dec. 31, 1963	\$605,472



**INVITATION TO FALL MEETING
BROWN UNIVERSITY, SEPTEMBER 8-11, 1964
WALTER WILSON**

We at Brown University are delighted that the American Society of Physiologists has accepted our invitation to hold its fall meeting here, especially since we have launched a new program of education in the sciences basic to medicine which is designed to prepare students for the clinical years of medical school, and to participate in the celebration of the 200th anniversary of the founding of our University.

Two hundred years ago this fall Brown University admitted its first class - one student. This year we are celebrating our bicentennial. There are only six older colleges in the country - Harvard (1636), William and Mary (1693), Yale (1701), Princeton (1746), Columbia (1754) and Pennsylvania (1755). Brown, founded by the Baptists, has been noted for its liberal charter - all denominations that were prominent in Rhode Island were represented on its governing board. The Charter states that "into this liberal and Catholic Institution shall never be admitted any religious tests but on the contrary all the members hereof shall forever enjoy full, free, absolute, and uninterrupted liberty of conscience; And that the places of Professors, Tutors, and all other officers, the President alone excepted, shall be free and open for all denominations of Protestants and youths of all religious denominations shall and may be freely admitted to the equal advantages, emoluments, and honors of the College or University." As early as 1770 the University moved away from the narrow limits of Protestantism and declared that children of Jews may be admitted into this University and entirely enjoy the freedom of their own religion without any restrictions whatever. We at Brown are proud indeed of this heritage.

The Program Committee is arranging for several symposia, for the presentation of scientific papers and for visits to the laboratories. The refresher course in "Physiological Psychology" is being planned by Professor Carl Pfaffman of the Department of Psychology who will serve as its chairman. (See announcement of Bowditch Lecture elsewhere in this issue).

The local committee is planning a reception by the President of Brown University, Social Hours on the free evenings, and the annual Fall Banquet.

Social activities of particular interest to the families will be arranged as desired.

- a. Walking tour of nearby points of historic interest, including the Brown University campus.
- b. A trip to Mystic Seaport, a recreated 19th century village in Connecticut, complete with whaling vessels.
- c. A trip to Old Sturbridge Village in Sturbridge, Mass.

- d. A trip to Newport with visits to the mansions along the Cliff Walk and Ocean Drive, Touro Synagogue, and the Old Colony House.
- e. A visit to the Rhode Island School of Design and its Museum.

Brown University cordially invites all participants and their families to use its dormitory, dining hall, and parking facilities. The Combined charges for room and board will be \$9.00 per person per day. Children seven years and under who share a room with their parents will be charged \$6.00 per day. Free parking on University lots.

Preliminary announcements together with registration, housing, and abstract forms will be mailed to the membership in May. These are to be returned to the APS Central Office not later than June 20, 1964.

We hope that every member who possibly can will come with his family and friends and join us in the celebration of our 200th Anniversary.

BOWDITCH LECTURE

"Evolution and Oxygen" is the title Daniel L. Gilbert has chosen for his Bowditch Lecture at the Fall Meeting of the American Physiological Society at Brown University.

Dr. Gilbert's interests in oxygen can be traced back to his exposure to Dr. Wallace O. Fenn at the University of Rochester. There he obtained his Ph.D. degree and became interested in what is unique about oxygen in relation to the energetics of life itself. More recently he has extended these ideas to the Planet Earth and the role which O_2 has played during organic evolution. Much of his work, however, has been in the problems of ion transport across membranes and only a few months ago he was catching the giant Humboldt squid off the coast of Chile in order to work with and bring back axons having a diameter of 1 millimeter. Dr. Gilbert is associated with Dr. Kenneth S. Cole's Laboratory and is Head of the Section of Cellular Biophysics, Laboratory of Biophysics, National Institute of Neurological Diseases and Blindness, National Institutes of Health, Bethesda, Maryland.

REFRESHER COURSE

September 8, 1964 - Brown University
(in connection with APS Fall meeting)

Physiological Psychology

Introduction

Opening Remarks - Carl Pfaffmann
Interrelation of Physiological Psychology and Physiology -
T. C. Ruch

Recent Advances in Sensory Psychophysiology

New Concepts in Psychophysics: Signal detection and direct
sensory scaling methods - Trygg Engen
Electrophysiology and Psychophysics of Human Cutaneous
Sensitivity - Burton S. Rosner
Behavioral and Neural Processes in Auditory Discrimination -
W. D. Neff
Color Vision - Lorrin A. Riggs

Recent Advances in Learning and Motivation

Basic Concepts and Procedures of Respondent and Operant
Conditioning - Donald S. Blough
Physiological Mechanisms of Learning - Robert Galambos
Behavioral Analysis of Hunger Motivation - Phillip Teitlebaum
Psychopharmacology - Neal E. Miller

Demonstrations

Eyeid Conditioning in Man - Russell M. Church
Intracranial Self-Stimulation - J. W. King
Thalamic Stimulation of Drinking Behavior - Sebastian Grossman



FUTURE MEETINGS

- 1964 - Fall Meeting, Brown Univ., Providence, R.I., Sept. 8-11;
Dr. Walter Wilson, Local Committee
200th Anniversary of Brown Univ.
- 1965 - Spring Meeting, Atlantic City, N.J., April 10-15.
- 1965 - Fall Meeting, UCLA, August 24-28;
Dr. Robert E. Smith, Local Committee
- 1965 - XXIII International Congress of Physiological Sciences,
Tokyo, Japan, Sept. 1-9; Dr. Genichi Kato, Chairman
Organizing Comm., Dept. Physiology, Keio Univ.
School of Medicine, Shinjuku-ku, Tokyo, Japan.
(Preliminary notices have been sent to APS members.
Additional copies of these notices are available from
Dr. Ray G. Daggs, 9650 Wisconsin Ave., Washington, D.C.
20014)
- 1966 - Spring Meeting, Atlantic City, N.J., April 11-16.
- 1966 - Fall Meeting, Baylor Univ., Houston, Texas.
- 1967 - Spring Meeting, Chicago, Ill., April 16-21.
- 1967 - Fall Meeting, Howard Univ., Washington, D.C.

COMMITTEE ON SENIOR PHYSIOLOGISTS ANNUAL REPORT

In November 1963, we addressed an inquiry to 269 members of the Society including all born before 1900 and all others who have retired. From the 124 replies news items were excerpted for the **PHYSIOLOGIST**. Also a list was prepared of those available or soon to be available for temporary positions. To each of these 24 names is appended a statement of the type of position the candidate would consider. This list is not distributed freely. It has been sent to each member of the Council and will be furnished by the chairman of this committee to those in need of temporary or part-time help from senior physiologists.

D. B. Dill, Chairman
E. A. Adolph
Philip Bard
W. F. Hamilton

THE NEW CAREER BROCHURE

LOUISE H. MARSHALL

(Member of APS Education Committee)

As with any enterprise of man, the future of physiology rests with the wisdom of its elders and the promise of its youngsters. One of the better ways to exercise wisdom is to strive for excellence in the young who enter physiology. In this mixed spirit of egotism and altruism the Education Committee set about to revise the Society's career brochure, entitled "A Career in Physiology." The revised brochure is titled "Consider Physiology."

"Consider Physiology" puts sparkle into physiology's public image, not by saying it's biggest and best, but by using a quality magazine format, bright eye appeal, a text which describes a variety of people doing interesting things. This conveys the soft-hard sell needed to improve physiology's image among the middle-teens whose attention was sought: young people of varied ability but with a common attribute, that of taking pride in their work. The objection to glamorizing is that it can be undignified and misleading, but in the competition for excellence the first battle is to capture interest; physiology can then take care of itself.

A prime objective was to have a balance of physiological specialties. The tendency to emphasize mammalian physiology obscures our differentiation from pharmacology and pathology and perpetrates a great injustice to the majority of physiologists. The lead figure in "Consider Physiology" is a "membrane man." Real diversification is achieved by the follow-up folders, which were written by specialists actively working in each area. These folders broaden the traditional concept of comparative physiology; emphasize marine physiology because of the burgeoning interest in the oceans; and include medical physiology because of its applicability to aging, population, and space travel. The folder on plant physiology was furnished by the American Society of Plant Physiologists, and our supply of these is limited. The omissions (and environmental physiology is an important one) were necessitated by limitations of time and funds.

Advice on "Choosing a Career" (another folder) is the distillation of ideas contributed from teaching, counseling, clinical psychology, and psychiatry. The timetable emphasizes the importance of timing educational decisions as the student moves from basics to specialties. Lack of planning results in wasted time and training deficiencies, whereas a planned approach to physiology strengthens both the specialty and the specialist.

"Physiology in Colleges and Graduate Schools" (also a folder) may be the most useful part of the career material, there being no other place where such information is available. Compilation of the data was arduous and was consolidated from several sources including the results of an APS survey. A continuing effort could eventually achieve complete coverage of both schools and specialties, and perhaps even locate physiologists now listed as zoologists, botanists, or microbiologists. This

folder is being distributed with an insert emphasizing that the list of institutions giving degrees in physiology is a partial one and that many physiologists hold degrees in other disciplines.

The reply postcard, attached to the back page of "Consider Physiology", confers a degree of flexibility to the Society's brochure which scoops the field - no other career material that provides this has come to our notice. The follow-up items can be revised, discarded, added to continually, making recruitment at this level a dynamic (physiological!) process. The advantage of this attribute will surely become apparent as new voices on the committee are heard. The postcard also provides feedback on the degree of success of the brochure itself and its distribution.

Physiology is its own best recommendation. To this end, the reply postcard offers the interested young person two opportunities for personalized contact. One is to ask for the name of a nearby physiologist who is willing to be an ambassador on a person-to-person basis. Members who would like to so serve should inform Dr. Daggs. The second opportunity begins with sending for the "List of Titles for Further Reading." Although most of the folders include a few titles, too many good ones had to be left out of the space available. The longer reading list is supplementary, contains both old and new titles, and makes clear the need for a popular biography of a physiologist and for a new source book of readings in physiology.

Our objective was to provide career material attractive enough to be reached for, interesting enough to be read through to the end, and helpful enough to be retained. How well it succeeds will be determined by the reaction of the young people. The National Science Teachers Association reacted so favorably they reversed the usual procedure and asked for copies to send to their members. Distribution, in addition to individual requests and the Society membership, was to over 33,000 biology teachers in junior and senior high schools, to more than 8,000 guidance counselors, and to organizations concerned with vocational counseling. The Society is indebted to many individuals, both within the membership and outside, who gave freely and promptly of their time. The Education Committee expresses its sincere thanks.

ANIMAL CARE PANEL MEETING

The fifteenth annual meeting of the Animal Care Panel will be held at the Hilton Hotel, New York City, September 21 to 25, 1964. Further information can be secured from the Executive Secretary, Mr. Joseph J. Garvey, 4 E. Clinton St., Joliet, Illinois, 60434.

XXIII INTERNATIONAL CONGRESS OF PHYSIOLOGICAL SCIENCES

Professor G. Kato, Chairman of the Organizing Committee for the 23rd International Congress of Physiological Sciences, has announced plans for the Congress to be held in Tokyo, Japan, September 1-9, 1965. About 2,500 active members and 1,000 associate members are expected to attend the Congress.

The registration fee has been set at \$25.00 for an active member and \$12.50 for an associate member. Active members of the Congress are entitled to take part in the scientific sessions and to present a free communication. Associate members include wives and other family members of active members.

The participants in the scientific sessions are at liberty to read their papers in any language they wish, however the use of English is strongly urged. In any event abstracts must be submitted in English.

Immediately following the Congress the following tours are available to members at reasonable costs.

- A. Kyoto and Nara (ancient capitals of Japan)
- B. Beppu (Spa) via Inland Sea and Aso (an active volcano in Kyushu) with a short visit to Kyoto and Osaka en route.
- C. Hokkaido
- D. Hakone and the five lakes surrounding Mt. Fuji.
- E. Ise Shrine and Shima (well-known for cultured pearls, as well as for the world-famous Ama, diving women).

A circular describing the Congress and a preliminary application card have been distributed to all APS members. Additional copies are available from the APS Central Office, 9650 Wisconsin Ave., Washington, D.C.

CHARTER FLIGHT TO TOKYO

A charter flight is being organized to attend the International Congress of Physiology in Tokyo in September 1965. All members of the American and Canadian Physiological Societies who may be interested in joining such a flight are invited to communicate with Dr. Olivier Heroux, National Research Council, Ottawa, Ontario, Canada.

The aim of the organizer is to get enough people to be able to get transportation to Tokyo at about half-price with a one or two-day stop-over in Honolulu and three or four weeks in Japan. Arrangements will also be made to have the Japanese Government sponsor tours for American and Canadian physiologists to visit national industries which would be of direct interest to physiologists such as the silk industry, pearl industry, etc.

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BIOLOGICAL INSTRUMENTATION

L. M. N. BACH

The articles to follow represent some of the material presented in a symposium held in conjunction with the Federation meetings in Atlantic City, April 11, 1963. The symposium, sponsored jointly by the Federation and the Exhibitors Advisory Committee (representing manufacturers of scientific supplies and equipment who exhibit at the meetings) was chaired jointly by Mr. M. E. Shepherd, an industrial consultant, and the author. The purpose of the symposium was to define and explore current and potential problems developing between scientists and their supporting industries. The importance of these problems was testified to by an attendance of 3000 Federation members and all of those participating were both surprised and gratified to find such a clear expression of interest. The panel which discussed these matters consisted of W. R. Adey (UCLA), E. G. Keller (E. Leitz, Inc.), K. Lion (M.I. T.), A. Miller (Sanborn Co.), L. E. Packard (Packard Instrument Co.), H. E. Sauberlich (U.S. Army Research and Nutrition Laboratories), O. H. Schmitt (Univ. of Minnesota), M. J. Shear (National Cancer Institute), and E. C. Whitehead (Technicon Co.). Limitations of time restricted the representation of interests to instrumentation problems involving biochemical processing and analysis and analogous problems in the area of electrophysiology.

It was perhaps symptomatic of the limited rapport between scientists and their supporting industries that an air of uncertainty flavored initial contacts among the panelists. Rather energetic and comprehensive exchanges of comments among panel members during a preliminary meeting and between the panelists and members of their audience in the subsequent symposium revealed at least two attitudes of interest. It was quickly obvious, in the first place, that both industrial and scientific members of the panel and audience perceived real obstacles to their most effective relationships and, secondly, manufacturers and scientists each had quite different perspectives on common problems.

I.

Introductory Comments

L. M. N. Bach

The ultimate purpose of this symposium is to explore ways and means of facilitating communication between scientists and their supporting industries, who with the support of government and private agencies, constitute a unique three-cornered facet of our society. Within this relationship, scientists initiate proposals to prove a concept or to provide unique training opportunities. Then, government and private agencies provide financial support for proposals judged most promising by advisory groups of scientific peers. Finally, granted funds are used by scientists to purchase research equipment and supplies consisting largely of items developed from the results of previous investigations by colleagues or predecessors in the field. Although such an accounting pro-

vides an indisputedly central role for scientists in this relationship, many investigators and teachers do not or cannot exercise obligations of leadership in this increasingly important area of responsibility through lack of appreciation, interest or time.

The economic importance of the interdependence between scientists and their supporting agencies and industries is illustrated by the fact that over 15 billion dollars were spent in all fields of scientific research and development in this country in 1962, a figure which represents 5% of the gross national product. Approximately 10% of this figure, or about 1.5 billion dollars, was spent on scientific instruments, including optical and medical equipment. The overall expenditure of 15 billion dollars for all types of scientific research and development represents twenty times the amount of government support made available during 1962 for biomedical research alone, a total of 686 million dollars, of which 151 million was devoted to biological research and 535 million to medical research. A study conducted ten years ago (1) indicated that 25% of all funds granted for biomedical research was spent for equipment and supplies. If this proportion is still valid currently, then about 171 million dollars of government support funds were expended for supplies and equipment in 1962, a figure which does not include funds spent for these items for teaching, or for research supported by private agencies and foundations, or for intramural research conducted in government laboratories. These figures clearly indicate that an important area of our national economy is fundamentally dependent upon the role of the scientist because he initiates research, because he influences expenditure of funds for research and teaching, and because he determines criteria of acceptability, areas of utility, and the demand for scientific supplies and equipment.

New pressures are rapidly building up for all of us in regard to demands for equipment. The influence of up-graded teaching of biology at all educational levels - undergraduate, graduate and professional, is even now being felt as a consequence of the stimulus of the Biological Sciences Curriculum Study exerted at the high school level and supported by AIBS. Furthermore, there are clear indications that research findings are brought more promptly and effectively to teaching programs, the lag period for this varying from one to five years, according to opinions of exhibitors solicited ten years ago (1). An even greater catalytic effect is experienced by the exchange of opinions and experiences within groups of scientists working in the same field through the proliferating number of symposia and conferences. Finally, the greatest demands for scientific equipment and supplies is probably generated by the hyperbolic application of research findings to medicine, agriculture, conservation and industry generally.

All of these incrementing demands suggest the need for mutual assessment of trends in scientific development and cooperative forecasting of future demands by qualified and interested biological scientists and representatives of their supporting industries. More effective means of transmission of information concerning potentially useful techniques and equipment developed for non-biological sciences should be encouraged. Both the manufacturer and the scientist are severely handicapped

by lack of available personnel and funds necessary for experimental development of equipment, including thorough "field" testing. Possibly some annual or semi-annual conference of qualified investigators and manufacturers might exchange ideas and proposals and, through a centrally administered but diffusely supported mechanism, arrange for fabricating and testing potentially desirable equipment for the benefit both of investigators and industry.

In the 1953 study (1), it was found that large companies among the exhibitors limited their production and sales to items susceptible to volume demand; custom-made and "courtesy-to-the-trade" items were more common among smaller but less viable concerns. The desirability of specialized items is often expressed by scientists, frequently accommodated by new, small and economically vulnerable firms and strongly resisted by the large economically sound companies which depend almost solely upon volume demand. Scientists, who are usually ruggedly individualistic, complain about the failure of industry to satisfy individual needs. Industry, which must reflect a profit to survive, finds that custom-building is simply not feasible economically. Of course, the unstated paradoxes in each case, include the tendency of scientists to work as "teams", rather than as individuals, and the sturdy insistence of industry upon the competitive nature of free enterprise.

Whatever the nature and resolution of such paradoxes, it is clear that both scientists and manufacturers must more fully acquaint themselves with the characteristics of each other, both positive as well as negative, in order to gain that greater appreciation essential to the productive well-being of both.

1. Gerard, R.W. *Mirror to Physiology*. Am. Physiol. Soc., 1959.

II.

Basic Concepts of Biological Instrumentation

Kurt S. Lion

'The purpose of instrumentation is to obtain information about the physical or chemical nature of an investigated object or process, or to control an object or a process in accordance with such information'(1). Instruments measure physical and chemical quantities, such as blood pressure, membrane potentials, or hydrogen ion concentration. They furnish information about biological phenomena only to the extent that these phenomena manifest themselves in terms of physical quantities.

The science of instrumentation deals with the methods and systems for the acquisition of signals and for the extraction of useful information from such signals. One can show that all complex instruments (instrumentation systems) are composed from a limited number of basic units (instrumentation elements), and that an orderly and logical system exists for the classification of all instrumentation elements. Figure 1 shows a 7 x 7 matrix which permits a logical classification for all instrumentation elements whether they be used for the conversion from one physical form into another (transducers, e.g., photoelectric cell) or whether they be used for the processing of signals(modifiers, e.g., amplifier).

Input Output		1	2	3	4	5	6	7
1 2 3 4 5 6 7	Mechanic	M	Thermal	Magnetic	Electric	Optic	Nuclear	Molecular
	Mechanic	M	Bimetal strip	Magneto-meter	Moving coil system	Light-mill		Hydrometer
	Thermal	Friction systems	M	Eddy current system	Thermal converter	Bolometer	X-ray Calorimeter	Calorimeter
	Magnetic	Rowland disk		M	Electro-magnetic systems			Paramagnet balance
	Electric	Piezoelectric crystal	Thermistor	Magneto-resistance	M	Photoelectric cell	Geiger counter	Polarograph
	Optic	Interferometer	Thermal radiation system	Faraday cell	Kerr cell	M	Scintillation crystal	Spectral Absorption cell
	Nuclear	Beta gauge					M	Tracer system
	Molecular		Thermal Indicator dye		Polarography	Photosynthesis systems	Nuclear Emulsions	M

Fig. 1.

The need for more and better instrumentation is evident in many phases of biological research. There is a need for integrated information in the field of instrumentation and for the development of instruments ("hardware").

The development of new instruments for special research projects is difficult and has caused frequent disappointment on the part of the users who often blame "lack of communication" between the biologist and the engineer for this difficulty. However, the phrase "lack of communication" comes dangerously close to being a cliché. The communication between the user of an instrument and its designer is often better than the instrument that ensues from such communication. It is the responsibility of a good engineering organization to understand the problem of the biological research worker, to establish the engineering specifications, to design, build and test the instrument and to collaborate with the research worker, just as it is the responsibility of the physician to extract information from the sometimes inadequate statements of the patient, to arrive at a diagnosis and to take appropriate therapeutic measures. On the other hand, the biological research worker must come to understand that such engineering and instrumentation services are costly.

Instruction in the field of instrumentation is needed primarily to acquaint the biologist with the methods and instruments that are available for biological research and with the inherent limitations of such methods and instruments. However, information in instrumentation is also of value because the mode of operation of instrumentation elements and systems is frequently similar to that found in living systems (e.g., that of an integrator or a feedback system). Knowledge of the field of instrumentation can help in the design of experiments of fundamental significance and sometimes can drastically reduce the number of biological experiments.

Adequate instruction in the field of instrumentation is not always available. Good teachers have always been rare and it is well known that good teaching is not as highly rated in academic circles as is research. Furthermore, many teachers are induced, by motives of status seeking, to teach in complex terms and for similar reasons formal (mathematical) teaching is often preferred over conceptual teaching. A good teacher not only conveys the material to be taught in a satisfactory manner but integrates the results of many scientific papers into a unified, logical (and, therefore, teachable) system. And what could be more important in the face of a rising flood of publications?

The progress of instrumentation in biology depends to a great extent upon satisfactory instruction in instrumentation. It is to be hoped that universities and the sponsoring agencies will understand this need and take necessary action.

1. K.S. Lion. *Instrumentation in Scientific Research*, p.1, McGraw-Hill Book Co., Inc., New York, N.Y., 1959.

III.

Electrophysiological Recording and Analytic Techniques

W. R. Adey

The critical requirements in neurophysiology for instrumentation which goes immediately to the fringes of the electronic art brings the neurophysiologist in contact with his industrial colleague in a way not duplicated by any other facet of physiological science. The neurophysiologist is required to take account of data having a tremendous gamut of physical parameters. He is required to record with elegant precision data from single cells where the input impedance characteristics of the amplifier taxes to the limit the noise characteristics of the thermionic tube and transistor engineering art. At the other extreme he must record and analyze appropriately enormous quantities of data characterized by slower phenomena in the EEG record. The very quantity of the latter data makes it imperative that he seek the advice of those who have dealt with similar random and pseudo-random processes, as for example, in the field of missile vibration or the physical wave processes in electromagnetic spectra, or even those seemingly mundane waves that delight us by the seashore.

The questing of the neurophysiologist has led him progressively from conventional electrophysiological techniques into newer methods, involving evaluation of electrical impedance measurements in small volumes of brain tissue, where the limits of resolution of the system are irrevocably linked to the inherent noise of the amplifier. Such studies have brought closer the evaluation of metabolic processes in intact brain tissue, without the need to subject it to the crude processes of grinding it with mortar and pestle long after death and subsequent analysis for the bleak skeleton of a long since departed frame of physico-chemical organization. This questing for finer and finer correlates of the dynamics of metabolic processes appears to be one of the most exciting areas of future neurophysiological research, and the required instrumentation will bring the physiologist in ever closer contact with his engineering colleague.

The most striking change in the last century and one half of physiological research has occurred in the last five years with the widespread application of magnetic tape recording techniques in physiological research. Although the magnetic tape recording medium will never replace various types of chart recorders, particularly in the essential aspect of displaying data in the course of the actual experiment, the subsequent utilization of the paper record for purposes of mathematical analysis has become increasingly dubious. Its transfer to digital form by manual digitization is a virtually impractical procedure for more than minimal amounts of data. The enormous quantities of analog material from many channels characterizing a electrophysiological research probably exceed the amounts of data collected in any other form of physiological research. It is virtually only by computer analysis of this data that meaningful aspects of patterns can be observed, and it is thus imperative to utilize data acquisition techniques permitting rapid and accurate transfer of major amounts of data to the computer. In this respect, magnetic tape recording

is quite unsurpassed.

In connection with the utilization of magnetic tape recording for physiological purposes, attention may be directed to the good and bad features of this medium. The special requirements of physiological research have not been met in many areas by typical instrumentation recorders developed primarily for the missile industry. For example, the wide spectrum of neurophysiological data, ranging from extremely slow phenomena having essentially DC characteristics, to the single nerve action potential requiring a minimal bandpass of 10 kilocycles per second, make demands on frequency modulation systems not easily met with current recording techniques. The accurate recording of the slow phenomena involve problems of subcarrier oscillator stability beyond the specifications of most types available commercially. In many applications, there is a requirement for a wide range of recording speeds, with data recorded at one speed often played back at a greatly different speed for purposes of analysis. Many commercially available instruments are exceedingly cumbersome and difficult to handle in the quite excessive number of electronic and mechanical maneuvers necessary to achieve these speed changes. Indeed, even some of the most expensive recorders appear to have sacrificed reliability in the course of what should be an essentially simple electro-mechanical operation.

The high cost of multichannel tape recording equipment would appear to warrant attention to the special problem of tape recorders shared by members of a group in a medical school or institutional facility. Simplicity and reliability of operation are obviously essential, but additionally, improvements could be affected in portability and the ruggedness of the equipment in such usage. Whereas size and weight are not significant factors in an instrument to be used in a fixed location, they become paramount factors in instruments to be moved from laboratory to laboratory. Our experience with recent miniature recorders compatible with large instrumentation recorders has suggested that these small instruments may well enjoy a great future in biological research. We have utilized such an instrument in records of brain waves from men and animals in field studies such as during freeway driving, at the launch site for monkeys in balloon flights and in vibration and centrifuge studies. This instrument uses half inch magnetic tape and records seven channels of data in standard IRIG format. It has been used satisfactorily on the lap of a jet plane pilot during rigorous flight maneuvers.

Tape recorder manufacturers still show considerable diffidence in meeting the needs of physiological research workers desiring to record more than the seven standard channels permitted on half inch tape or the fourteen or sixteen channels available on even more expensive one inch tape transports. The neurophysiologist has become accustomed to recording twenty or thirty channels on his chart recorders and is frequently dismayed at his inability to secure equivalent channels in even an expensive tape recorder. The approach to this problem in our laboratory has been by the use of FM multiplex techniques developed in the missile industry to accommodate very large numbers of data channels. Using standard twin track recorders at 30 or 60 inches per second, we have found it possible to record twenty-eight channels of data on the two tracks.

Although attention to input levels is a rigorous requirement with this system to avoid interchannel interference, this is no more difficult than with any other recorder and the results justify attention to this detail.

Striking developments have occurred in recent years in the development of sensors for neurophysiological recording. For example, in the simple acquisition of the electroencephalogram from the scalp, the adhesive electrode, in all its varied and misbegotten shapes, is giving place to the electrode-amplifier, in which the amplifier is integral with the sensing electrode. The elimination of a connecting lead, with its attendant sway-artifacts, is further assisted by a relative insensitivity to electrostatic and electromagnetic interference, since the connection from this microminiature preamplifier to the main amplifying system can be at a very low impedance. It is here that we find ourselves on the threshold of fascinating vistas in the field of radiotelemetry.

The manifold advantages of radiotelemetry systems for locally transducing electrophysiological data in a freely moving individual are obvious. Despite the simplicity of the concept, however, much development remains to be done before an entirely satisfactory multichannel system will be available. The disadvantages of self-controlled subcarrier oscillators working at frequencies around 100 megacycles are well known, particularly the problems of drift resulting from temperature and humidity changes. While this may be tolerable in the laboratory environment where retuning of the local receiver presents no major difficulty, it is virtually unacceptable in field studies. The problem of drift is greatly accentuated where many channels may be operating in the same portion of the radio spectrum. For these reasons current developments involving some form of frequency or amplitude modulation of a stabilized oscillator, with the multiplexing of the data prior to modulation, appears to offer a more fruitful prospect than was available in earlier systems. In some circumstances, telemetry by ultrasonics or by magnetic transducers may be more appropriate than by conventional radio techniques.

Turning finally to problems of computer analysis of neurophysiological data, there has been a significant evolution of a hierarchy of computing devices. The simplest suit the needs of those who require rapid but necessarily restricted forms of on-line computation. By reason of their small size, they have come to be shared amongst teams of investigators and their role in future neurophysiological research is assured. Mostly they are special purpose digital instruments, and are capable of performing averaging of transients, auto-correlation and cross-correlation. There remains a substantial challenge to our engineering colleagues to achieve a similar small but versatile computer capable of a variety of spectral analyses from a number of channels of data in an on-line situation. It has become increasingly apparent that the cross-spectral techniques with its ability to reveal shared aspects of amplitude, phase and coherence functions between EEG channels is indeed a very potent tool in revealing patterns of organization in brain wave data. At the moment this type of analysis is limited to large general purpose computers, but there would seem no basic reason why a special purpose digital or analog computer may not achieve the requisite standards of speed and accuracy necessary for this type of analysis in physiological data.

With the increasing sophistication of computer techniques in analysis of neurophysiological data the utilization of medium and large digital computers has evolved a new hierarchy of computing techniques not previously applied to physiological data. Starting with the utilization of auto- and cross-correlation analyses of time series, the neurophysiologist has progressed to the use of these complex cross-spectral analyses and sophisticated phase-and-amplitude codes. Even more complex analyses are now undergoing evaluation, including the stochastic aspects of cross-spectral analysis and amplitude transfer functions. These in turn are leading to the use of various forms of matrix analyses which reveal shared and unshared components in patterns of electrical brain activity. These techniques make substantial demands on the computers themselves, both in memory capacity, and in speed of operation. They are far too complex to be performed on other than the largest computers. It should be emphasized that their utilization in neurophysiology springs directly from collaborative associations with missile research. Mathematical techniques for the analysis of such problems as missile vibration and variations in the earth's magnetic field as recorded by the magnetometer in a spinning satellite have their direct application to analysis of brain wave data. The amount of skilled endeavor necessary for the preparation of such computer packages can rarely be anticipated as the normal function of bioscience research. The prohibitive cost of such programming makes it highly desirable that the physiologist seek out the availability and suitability of such programming packages as they may exist in a wide variety of industrial institutions. The collaborative associations achieved in this way frequently blossom into further associations in which the physiological concepts themselves provide the seeds for elaboration and modification of these mathematical programs.

In conclusion, it may be asked what broad philosophy may prompt the earnest pursuit of such difficult and even tedious research with massive commitments to expensive hardware in data acquisition systems, and even more complex and expensive instrumentation for data analysis. The answer can be direct and categoric. It would seem that without a radical reappraisal of classic neurophysiological techniques in studies of brain function, there is little hope of an answer to the problems of information storage in cerebral systems. On the other hand, these new techniques offer the tangible opportunity to approach more directly than hitherto the elusive problem of the memory trace and the physico-chemical mechanisms which may underlie it. Elucidation of these problems of information storage in cerebral systems may be expected to lead directly to the creation of the series of realistic models of cerebral organization. It is as yet too early to tell whether these models may have ultimately a direct impact on the design and construction of computers. It does not seem unrealistic, however, to suggest that the fascinating aspects of a combination of digital and analog modes of operation in the individual logic elements of the cerebral system may ultimately find their counterpart in the design of the electronic computer and particularly, that the aspects of distributed memory functions characterizing the cerebral system may enhance the capability of the computer in a fashion that we can scarcely conceive.

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The following volumes are now available to members of the American Physiological Society at the prices quoted below:

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AIBS MEETING

The 15th Annual Joint Meetings of Biological Societies, sponsored by the American Institute of Biological Sciences, will be held at the University of Colorado, Boulder, August 23-28, 1964.

Participating societies will be offering scientific programs covering many of the biological sciences. In addition, a highlight of the 1964 meeting will be several AIBS symposia -- on biotelemetry, exobiology, and laboratory facilities and standards.

Societies now scheduled to be meeting under AIBS auspices include:

American Bryological Society	Ecological Society of America
American Fern Society	Genetics Society of America
American Fisheries Society	Mycological Society of America
American Microscopical Society	National Association of Biology Teachers
American Society for Horticultural Science	Nature Conservancy
American Society of Human Genetics	Phi Sigma Society
American Society of Parasitologists	Phycological Society of America
American Society of Plant Physiologists	Society for Industrial Microbiology
American Society of Plant Taxonomists	Society for the Study of Development and Growth
American Society of Zoologists	Society of Nematologists
Biometric Society -- ENAR-WNAR	Society of Protozoologists
Botanical Society of America	Tomato Genetics Cooperative

For registration information see the April, 1964, BioScience or write: AIBS Registration, Room 508, 2000 P Street, NW, Washington, D.C., 20036.

AMERICAN DOCUMENTATION INSTITUTE

The annual meeting of the American Documentation Institute will be held October 5-8, 1964 at the Sheraton Hotel, Philadelphia, Pa.

Topic areas to be covered include: Symbolization and Transformation of Information; Analysis, Correlation and Indexing; Document Media, Storage and Display; Information Centers and Networks. For further information write Mr. B. F. Cheydleur, Philco Corp., Willow Grove, Pa. 19090.

INTERNATIONAL BIOLOGICAL PROGRAMME*

The International Biological Programme (IBP) has been approved and the Executive Board of the International Council of Scientific Unions (ICSU) has set up a Scientific Committee for IBP under the four Unions, - Biological Sciences (IUBS), Biochemistry (IUB), Geography (IGU) and Physiology (IUPS). The IBP is the successor in the biological field to the International Geophysical Year.

ICSU had adopted the basic resolution that because of the rapid rate of increase of the human population, there is an urgent need for greatly increased biological research. Therefore, an IBP activity entitled "The Biological Basis of Productivity and Human Welfare" is proposed with the objectives of ensuring a world-wide study of (1) organic production on the land, in fresh water and in the seas, so that adequate estimates may be made of the potential yield of new as well as existing natural resources, and (2) human adaptability of the changing conditions. The scientific planning committee has worked on the production of a "blueprint" since May 1962. Also involved in making recommendations are WHO, FAO, and UNESCO. The plan is presented under the following headings:

- A. Productivity of Terrestrial Communities: I Ecology; II Physiology; III Conservation.
- B. Productivity of Freshwater Communities.
- C. Productivity of Marine Communities: I Intermediate Trophic Levels; II Fishery Resources.
- D. Human Adaptability.
- E. Use and Management of Biological Resources.

Each of these ecological projects provides a sustained opportunity for obtaining internationally comparable observations on the populations, resources, habitats and processes concerned. The program is based largely on existing scientific research all over the world so that the main role of IBP will be to coordinate and stimulate rather than to direct.

The program can be divided into two phases. A preparatory phase, to last about 2-3 years, is designed to include (a) detailed planning; (b) methods; (c) training; and (d) pilot projects. A definitive phase, to last about 5 years, needs further elaboration during the next 12 to 18 months. Physiologists, geneticists and human biologists generally will be interested chiefly in Project D, Human Adaptability.

One of the main ideas behind the Human Adaptability project is that it is important, before human communities become obscured in world-wide uniform culture, to study the processes of adaptation to as wide a range of terrains, climates and social environments as possible. In order to formulate a realistic practical project on a world-wide scale, a program of some 50 research topics has been presented. The major

*Taken in most part from the January 1964 IUPS Newsletter.

topics are listed as follows:

1. Environmental Physiology

A knowledge of the limits of adaptation and the causes of breakdown and loss of acclimatization has a direct bearing on standards which need to be laid down for effort, mental or physical work, for sleep and for optimum growth and development. The following are examples of questions which might be investigated.

- A. The effects of age and sex and the interrelations between heat adaptation, cold tolerance and physical fitness.
- B. Differences between ethnic groups in the same and different environments; communities living at altitudes over 12,000 feet.
- C. The changes in people of non-European cultures who have recently adopted the western way of life.
- D. Characteristics of particular occupations, including fishermen, lumberjacks, Olympic athletes and others.
- E. The range of thermal comfort for different occupations in different parts of the world.
- F. Problems of short-term acclimatization and de-acclimatization.

2. Fitness, Growth and Physique

In addition to tests of maximum working capacity, tests for fitness would include specific indices of respiratory, circulatory and muscle function. Some of these techniques are too difficult for wide-spread application but a "basic" suitable battery of tests has already been agreed upon provisionally. These include tests for endurance and capacity for exercise in daily life. World-wide comparisons on the growth of children and on adult physique in relation to environmental, genetic and nutritional factors are badly needed. Anthropometry and specification of physique and body composition are therefore a very important aspect in IBP.

3. Genetics of Population

The number of known genetic polymorphic systems in man is increasing rapidly. Although some of the longer-known systems have been studied in populations throughout the world, many of the new systems, including chromosomal characteristics, have been studied only in a few populations. The IBP provides a unique opportunity to fill in many of these gaps. For instance the study of isolates and also of inbreeding communities provides an unusual insight into the genetic structure of mankind. There is now strong evidence that the present world distribution of genetically determined characters is, in the main, the result of natural selection. However, with respect to particular genetic systems and on the inter-action between genetic and developmental factors, few of the relatively specific selector forces have as yet been identified. Selective factors can be broadly classified as environmental,

nutritional and infective. These operate either singly or more commonly in interrelationship by effecting differential mortality, morbidity and fertility.

4. Health Aspects, Medical and Epidemiological

As the field of medical research is so vast and IBP is primarily concerned with basic biological research, it would seem reasonable in the program under "Human Adaptability" to admit those topics of medical interest which have a direct bearing on problems listed and which (e. g. in epidemiology) can readily be incorporated into the field of research. Topics, particularly suitable for IBP purposes, include surveys of blood pressure; blood hemoglobin, protein and lipid values; and immunological surveys of disease anti-bodies in sera. Of special interest would be investigations on adaptability to changes of diet, giving consideration to factors concerned in consumer acceptance of unfamiliar foods.

In respect to the scheme as a whole, it was agreed by the IBP Committee that certain investigations should begin immediately. The Executive Committee of IUPS decided that discussion should be put in hand on such topics as the standardization of measurements; the provision of field techniques; the testing and improvement of methods of taking, transporting and preserving biological specimens; and the collection of existing survey data, particularly in demography and population genetics.

Biologists from a dozen countries attended working parties during 1963 on the assessment of cold tolerance, heat tolerance, respiratory capacity and working capacity and anthropometry. On the genetic aspects, a WHO working group in October 1962 and an IBP working group in December 1962 made detailed recommendations on aims and methods.

Preparatory work will no doubt be intensified once ICSU has made official approaches to adhering countries through national IBP committees examining the proposals ICSU is to put forward early in 1964, and when appropriate financial and other support becomes available. A major aim in the preparatory phase is the completion of field handbooks of agreed methods (as was done in IGY). Methodical proposals will be submitted to geneticists, physiologists and others as soon as they become available and it is hoped that by the time of the International Physiological Congress in Tokyo in 1965, the physiological methods will be in an advanced state for final adoption.



NEWS NOTES FROM PHYSIOLOGICAL SOCIETIES*

Belgian Physiological and Pharmacological Society

New officers of the Society are: President, Prof. J. Lecomte; Vice-Presidents, Prof. I. Leusen and Prof. M. Segers; Secretary and Treasurer, Prof. J. Colle.

Prof. J. P. Bouchaert, head of the Physiological Institute of the University of Louvain, has been awarded the Jubilee Prize of the Royal Flemish Academy of Medicine.

Association des Physiologistes de Langue Francaise

A joint meeting of the Association and of the Czechoslovak Physiological Society will be held July 8-10, 1964 at the Faculty of Medicine of Praha.

The Association announces with regret the death of Prof. C. Soula, President of the Comite National Francais des Sciences Physiologiques.

Deutsche Physiologische Gesellschaft

The 28th meeting of the Deutsche Physiologische Gesellschaft was held July 1963 in the newly built Physiologisches Institut in Köln.

The scientific program was initiated by talks by Prof. Dr. von Muralt of Berne and Prof. Dr. Feldberg of London, both of whom were awarded honorary doctorates. The next meeting will be held in September 1964 in Tübingen.

Prof. R. Knebel has been appointed a Member of the W. G. Kerckhoff-Herzforschung Institut and head of the Cardiology Abteilung. Prof. Lehmann of Dortmund has been named President of the Deutschen Gesellschaft für Arbeitsmedizin.

In Heidelberg, a new Institut für Sozialmedizin und Arbeitsphysiologie has been established of which Prof. Schaeffer is now acting as Director. This post alternates between the heads of the three departments of Physiologie, Innere Medizin and Sozialhygiene.

The Society notes with regret the deaths of Prof. Wachholder, Prof. Durig, Prof. Hoffman, Prof. Szakall, and Prof. Graf.

Association of Physiologists and Pharmacologists of India

The International Brain Research Organization (IBRO) will be holding a Travelling Seminar (on the pattern of a Teaching Workshop) at the All-India Institute of Medical Sciences at New Delhi during the

*Taken from IUPS Newsletter of January 1964.

months of October and November 1964.

Israel Physiological and Pharmacological Society

The Society requested the Israel National Academy of Sciences to serve as adhering body to IUPS, thereby revising the status of the Society to one of a supporting organization of IUPS.

The Physiological Society of the Rumanian People's Republic

The officers of the Society are: President, Prof. G. Benetato, and Secretary, Dr. V. Vasilescu. The Society bimonthly sessions are held at the Union of Medical Science Societies. The Society publishes a bimonthly review, "Revista de fiziologie normala si patologica." It is published in Rumanian with abstracts in English, Russian and French.

Society of Physiological Sciences, United Arab Republic

The U. A. R. Society of Pharmacology is a section of the U. A. R. Society of Physiological Sciences and has been designated as a Supporting Society of IUPS.

Yugoslav Physiological Society

The Society was founded in 1957 and since September of 1962 has been a member of IUPS. The Society has 425 members and in addition to physiologists is comprised of research workers in related sciences. The President of the Society is Prof. N. Allegretti. In addition to annual meetings National Congressional meetings are held biennially. The next Congress will be held in Ljubljana in 1965.

Society of General Physiologists (U. S. A.)

The next meeting of the Society is scheduled for September 9-12, 1964 at Woods Hole, Mass. with a symposium to be organized by Drs. T. Hayashi and A. Szent-Gyorgyi on Molecular Architecture in Cell Physiology. The officers of the Society are: President, Dr. J.W. Hastings of the University of Illinois; President-Elect, David Bonner; and Secretary, Roger Milkman.



CORRECTION IN BOWDITCH LECTURE

(Published in the February 1964 issue)

Dr. Renkin has asked that the following correction be noted in his lecture on Transport of Large Molecules.

In the third paragraph on page 22 is the following statement: "The dashed lines running diagonally downwards with a slope of $-1/2$ represent the diminution of transport to be expected on the basis of free diffusion." This statement is correct only for small molecules. For large molecular species such as are of concern in this lecture, the slope approaches $-1/3$ (H. Netter, *Theoretische Biochemie*, Springer Verlag, Berlin 1959, pp. 74-76). The error is incorporated into figure 3 and occurs elsewhere in the text.

VOSTEEN TRANSLATION AVAILABLE

Copies of "New Aspects in the Biology and Pathology of the Inner Ear" by Dr. K. H. Vosteen, in an English language translation, are available, at no charge, from the Beltone Institute for Hearing Research, 4201 W. Victoria St., Chicago, Ill.

The 112-page Vosteen work, first presented at the annual meeting of the German Otolaryngological Society in 1961, but not previously available in English, represents the first attempt to sum up the present state of knowledge of biochemical aspects of the auditory process. The work not only describes recent research methods but also correlates their findings with facts known from electro-physiological and other studies.