

Sixty-Eighth President of APS

Leonard S. Jefferson

What Are Some of the Most Pressing Challenges Facing Physiologists Today?

One of the most pressing challenges is how to take advantage of the unprecedented opportunities that exist today for progress in biomedical research. Recent advances in the understanding of basic cellular and molecular processes provide the opportunity for us not only to unravel the mysteries of normal physiology but also to identify specific defects that contribute to the pathophysiology of various diseases. Pursuit of these opportunities is dependent in large measure on funding from the NIH for research project grants. Unfortunately, most of the growth in NIH funding in recent years has been in the areas of earmarked appropriations and Small Business Initiation Grants, and the total amount of dollars available for research project grants has been relatively flat since 1987. Indeed, funding by NIH for unsolicited research project grants has fallen to an all-time low of 15% during FY 1995. In an attempt to identify ways to reverse this downward trend, the APS along with the other member societies of the FASEB convened in October 1994 a "Consensus Conference on FY 1996 Federal Research Funding in the Biomedical and Related Life Sciences." Participating in the Conference were representatives of the Federation's nine member societies, including scientists from universities, industry, and government

Inside	
The Future of Academic Health Centers	51
APS Conference: Understanding the Biological Clock	64
APS Conference: New Discoveries Within the Pancreatic Polypeptide Family	65
APS Urges Investment in NIH	68



from all parts of the nation. With regard to a budget for NIH, the Conferees recommended an overall increase of 10% and an increase of 14% in funding for research project grants. Moreover, they recommended support of a total of 26,000 research project grants. These numbers compare favorably with the NIH's professional judgment budget, which has recommended an overall increase of 15% for FY 1996.

Are these recommendations realistic at a time when the President and the new Congress are emphasizing a reduced Federal budget? In my view, the recommendations are absolutely essential for maintaining the country's investment in biomedical research, an enterprise that is on the threshold of providing unprecedented advances in the development of treatments and cures for diseases that afflict so many Americans. Investment in biomedical research not only reduces suffering, saves lives, and saves money in health care costs and in days of productive work gained, but it also spawns growth in the pharmaceutical and biotechnology industries. For example, the biotechnology industry, which is a direct outgrowth of the Federal government's investment in basic re-

CONTENTS

68th APS PRESIDENT		Membership
Leonard S. Jefferson The Future of Academic Health	49	News From Senior Physiologists Helen F. Cserr (1937–1994)
K. I. Shine	51	PUBLIC AFFAIRS
A MATTER OF OPINION		APS Urges Investment in NIH
To the Hill M. Frank	59	Clinton Submits Funding Request OMB Asks Comments on Indirect Cost Changes
APS NEWS		PEOPLE AND PLACES
Awards and Fellowships		Bloom New Editor-In-Chief for
O'Doherty Receives APS-Genentech Fellowship Call for Nominations: Bowditch and	61	Science Schultz Receives ACDP Distinguished Service Award
Cannon Lectures	61	Fray Wins Award
APS Conferences		OPS Annual Meeting
Mechanotransduction and the Regulat	ion	Hesslink to Host Radio Talk Show
of Growth and Differentiation	62	von Humboldt Foundation Awards
Regulation, Integration, Adaptation: A Species Approach	63	BOOK REVIEWS
Understanding the Biological Clock: From Genetics to Physiology	64	BOOKS RECEIVED
Pancreatic Polypeptide Family:	45	POSITIONS AVAILABLE
	00	ANNOUNCEMENTS

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APS Research Career Enhancement Awards

66

66

68

69

70

71

71

71

71

71 71

72

72

73

77

78

79

Statement of Purpose: The APS **Research Career Enhancement Awards** are designed to enhance the career potential of our members. The awards will provide up to \$4,000 to allow individuals in the early phases of their careers to obtain special training and in later phases of their careers to develop new skills and to retrain in areas of developing interests.

The Awards can be used to support

- short-term visits to other laboratories to acquire new scientific skills
- attendance at special courses devoted primarily to methodologies appropriate for both new investigators and more senior investigators entering a new field of research.

Application Procedure: Candidates, who are members in good standing, may submit an application form including a curriculum vitae, justification for requesting an award, description of enhancement activity and current research program (not to exceed 2 pages), and anticipated budget for the proposed program of enhancement. The applicant must also include a letter of support either from his/her department chair. host laboratory, or other appropriate individual.

Application Deadlines: February 15 and August 15.

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The Future of Academic Health Centers

Kenneth I. Shine, MD

President, Institute of Medicine, National Academy of Sciences

This article is based on remarks delivered to the Annual Retreat of the Association of Chairmen of Departments of Physiology, December, 1994.

To paraphrase Charles Dickens on the state of health sciences research in America. "We are in the best of times: we are in the worst of times." Opportunities for the health sciences have never been greater. Cell biology offers an understanding of growth and development that will revolutionize our understanding of the nervous system and malignant cells, to name but two important applications. The genetic revolution promises understanding about the origins of disease and potential therapies of immense power. Biotechnology offers opportunities to design and create biologicals and drugs with unique forms and functions. At the same time, overall support of the health science research enterprise is limited. Barring some entirely new sources of funding, the NIH budget is likely to increase at approximately the rate of the Consumer Price Index, which is well below the real inflation rate in health science research. Industry is consolidating its research activities, and the research investments by the mature pharmaceutical industry will be limited. Biotechnology companies will continue to expand the horizons in science, although the enormous cost and the need for continued investment of venture capital will limit the rate of growth. In this setting, changes in the health care system are occurring that will significantly diminish the support of research and education in our academic health centers. The failure of federal efforts at health care reform produced several potential large losers. The poor, particularly those not eligible for Medicaid, are at very high risk, since they have neither insurance nor adequate access to care. Many segments of society are at risk for a decrease in the quality of care as cost considerations become the driving cost in the health care system. However, among the biggest losers were academic health centers. All of the legislation under consideration in 1994 included some continued support for research and education in the face of changes in the health care delivery system. Absent legislation, academic health centers are left to cope with market forces.

The Health Care System

The health care system is undergoing changes similar to those experienced by industry in general over the past 10-15 years. The consolidation of all components for purposes of establishing efficient use of scale, closing down excess capacity, and increasing market share continues. This consolidation involves all participants. Whether one considers the combination of Humana and Columbia Health Care among for-profit managed care organizations, the buyout of Hahnemann Medical School by the Medical College of Pennsylvania's parent organization, the creation of a new relationship between the Massachusetts General Hospital and the Brigham and Women's Hospital, or the Merck purchase of MEDCO, you see evidence of consolidation all over the country. In Califor-

"...changes in the health care system are occurring that will significantly diminish the support of research and education in our academic health centers."

nia, small employers can now purchase health care insurance through the statewide Public Employees Retirement System (PERS). By pooling their efforts, PERS was able to obtain a 1.1% decrease in health care premiums for participants. The result of these changes will, in my opinion, produce not more than three or six major players in most metropolitan areas in the US. By players I mean three to six insurers and/or purchasers of care and three to six systems of provision of care.

The dominant form of the care will be managed care, which ultimately will cover 75-80% of the population. Within the overall rubric of managed care, the majority of such care will be based on a capitated system, that is, where providers agree on a specific fee to provide all of the health care for enrollees. The principal driving force in this development is competition based on price. There is little room in competition for additional payments for research and education. Indeed, even the Harvard Community Health Plan, with its strong commitment to education, has reduced its contribution from 1% of revenues to 0.45% in the past year, and the contribution is likely to go lower still. Change is likely to continue, primarily focused at the state level, with an increasing number of individuals on Medicaid being organized into managed care systems, which will also attempt to control costs. Of considerable importance in this development is evidence that, once enrolled in a system that gives Medicaid patients choice, substantial numbers of them will choose to go to facilities other than the academic health center. Indeed, under certain circumstances, using significant numbers of nonphysician health care providers, for-profit organizations have been able to provide both quality and cost-effective health care to Medicaid recipients under terms in which academic health centers cannot compete. In at least one case, an academic health center has been forced to subcontract to a for-profit managed care organization to maintain patient flow for teaching and patient care needs. These changes are likely to evolve over a 5- to 10-year period, with the result being a distinctly American system. My own suspicion is that this will ultimately become a regulated industry in which most of the management is in the private sector, but the public sector would provide oversight not unlike that which the Securities Exchange Commission, the FCC, or the Federal Reserve Board provides for other highly concentrated private sector activities.

Changes in the health care delivery system predict other outcomes of importance to research and education. The role of primary care providers will continue to increase. It is clear that starting salaries for general internists have been rising sharply and that all generalist physicians are likely to receive higher compensation. At the same time, subspecialists are being laid off or asked to undergo retraining to become primary care providers. In the managed care organizations, a substantial amount of services can be provided by nonphysician health professionals, including advanced practice nurses and physician assistants. The education of physicians increasingly will require that they learn effectively how to work in a collegial relationship with other health care providers, although clinical departments currently continue to train subspecialists primarily driven by patient care needs at academic health centers. This too will come under increasing pressure as income to subspecialty units declines and medical students and residents are less willing to pursue careers where job opportunities will be limited.

Information systems finally are taking hold in the health care environment. These systems range from very sophisticated patient records and library functions to outcome data and multimedia applications to care at distant sites, including rural and center city locations. Some medical schools now require all entering students to have a personal computer-a trend that is likely to increase. Quality of care in the health care system increasingly is based on measurements of outcomes, where the latter includes biological and physiological parameters, functional assessment, and patient and family satisfaction. Even in the absence of governmental requirements, corporations are increasingly requiring such outcome information to determine with whom they will contract. Preventive services increasingly will be used as an important parameter to measure the effectiveness of health care delivery systems. For stable populations they will have real economic advantage for those managed care organizations that can undertake costeffective preventive programs that are population as well as individually based. These approaches increasingly will find their way into medical school curricula as well as into the public health arena. With increased information available, not only the employer who pays for health care services but also the patient and his/her family increasingly will be demanding information from physicians or other providers to make informed decisions. Well-informed joint patient-doctor communications will be critical to this new environment, and the skills required for presenting options to patients will go beyond showing them videodisks but will include a substantial explanation of risk and elucidation of risk-benefit relationships.

Health Sciences Research

Changes in the health care system will have direct effects on health sciences research. The consolidation currently underway in the pharmaceutical industry will reduce the size and scope of industrial research. Efforts will be focused on the development of well-defined advances on the basic science side, and the ratio of fundamental research to developmental research, which was never terribly large, will decrease. Some pharmaceutical houses have already indicated that they will no longer attempt to develop agents that replicate existing effects but will have to position themselves to produce innovative products. Consolidation will also increasingly connect the pharmaceutical manufacturers with delivery of health care through distribution and even direct application of services.

The impact on the academic health center is primarily based on the significant decreases in patient care income that will be available. Medical schools on average receive on the order of 40% of their budgets from patient care. This crosssubsidy for research is at least in the \$820- to \$850-million range, according to surveys done by the Association of American Medical Colleges, and I believe these figures are underestimated. An additional \$1.6 billion from patient care monies underwrite the cost of education. Because the line between research and education support of faculty is often narrow, the overall impact will be substantial. It is worthwhile noting that the portion of the NIH budget that goes to academic health centers amounts to approximately \$4.2 billion. An \$850 million loss would be equal to almost one-fourth of the NIH contribution. The Dean's Tax provided substantial amounts of money from practice plans, which were used to cost-share indirect costs and to provide the discretionary monies that the school made available not only for clinical departments but also for basic science departments. Renovations, equipment, bridge funding between grants, and start-up funds for recruiting new faculty commonly were derived from the dean's funds contributed from the practice plans. In some cases, the hospital also has provided money to the medical school to use for these purposes. Supplementary salaries for fellows and funding for MD/PhD candidates beyond the NIH training grant slots also were derived from these monies. In many cases, research faculty have been historically underreimbursed by federal agencies because a significant portion of their salary on a grant could be derived from the practice plan. Providing such funds allowed a larger proportion of the grant money to be used for technical support and supplies and also kept the average cost of the grant down. With the shrinkage of faculty practice revenues, those investigators who can be funded in the top decile will be under pressure to put all of their relevant salary on grants, which, as a consequence, will raise the average cost of a grant. The impact of that on the overall community will mean that those with very high priority scores will receive an increasing proportion of the monies, and the total number of grants funded will decline. Pressures to provide competitive health care will mean that clinicians will have to focus on patient care, and it will become increasingly difficult for a physician to be a clinical investigator. Pharmaceutical research in the medical center will be under pressure since the industry will be under financial constraints, and there will be less opportunity to offset overhead costs, which have been historically paid for from patient care revenues.

The overall significance of these changes will be a resizing of the health science research enterprise, with the academic portion ultimately downsizing to some degree. The

"Health services research will increase in its importance and in its fraction of academic research activities."

downsizing will not be shared by all the institutions proportionately, but it will be significant for many. The implication of these changes includes an increasing differentiation of faculty to those who are the outstanding scientists and who will spend essentially all of their time at science and those who are the outstanding clinicians and who will spend all of their time in practice. To be competitive, institutions will have to have critical masses of highly focused investigators to provide the edge needed to retain high priority scores. There will be fewer MD clinical investigators and a need for an increasing number of PhD's to participate in clinical research. Gene therapy is an excellent example of a situation in which a well-trained PhD can work closely with a well-trained clinician to treat patients. New programs for training a small number of better prepared clinical investigators with protected time will be required. Health services research will increase in its importance and in its fraction of academic research activities. The opportunities to work with managed care organizations will increase, and information systems developed between academic health services, researchers, and the managed care community will have increasing importance. Primary care research will attain new emphasis. Such research is based not on the response to specific diseases or diagnoses but on symptom complexes and episodes of illness. It will focus on the management of a headache rather than a brain tumor. It will emphasize outcome research information systems, social and behavioral sciences, and economics.

Relationships With Managed Care

New opportunities exist for relationships with managed care entities. Of particular importance is the necessity to connect research and education with the managed care enterprise in a way that is of convincing benefit to both. For example, educational programs that are multidisciplinary, involving physicians, nurses, physician assistants, and public health experts, can provide new models of care in both the academic center and the managed care organization. Medical students will increasingly require education in the managed care setting. Although such organizations are loath to invest substantial amounts of money in this enterprise, their experience dictates some advantages to participation. It is estimated by leaders in the managed care industry that it requires approximately 18 months to prepare a graduate of a generalist physician program to practice in a managed care environment. That is a costly investment. Preparing residents and students within such an environment would be valuable to the managed care enterprise. Equally important, managed care has much to instruct academic centers who are notoriously poorly organized to provide ambulatory care. There are opportunities to learn from joint research activities in prevention, in identifying what works and does not work in the practice of medicine, and in looking at long-term as well as short-term interventions for populations who are cared for over long periods of time. In many cases, it may be more cost effective to carry out clinical trials in a managed care setting if properly designed.

Of particular importance to scientists is the need for better technology assessment. Clearly, if the products of fundamental science are defined in that way and to industry, scientists must improve productivity. That means that they must either produce something previously done well at a lower cost or there must be a really unique innovation. Technology assessment becomes valuable to the managed care organization

"Medical students will increasingly require education in the managed care setting."

in understanding what it should or should not offer to its patients, and it is an important potential for research in the academic health center.

The social and behavioral sciences will be of increasing importance because of the major role that behavior plays in producing illness. Foege and McGuinness have estimated that over 40% of America's health care budget is expended in care for the consequences of smoking, violence, alcohol, and human immunodeficiency virus, all of which require major interventions from the social and behavioral sciences. The real expertise in these areas often exists on the general campus, and important progress will depend on developing new configurations between the medical school and the college of letters and sciences so that the most outstanding investigators can work in this area.

Creating effective new relationships that will support research and education will require that all of the participants in the health care system understand each other. Managed care organizations require appropriately prepared providers with an understanding of quality assessment. These organizations will need to carry out clinical trials or have access to such trials at reasonable costs and will benefit from good technology assessment. Corporate and public communities need to understand quality. They need to accept the importance of generating new knowledge for care and for academic development, such as the biotechnology and pharmaceutical industries. Government, on the other hand, will have a major concern about caring for Medicaid populations and other uninsured people as well as dealing with such special populations as drug abusers and violent individuals.

There are some special challenges for the research community itself. The NIH will not be able to fund health science research anywhere near the extent to which opportunities are provided. We should work as energetically as we can to enhance NIH funding, but it should be recognized that decreases in funding in other agencies are likely to be used to reduce the deficit rather than to be moved to the NIH. For this reason, I believe new configurations for research in government agencies are important. The Department of Energy, the Environmental Protection Agency, and the National Institute for Occupational Safety and Health have created a pool of resources for supporting research in environmental health with a single application and with combined peer review but multiple funders. The Department of Defense has been actively looking for dual-use research, including health science research. The recent experience with the congressional addition of \$211 million for research in breast cancer was distributed on the basis of recommendations from an Institute of Medicine committee so that 78% of the money was apportioned to investigator-initiated extramural research. Finding ways to carry out interdisciplinary research involving multiple agencies in which the purposes of all are served is much more likely to be productive than attention to move that money to the NIH.

The quadrennial NRC review of PhD training in the health sciences recommended that the number of PhD's trained in the biomedical sciences be held about the same, with an increase in investigators in services research, social and behavioral sciences, the MD/PhD programs, and nursing. These recommendations ought to be reflected in the recruiting practices of academic health centers. Included in these efforts should be continued emphasis on diversity of gender, race, and ethnic background among candidates for the PhD.

Academic health centers should develop programs in technology assessment so that science is used well. We need to connect the approval process with cost and utilization. New technology should be reimbursed if it replaces older technology at a lower cost or if it does something unique and special, in which case reimbursement should be confined to that use. Reimbursement should reflect evidence for what kind of learning curve should be demonstrated, particularly when technical proficiency must be demonstrated. Reimbursement should depend on taking advantage of volume effects so that reimbursement only takes place where the efficiencies and high-quality results of experience can be demonstrated.

Support for Science

In general, there is strong bipartisan support for fundamental science. There may also be an opportunity to pursue the original proposal from Senator Hatfield and Senator Harkin to have a contribution from health care premiums in support of research and education. I would suggest that this contribution be directed not to research in general but to clinical research sponsored and peer-reviewed through NIH mechanisms. This recommendation is based on the notion that managed care organizations may support a specific assessment on premiums, provided that the playing field is level for all organizations and that they all contribute the same percentage. The advantage to the managed care systems would be an understanding that patients would be referred only for clinical research funded by peer-reviewed mechanisms using these

"The academic health center can and must play a critical role in K-12 mathematics and science education."

monies as sources of support. Devoting the monies to clinical research would make much more sense to the public, who would see it connected to health care while, at the same time, it would protect the NIH budget. At the present time, approximately 30% of NIH monies is spent on clinical research. I believe we could make the strong argument that the support of fundamental science by the NIH requires a direct appropriation from the Congress, whereas clinical research could be supported by an assessment based on the Hatfield-Harkin approach. Separating these lines of support would significantly decrease the probability that congressional support for fundamental science would be eroded by the desire to pay all increased funding out of a clinical assessment.

It is also important to recognize that the recent Presidential paper Science in the National Interest closely connected K-12 mathematics and science education with a science message. Scientific literacy is important not only to train more scientists but even more important perhaps to create a public that is capable of competing in the work force of the 21st Century and has an understanding of the value of science so that public support is maintained. The academic health center can and must play a critical role in K-12 mathematics and science education.

Academic health centers are fragile. In the current environment, they are at substantial risk, and they will need help, particularly to maintain their research and education missions. Open communication with the public, emphasizing the overall importance of science as a basis for technology and progress, connecting both education and science together and building new mechanisms for interdisciplinary research and interdisciplinary funding will be critical to this success. Finding new sources of funding, perhaps connected to the health care system itself, should be a priority over the next several years. These are challenging times. In the words of Inspector Clouseau, "There is a time for laughing and a time for not laughing, and this is not one of them."



68th APS PRESIDENT

(continued from p. 49)

search, had revenues of \$11.3 billion and had created 103,000 jobs by mid-1994.

The challenge is to educate Congress and particularly the new staff for key appropriations committees about the benefits of investing in biomedical research. Everyone, every working scientist, must become involved in an advocacy effort that is targeted not only to Congress and staff on Capitol Hill but also to individual members of Congress and their staff in their local district offices. APS is involved in this advocacy effort in many ways, perhaps the most important

"The challenge is to educate Congress and particularly the new staff for key appropriations committees about the benefits of investing in biomedical research."

being to try to ensure that all scientists are sounding a common voice in support of the important issues related to biomedical research. Toward this end, for the past two years the APS, its sister societies in FASEB, and a number of other scientific societies have formed a Coalition of Biomedical Scientists. This group, which represents more than 250,000 practicing scientists, has developed consensus statements in support of biomedical research and has communicated these to the President and to the Congress in a timely fashion during the budget process for both FY 1995 and FY 1996. This effort is important because to some extent the larger the number of constituents involved the more the message is heard. It is not enough, however, and both the APS and you as individual physiologists and citizens must do more! The APS will continue to work through its Public Affairs Officer, through the FASEB Office of Public Affairs, and through efforts of the officers of the Society to influence public policy related to biomedical research. However, no effort is as effective as a member of Congress hearing directly from a constituent either by letter (try e-mail) or in person (visit the local office).

Are There Other Issues Related to Biomedical Research Requiring the Action of Physiologists?

Yes, there are of course several, but perhaps the most important has to do with the question of whether graduate programs in the biomedical sciences are collectively producing too many PhD graduates for the number of positions available in today's market place. If we are talking about positions likely to become available in universities, then the answer is almost certainly yes. If we include industry, then the answer may be yes, but we are less certain. If we expand the market place to include PhD-trained individuals moving into science education in elementary and secondary schools, as Bruce Alberts and others advocate, then the market place may be able to accommodate the number, but are we providing the appropriate training for these types of careers? What is certain is that the morale among graduate students in PhD programs in biomedical sciences is, in my opinion, at an all-time low, and the number as well as the amount of time PhD-trained individuals spend in postdoctoral training positions continues to increase.

Presently, there is a sparsity of data available to help answer the question of the manpower needs in the biomedical sciences. For this reason, the APS is working with FASEB, NIH, and others in an attempt to develop an appropriate data base. In the meantime, every graduate program should carefully assess its mission with respect to a rapidly and dramatically changing market place. Physiology graduate programs, in particular, should be cognizant of the growing need to provide a broadly based training experience ranging from cellular and molecular to systems approaches.

What Kinds of Scientific Meetings Should APS Sponsor?

In my view, the APS is currently following the best course of action by sponsoring both small meetings developed around specific "state-of-the-art" areas of research, i.e., the APS Conferences, and larger interdisciplinary meetings designed to promote interaction, attract scientific exhibits, and generate revenue, i.e., the annual Spring Meeting, that provide

"Physiology graduate programs, in particular, should be cognizant of the growing need to provide a broadly based training experience . . ."

the opportunity for all members of the Society to come together on a regular basis. The annual Spring Meeting is presently and, as recently decided by Council, will continue for the foreseeable future to be held in conjunction with Experimental Biology. Ways to improve the annual Spring Meeting were the focus of much of the discussion at the APS Council Retreat held in November 1994. From these discussions came several plans for improving the Spring Meeting that are presently being implemented. I will mention here only two of the changes being planned. First, APS President Brian Duling has

Introducing . . .

Leonard S. Jefferson

Leonard S. (Jim) Jefferson was installed as the 68th President of the American Physiological Society at the close of the Society's Spring Meeting this month in Atlanta, GA.

Jefferson is professor and chairman of the Department of Cellular and Molecular Physiology and Associate Dean for Research and Graduate Studies at The Pennsylvania State University College of Medicine. He succeeds Brian R. Duling as president of the nation's oldest biomedical scientific society.

Jefferson, who was born in Maysville, KY, received his BS degree in chemistry from Eastern Kentucky University in 1961 and his PhD degree in physiology from Vanderbilt University in 1966. Following a postdoctoral fellowship at Cambridge University in England, he joined the faculty of the newly established College of Medicine of The Pennsylvania State University where he rose through the ranks to become professor in 1975. He was appointed chairman in 1988, succeeding Howard E. Morgan, who had also served as President of the Society.

During the 27 years he has been a member of the APS, Jefferson has been active in functions of the Society related to education, publications, and governance. He was a member of the Education Committee for six years, serving as chairman from 1976 to 1979; a member of the Section Advisory Committee for seven years, serving as chairman from 1990 to 1993; a cochairman of the Task Force on Governance; a member of the Interim Awards Committee; and a member of the Publications Committee. He has been active in the Endocrinology and Metabolism Section of the Society, serving as Secretary-Treasurer from 1983 to 1986 and as chairman of the section from 1986 to 1989. He also represented the Society on the FASEB Publications Committee for three years, serving as chairman of that committee from 1989 to 1991. Jefferson served on the Editorial Board of the American Journal of Physiology: Endocrinology, Metabolism and Gastrointestinal Physiology from 1976 to 1979, as Associate Editor of the American Journal of Physiology: Endocrinology and Metabolism from 1981 to 1984, and as Editor of the same journal from 1984 to 1991.

Jefferson has been active in other organizations, including the American Diabetes Association, the Juvenile Diabetes Foundation International, the National Diabetes Advisory Board, and the Association of Chairmen of Departments of Physiology. He served two four-year terms on the Metabolism Study Section of the NIH and served as chairman of the scientific review committees and the research policy committees, respectively, for both the American Diabetes Association and the Juvenile Diabetes Foundation International. He is currently serving a second term on the Medical Science Review Committee of the latter organization.

Jefferson is the recipient of a number of honors and professional awards, including the Elliot P. Joslin Award, the Lilly Award, and an Established Investigator Award from the American Diabetes Association; the David Rumbough Scientific Award from the Juvenile Diabetes Foundation International; the Distinguished Alumni Award and the Outstanding Alumnus Award from Eastern Kentucky University; and a MERIT Award from the NIH.

Jefferson has been active in both teaching and research. In addition to teaching medical physiology and a number of specialized courses for graduate students, he has provided research training for twenty-eight students and twenty-four postdoctoral fellows. His research and training programs have been supported by the NIH, the American Diabetes Association, and the Juvenile Diabetes Foundation International. Two of his current grants from the NIH have been funded continuously for twenty-three and twenty-five years, with the latter grant recently being awarded funding for years twenty-six through thirty. Jefferson's research has focused on mechanisms of regulation of metabolism in liver, skeletal muscle, and heart, particularly the actions of hormones and nutrients. His work has contributed to our understanding of the mechanisms responsible for the hyperglycemia and muscle wasting observed in uncontrolled diabetes mellitus, and it continues to provide new insights into the molecular basis of insulin action on gene expression.

been working actively with the presidents of other societies involved in Experimental Biology to redefine the structure used for identifying and programming themes. The goal is to develop interdisciplinary themes that are more reflective of current research efforts. In so doing, the Society's hope is to strengthen the "meeting within a meeting concept."

The second important plan to evolve from the 1994 Retreat is the establishment of a "Physiology InFocus Program" as an innovative addition to Experimental Biology beginning in 1996. The Physiology InFocus Program will bring the top scientists from different disciplines in a specific area of research to Experimental Biology to discuss, debate, and analyze their research in a concentrated two-day interdisciplinary format, thereby promoting interactions and learning that could not be accomplished otherwise. In the view of those involved in the retreat, an interdisciplinary format is defined as including at least several interest groups within APS and participating societies, encompassing varied levels of biological organization (e.g., from molecular to systemic), and using tools of more than one broadly defined scientific discipline (i.e., physiological, pharmacological, biochemical). In effect the Physiology InFocus Program will be similar to an APS Conference, but it will be held within the structure of Experimental Biology. Our hope is that other societies participating in Experimental Biology will develop their own InFocus Programs with exciting formats appropriate to their needs.

What Direction Should APS Take With Its Publications?

APS has a strong track record with its publications, and presently, a number of initiatives are being pursued to ensure continued success. First, the Publications Committee and the Publications Manager are constantly seeking ways to produce our journals more efficiently, cut costs, and increase numbers of subscriptions. These efforts are critical to maintaining the current low prices for subscriptions to our journals. Second, the Publications Committee employs a rigorous process to ensure appointment of Editors who are not only highly recognized scientists in their area of research but who also demonstrate management skills and a vision of the future direction for the particular journal. This process is critical to ensure the continued high quality of our journals. Finally, the APS has embarked on a number of initiatives related to electronic publications. I will mention here only a few of these.

The new APS electronic journal *APStracts* was founded in January 1994. It has an ISSN number from the Library of Congress, is copyrighted, and is citable. It began with abstracts of manuscripts accepted by AJP: Cell Physiology and in January 1995 was expanded to include abstracts of manuscripts accepted to all individual journals of the American Journal of Physiology, the Journal of Applied Physiology, and the Journal of Neurophysiology. It can be accessed on the APS Gopher Server.

The APS is participating in the Red Sage Project, an experimental electronic journal for the faculty, staff, and students of the University of California at San Francisco. The Red Sage Project is a collaborative project of UCSF, AT&T Bell Laboratories, and several scientific and technical publishers, including the APS. It is a pilot study that will run from January 1, 1994, to December 31, 1997, after which users will be charged a fee.

The APS is moving toward making its journals available electronically in 1996. Even though the printers of our journals, Science Press and Lancaster Press, had alpha-testing demonstrations of CD-ROM products at Experimental Biology '94 in Anaheim, the Society's focus has not been restricted to CD-ROM. Indeed, some of the advice received from respondents to a survey on electronic publishing suggested that on-line publication (via Internet) was a preferable route for publication of the Society's journals. It is our expectation that the APS will publish at least one of our journals electronically in 1996. Whether publication will be on-line and/or on CD-ROM remains open to further discussion. A final decision should be made by the summer of 1995, and you, the membership, will be informed in order to share in the adventure.

APS Election Results

James A. Schafer, Professor, Department of Physiology and Biophysics, University of Alabama at Birmingham, is the new President-Elect. The two newly elected Councillors taking office on April 12, 1995, for three-year terms are Walter F. Boron, Professor and Chair, Department of Physiology, Yale University, New Haven; and Gerald F. DiBona, Professor and Vice Chairman, Department of Internal Medicine, University of Iowa, Iowa City.

President-Elect



James A. Schafer



Walter F. Boron

Councillors



Gerald F. DiBona

A Matter of Opinion

To The Hill

The turning of the year and the seating of a new Congress provides the impetus for hoards of special interests, concerned citizens, and hired guns (lobbyists) to descend on Capitol Hill seeking favors from their elected representatives. For APS, it is a time for educating new members of Congress and their staffs, but it is also a time for testifying before various subcommittees, seeking additional funds for NIH and other science agencies.

Preparation for our great migration begins in the fall as we participate in the annual FASEB Consensus Conference. As noted in *The Physiologist*, this year's Conference recommended a 10% increase in the NIH budget for FY 1996. As soon as the new Congress officially convenes the Society sends its requests to the chairs of the Appropriations Subcommittees asking for an opportunity to present the views of the APS and the physiological community.

Very shortly afterward, we receive a response from the House Subcommittee responsible for NIH funding. Not waiting for the President's budget, the Chairman decides to hold public witness hearings right away. We are scheduled to testify before the House Appropriations Subcommittee on Labor-HHS-Education, on Tuesday, January 31. The Senate Subcommittee, on the other hand, refuses our request, because this year they are only planning to receive written testimony.

Now the work begins. A draft statement is written for review by the APS Executive Cabinet. With the expectation that APS President Brian Duling will testify, he is asked for his thoughts on NIH funding as well as how to make a convincing case for the NIH based on his research and experience. This is done to put a "hook" into the testimony, to make it unique to the presenter. However, at the last minute his plans change and Jim Jefferson, President-Elect, is unable to juggle his schedule to testify.

I get the call: make like Brian Duling and testify on behalf of the APS in support of NIH funding. The latter is easy, but there is absolutely no way I can make like Brian Duling. That means a change in the testimony in order to make it sound like something that I would say.

Following a sleepless night, I make my way to the mountain to testify. I climb Capitol Hill with my guide APS Public Affairs Officer, Alice Hellerstein, to testify before the House Appropriations Subcommittee in Room 2358, Rayburn Building. This is the room where for so many years Congressman Natcher graciously invited all speakers to "come on down" to voice their support for NIH. But times have changed since I first made this pilgrimage; Natcher died last March, and in November the Republicans took control of Capitol Hill. So Congressman John Porter (R-10th-IL), also a long-time friend of NIH, is now our "Mr. Chairman." Arriving at Room 2358 for the 10:00 am-12:00 noon hearing, I discover that APS is scheduled to testify last. Oh great, just like presenting at 4:15 pm on the last day of the Experimental Biology Meeting. Would anyone be in the room besides the Chairman, Alice Hellerstein, and myself? I doubt it, especially after hearing presentations from the American Liver Foundation, the NIH Alumni Association, the Association of American Medical Colleges, and the National Hemophilia Foundation. What was my draw? How could I get them to stay?

But there was hope; maybe the witness testifying on behalf of the Inner City Games would draw a crowd that would have the courtesy to hang around to listen to me. After all, he was scheduled to testify only three slots in front of me, and you'll all agree that I'm as big a draw as Arnold Schwarzenegger.

Unfortunately, things did not go as planned. Schwarzenegger did not appear when scheduled, so Congressman Porter took the next speaker, and then the next. Was I going to one up Schwarzenegger and testify before him? Was I going to be his warm-up act? But then it happened, the crowd began to grow. Congressmen Bonilla, Istook, Wicker, Miller, and Riggs joined Congressman Porter at the bench, and the door swung open, revealing Arnold Schwarzenegger ready to take his rightful place at the witness table. He was going to be my warm-up act, not the other way around.

Greeting the actor warmly, Porter informed Schwarzenegger that he had just seen "True Lies" and that, after seeing it, he was prepared to give him anything he wanted. How could I hope to compete? I had never had a featurelength film; I had only been featured on the local news, and I'm sure that Porter never saw it.

Schwarzenegger spoke of his association with a nonprofit group working to organize athletic games for inner city youth in Los Angeles and other cities, urging Congress to find a way to provide support for this important endeavor. He spoke of how important sports can be in developing self confidence and teamwork and reflected how athletics had led him into entertainment and public service. Congressman Bonilla asked Schwarzenegger how he could reconcile his Republican philosophy with his call for Federal support. Moreover, Porter asked whether his Republican philosophy might ultimately lead him to Congress.

As Schwarzenegger rose from the witness seat, Congressman Porter invited me down to testify on behalf of the NIH. How should I handle this? Should I start right into my presentation and ignore the man who had presented before me? I couldn't do it. I thanked Congressmen Porter and Bonilla (all the other Congressmen fled after Schwarzenegger's testimony) for the opportunity to testify but acknowledged that "Arnold was going to be a hard act to follow." I commented that I was pleased that Congressman Porter had told Schwarzenegger that he could have anything he wanted and that, since I was a close friend of Arnold's, I was hopeful that he would also give the biomedical community everything we wanted.

With chuckles and smiles from those present, I began my testimony. When I finished, Porter thanked me for my comments and indicated that he wasn't going to be able to be as generous as I might like, but he would try to give us almost everything we wanted. He endorsed the suggestion made in the APS testimony that NIH makes an important contribution to building the intellectual capital of our Nation and that it must be preserved. He also seemed receptive to our suggestion that we should identify other sources of support for NIH beyond the regular appropriations.

Although APS and the biomedical community probably won't get everything we want for NIH because of the severe fiscal constraints facing Congress, I had the satisfaction of presenting the Society's case to Congress. I also received an autographed picture of my good friend, Arnold Schwarzenegger. What more could I ask for?

Obviously, there is much more that I could ask for, and I did by visiting the offices of some key members of Congress. Although Alice and I did not get to meet with the Representatives themselves, we did get to speak with their staff. In some ways, talking to the key staff responsible for NIH and animal welfare issues is more important than speaking to the elected representative, because the staff distills the message and ensures that the Member has the facts.

What a surprise it was for Alice and me to enter the office of a key staff member for the House Agriculture Committee, with responsibility for oversight of the Animal Welfare Act, and discover that he was new to many animal welfare issues. He had been in the job for only three weeks and was already getting bombarded by animal welfare/rights groups. From his first day in the job, he had been receiving calls from animal rights groups opposed to the methods used for collecting urine from horses for the production of Premarin. Our appearance was like a breath of fresh air, since we served as a voice of reason. Both Alice and I believe we made a friend who will call on APS when the need arises.

We also visited with the staff of Rep. Steny Hoyer (D-5th-MD), who sits on Rep. Porter's Appropriations Subcommittee. We renewed contacts with the staff of Connie Morella (R-8th-MD) whose district includes the NIH as well as the People for Ethical Treatment for Animals and also met with a staff member from Congressman Roscoe Bartlett's (R-6th-MD) office.

As you might recall, Roscoe Bartlett is our resident physiologist in Congress, having been an APS member from 1958-1961. Being residents of Maryland, it was very easy to stop into Hoyer's, Morella's, and Bartlett's offices, but it was just as easy to stop into the offices of Reps. John Boehner (R-8th-OH), Earl Hilliard (D-7th-AL), and Harold Volkmer (D-9th-MO).

Each office was prepared to hear us out and obtain information about issues their subcommittees or Congressman might need to address during the coming year. Each new staff member was on a steep learning curve, trying to soak up as much knowledge as possible and attempting to identify credible sources of information. What Alice and I did is something that each APS member should do as well.

Whether in Washington or in the local district office, each APS member should take the time to meet with his/her members of Congress or a key staff member to discuss the issues of biomedical research support, excess regulation of the research enterprise, the continued need for animals for biomedical research, and many other issues of importance to the scientific community. Your elected representatives and their staff are interested in your research, its impact on the community in terms of number of employees, and what you need for the future. They might even be interested in visiting your laboratory the next time they are in the district.

I urge you take the time to contact your representatives. It's a fifteen-minute visit that could make a difference to you and the people in your laboratory. It's a visit that could make a difference to the entire scientific community.

Reach out and touch a Congressman. APS is here to help!

Martin Frank Executive Director

Ethics Course on Animal Research

A summer course on ethical issues of animal research will be held June 24-29, 1995, on the campus of Georgetown University, Washington, DC. The course is open to college faculty and others who would like to improve their skills in teaching about ethical issues surrounding the use of animals as research subjects. Emphasis will be on how to use this course material in classroom instruction.

Topics include the moral status of nonhuman animals, the justification for using animals as experimental subjects, ethical concerns about vulnerable subjects, student objections, the use of alternatives, animal harms and pain, legal issues, and the importance of species. Varying points of view will be presented in a well-balanced fashion. The course directors are F. Barbara Orlans, PhD, and Tom L. Beauchamp, PhD, both of the Kennedy Institute of Ethics, Georgetown University. Information: Moheba Hanif, Kennedy Institute of Ethics, Georgetown University, Washington, DC 20057. Tel: 202-687-6833; fax: 202-687-8089; e-mail: hanifm@guvax.geor-getown.edu.

Awards and Fellowships O'Doherty Receives APS-Genentech Fellowship

Through a generous contribution from Genentech, Inc., the APS initiated a postdoctoral fellowship in mammalian organ system physiology. The APS-Genentech Fellowship is designed to promote careers in mammalian organ system physiology in recognition of the fact that many advances in cellular and molecular biology will ultimately require an understanding in the context of the organism. The central criterion is that the postdoctoral project uses the tools of cellular and molecular biology in the setting of the whole animal.

The APS-Genentech Review Committee, chaired by Helen Cooke, had the difficult task of reviewing the 43 applications received and identifying the sole recipient of the award. Based on extensive discussion and review, the Committee selected **Robert O'Doherty** as the 1995 APS-Genentech Fellowship recipient.

Robert O'Doherty received his doctorate in Molecular Physiology in the Department of Molecular Physiology and Biophysics, Vanderbilt University, under the direction of Daryl Granner. His thesis title was "The Regulation of Hexokinase II (HKII) In Vivo." He will be doing his postdoctoral training in the laboratory of Cristopher B. Newgard, Departments of Biochemistry and Internal Medicine and the Center for Diabetes Research, University of Texas Southwestern Medical Center, Dallas. O'Doherty will use a recombinant adenovirus delivery system to study the regulation of rat liver glycogenolysis by expressing wildtype and chimeric glycogen phosphorylases displaying differential AMP and/or covalent activation in the liver of normal and gsd/gsd rats. These gsd/gsd rats have impaired liver glycogenolysis caused by a deficiency of liver PK.

The selection of O'Doherty represents the Society's first effort to promote careers designed to integrate cell and molecular techniques with mammalian organ system physiology. Every effort is being made to expand the program so that other young scientists can be encouraged to pursue a career in this area. Announcements of future programs will appear in *The Physiologist*.

Call for Nominations

Bowditch Lecture Award

The annual Bowditch Lecture honoring the first elected President of the American Physiological Society, Henry Pickering Bowditch, has been given at the annual meeting since 1956.

The lecturer is selected by the President with the consent of Council from among the regular members who have achieved outstanding work and are under 40 years of age at the time of presentation. The award is for original and outstanding accomplishments in the field of physiology. Originality of approach, clarity of data presentation, and the general significance of the results are important criteria. The award conveys an honorarium of \$2,500 plus travel and per diem expenses to attend the spring meeting, and the recipient is invited to submit a manuscript for publication in one of the Society's journals.

Nominations should be accompanied by letters from two nominators describing the importance of the candidate's work, a brief sketch of the nominee's professional history, papers or manuscripts that substantiate the excellence of the candidate, and a curriculum vitae. The nominators should clearly state the contributions of candidates to any jointly authored manuscripts and papers, documenting the independence of the nominee's work. Nominations should be submitted by October 1 to: The APS Bowditch Lecture Award, 9650 Rockville Pike, Bethesda, MD 20814-3991.

Physiology in Perspective Walter B. Cannon Memorial Lecture Award

The Cannon Memorial Lecture honors Walter B. Cannon, President of the Society from 1913-1916 and one of the century's most distinguished physiologists. The plenary lecture is presented annually by a distinguished physiological scientist, domestic or foreign, at the spring meeting on a subject that addresses some aspect of the concept of homeostasis as enunciated in Cannon's classic work, *The Wisdom of the Body*. The lecture, sponsored by the Grass Foundation, is selected by the APS President with the consent of Council.

The recipient receives an honorarium of \$4,000 plus travel and per diem expenses and is invited to submit a manuscript for consideration of publication in one of the Society's journals.

Nominations for the Cannon Lecture Award should be adequately documented to demonstrate the candidate's contributions to physiology. A curriculum vitae should accompany the letter of support describing the nominee's achievements. Submit nominations by October 1 to: The APS Cannon Lecture Award, 9650 Rockville Pike, Bethesda, MD 20814-3991.

APS Conferences

1994 APS Conference

Mechanotransduction and the Regulation of Growth and Differentiation

October 5-8, Hyatt Sarasota, Florida

The APS Conference "Mechanotransduction and the Regulation of Growth and Differentiation" was held Wednesday, October 4 through Saturday, October 8, 1994 at the Hyatt Sarasota Hotel, Florida and organized by **Peter A. Watson** and **Howard E. Morgan** of The Geisinger Clinic, Danville, PA. The conference commenced Wednesday with an evening lecture by **James Hudspeth** followed by a poolside Opening Reception.

Fourteen sessions were programmed, consisting of two lectures, six symposia, and six poster sessions. The sessions were scheduled such as to allow free time each afternoon for attendees to enjoy and explore the Sarasota area.

Of the 165 total registrants, there were 35 (21%) complimentary, 70 (42%) nonmembers, 29 (18%) APS members, 24 (14%) students, and 7 (4%) guests.

Four students received the Graduate Student Award, which was presented for outstanding poster presentation: Howard Doong, University of Chicago; Ann A. Lee, University of California, San Diego; Gretchen E. Moeller, University of Minnesota; and Victor Ruiz-Velasco, Tulane University. The recipients were awarded a \$500 cash prize and certificate at the banquet on Saturday at which David McClay presented a lecture entitled "Complex Mechanochemical Signal Transduction Involved in the Regulation of Development."

Of the 76 abstracts submitted, 14 (18%) were from female first authors, 8 (10%) were from authors residing at institutions outside The Americas, and 6 (8%) were from US government laboratories. Of the 35 invited participants, 3 (9%) were female, 4 (11%) travelled from outside The Americas, and 1 was from a US government laboratory.



Graduate Student Award winners for outstanding poster presentation: Gretchen E. Moeller, Howard Doong, Victor Ruiz-Velasco, and Ann A. Lee, with Dr. Peter A. Watson, organizer.

Authors of submitted abstracts were asked to indicate a society with which they hold a membership. Of the 76 abstracts received, 12 (16%) were from members of The Biophysical Society; 11 (14%) were members of The American Society for Cell Biology; 5 (7%) were members from The American Heart Association, Basic Science Council; and 2 (3%) were members from The American Society of Artificial Internal Organs. Other represented societies were American Association of Immunologists, American Thoracic Society, Australian Physiological and Pharmacological Society, Biomedical Engineering Society, North American Society of Biorheology; National Academy of Science, and Physiological Society (UK).

APS Membership

Membership applications may be obtained from APS Membership Services, 9650 Rockville Pike, Bethesda, MD 20814-3991. Applications are reviewed and approved by Council on a regular basis throughout the year.

1994 APS Intersociety Meeting

Regulation, Integration, Adaptation: A Species Approach

October 29-November 2, San Diego, California

The intersociety meeting "Regulation, Integration, Adaptation: A Species Approach" was organized by the Comparative Physiology Section and held at the Town & Country Hotel in San Diego, California, Saturday, October 29 through Wednesday, November 2, 1994. The meeting commenced on a social note Saturday evening with the Opening Reception, at the Tiki Hut, with scientific sessions starting Sunday morning lasting through Wednesday. Joining The American Physiological Society, Comparative Physiology Section in the organization of the meeting were American Society of Zoologists (ASZ), Comparative Physiology and Biochemistry Division; Canadian Society of Zoologists (CSZ), Comparative Physiology and Biochemistry Section; German Society of Zoologists (GSZ); and Society of Experimental Biology, United Kingdom (SEB). This was the second meeting held under the auspices of the APS Comparative Section; the first was held four years ago, in 1990, at the Hyatt Orlando in Florida and was entitled "In Search of Physiological Principles: The Use of Animal Diversity and Novel Technology." It is anticipated that another meeting will be proposed by this group to be held in 1998, as they have indicated a desire to hold a comparative-approach meeting every four years.

In all, 286 abstracts were submitted for poster presentation. Of these, 76 (27%) were submitted by female first authors, 45 (16%) were from institutions outside The Americas, and 3 (1%) each were from US government laboratories and private industry. Of the 150 invited participants, 19 (13%) were female, 40 (27%) reside outside The Americas, 3 (2%) were from US government laboratories, and 1 (1%) was from private industry. The break-down of non-APS sponsors' society as indicated on the abstract form was 101 (35%) from ASZ, 43 (15%) from SEB, 28 (10%) from CSZ, and 6 (2%) from GSZ.

The scientific program consisted of 57 total sessions, including 1 discussion, 3 workshops, 8 lectures, 22 symposia, and 23 poster sessions. All contributed abstracts were programmed as posters.

Of the 286 abstracts received, 57 (20%) were submitted for the Scholander Award Competition: a competition of the best abstract presentation by a graduate student or postdoctoral fellow. All entries presented their posters on Sunday, and teams of judges selected semifinalists each day. The winners



Mrs. Per Scholander with recepients of Scholander Award: Nicholas S. Bernier, Rayna Gonzales, James D. McLister, and Douglas S. Neufeld.

presented their abstracts in a final session on Wednesday. The winners were **James D. McLister**, University of Guelph (\$750); **Douglas S. Neufeld**, University of Arizona (\$500); **Nicholas S. Bernier**, University of British Columbia (\$375); and **Rayna Gonzales**, Lovelace Institutes (\$375). The winners were presented with their cash prize during the banquet on Wednesday at which **Peter Hochachka** presented the Scholander Lecture entitled "The Scholander Legacy: From Simulated Diving to Microcomputers on Mesopolagic Seals."

This meeting marked the first occurrence of a postdoctoral registration rate, which, as indicated by the number of postdoctoral registrants, was highly applauded. Of the 588 total registrants, 163 (27%) were students, 148 (25%) were complimentary, 147 (25%) were members of a participating society, 63 (11%) were postdoctorals, 48 (8%) were nonmembers, 14 (2%) were guests, and 4 (1%) were retired members.

A total of 8 applications were received for the NIDDK Travel Fellowships for Minority Physiologists. Of these, seven were selected: Nancy Maria Aguilar, Scripps Institution of Oceanography; Inez Archuleta, New Mexico State University; Patricia A. Arreola, Las Cruces, NM; Michela N. Baca, The Lovelace Institutes; Rayna J. Gonzales, The Lovelace Institutes; Percy Joseph Jordan, University of Southwestern Louisiana; and Raul Trejo, Berkeley, CA. 1995 APS Conference

Understanding the Biological Clock: From Genetics to Physiology

July 9-12, Dartmouth Medical School, Hanover, New Hampshire

Saturday, July 8	Sunday, July 9	Monday, July 10	Tuesday, July 11	Wednesday, July 12
	Focus Molecular Analyses of Circadian Oscillators and their Output	Focus Analyses of Circadian Clocks at the Level of Cells and Tissues	Focus Circadian and Circannual Rhythms in Organisms	Summary Reports of Study Groups on Genetic and Physiological Analyses of Circadian Clocks
	8:30-10:30 AM	8:30-10:30 AM	8:30-10:30 AM	8:30 AM-1:00 PM
	Symposium: Molecular Basis of the Circadian Oscillator. Chair: Arnold Eskin Participants: Takao Kondo, Jay Dunlap, Joe Takahashi, and Amita Sehgal	Symposium: Cellular Analysis of Circadian Oscillators. Chair: Michael Hastings Participants: Martin Zatz, Gene Block, and Till Roennenberg	Symposium: Circadian Rhythms, Physiology and Behavior. Chairs: Theresa Lee and Fred Karsch Participants: Stephan Reebs and Bruce Goldman	Group Reports Carl Johnson,, Robert Moore, Rae Silver, C.P. Kyriacou, Jay C. Dunlap, J. Woodland Hastings, Patricia DeCoursey, and Eberhard Gwinner,
	10:30 AM-12:30 PM	10:30 AM-12:30 PM	10:30 AM-12:30 PM	Charles Czeisler, Derk-Jan Dijk, Anna
	Symposium: Molecular Biology of the Circadian Clock and its Output. Chair: Ueli Schibler Participants: Jennifer Loros and William Schwartz	Symposium: Circadian Systems: Input, the Pace-maker, and Output in Multicellular Systems. Chair: Kathy Siwicki Participants: Steven Reppert, Rebecca Prosser, and Russell Foster	Symposium: Human Circadian Control, Physiology and Clinical Applications. Chair: Ken Ichi Honma Participants: Charles Czeisler, Josephine Arendt, and Thomas Wehr	Wirz-Justice, and Thomas Wehr
2:00-9:00 PM	2:30-4:30 PM	2:30-4:30 PM	2:30-4:30 PM	2:30-4:30 PM
Registration	Poster Sessions Authors in Attendance	Poster Sessions Authors in Attendance	Poster Sessions Authors in Attendance	Poster Sessions Authors in Attendance
7:30-8:30 PM	7:30-8:30 PM	7:30-8:30 PM	7:30-8:30 PM	7:00-9:00 PM
Welcome Session	Plenary Lecture: Molecular Analyses of Circadian Oscillators and Their Output: Model Systems and Molecules. Michael Robash	<i>Plenary Lecture</i> : The Circadian System in Vertebrates. Robert Moore	Plenary Lecture: Circadian Organization in the Vertebrates: New Directions. Michael Menaker	Banquet and Lecture: Circadian Clocks, Past, Present, and Future. J. Woodland Hastings
8:45-10:30 PM Opening Reception				

1995 APS Conference

New Discoveries Within the Pancreatic Polypeptide Family: Molecules to Medicine

Wednesday, November 8	Thursday, November 9	Friday, November 10	Saturday, November 11
	8:00 AM-12:30 PM	8:00 AM-12:00 Noon	9:30-11:00 AM
	The Biochemistry and Molecular Biology of NPY/PYY/PP Family. Chairs: J. Polak and S. Bloom Speakers: J.M. Allen, D. Larhammar, C. Wahlestedt, T.W. Schwartz, A.B. Leiter, and C. Minth-Worby	New Discoveries in Actions of NPY/PYY/PP Family in the Central Nervous System. Chairs: R. Rogers and T. Westfall Speakers: S.P. Kalra, W. Colmers, S. Leibowitz, and W. Zipf	Free Time
2:00 PM	9:30-11:00 AM	1:00-4:00 PM	11:00 AM-2:30 PM
Registration Opens	Free Time	Free Time	Role of Peptides in the NPY/PYY/PP Family in Disease. Chairs: W. Zipf and T.W. Schwartz Speakers: M. Heilig, S. Bloom, J.N. Polak, J.D. White, D. Andersen, and M. Brown
6:30-8:00 PM	4:00-7:00 PM	3:30-7:30 PM	
Opening Reception	Distribution, Biochemistry and Molecular Biology of NPY/PYY/PP Family. Chairs: C. Wahlestedt and V. Pickel Speakers: V. Pickel, R. Quirion, D.C. Whitcomb, F. Sundler, M. Laburthe, M.C. Michel, and K. Tatemoto	Peripheral Autonomic Actions of Peptides from the NPY/PYY/PP Family. Chairs: I. Taylor and H.J. Cooke Speakers: Z. Zukowska-Grojec, G. Aponte, J.M. Lundberg, T. Westfall, I. Taylor, H. Cox, J. Wiley, and R. Rogers	
8:00-9:00 PM	7:00-9:30 PM	7:30-9:30 PM	
Historical Lecture: Discovery of the NPY/PYY/PP Family. R.E. Chance	Poster Sessions	Poster Sessions	

November 8-11, 1995, Newport Beach, California

Membership

News From Senior Physiologists

Letters to Helen Tepperman

Nancy M. Buckley writes that "while I am now Emeritus Professor of Physiology and Biophysics, Albert Einstein College of Medicine, I am not involved in academic affairs and only occardiovascular casionally discuss research with former colleagues. However, I have continued to read selectively but more broadly. I have also become active in the newly formed Lyceum Club for retiree members of the New York Academy of Sciences. My creative efforts are once again in focus on music composition (art songs, to be exact), and I continue to participate in seminar programs and meeting

Helen F. Cserr, 1937-1994



On November 12, 1994, a memorial service was held at Brown University to honor Helen Fitzgerald Cserr, Esther Elizabeth Brintzenhoff Professor of Physiology. The following tribute by John Pappenheimer is one of several tributes presented at the service by her students and colleagues who came from of the United Nations Association and other international affairs organizations. This is a rewarding but quiet life."

Julian L. Ambrus writes "I just passed my 70th birthday and I have retired from the Roswell Park Memorial Cancer Institute and from the Chairmanship of the Pathophysiology Department of the Roswell Park Division of the State University of New York at Buffalo Graduate School. I moved across the street to Buffalo General Hospital where I continue as Professor of Internal Medicine."

"I continue to be Editor-in-Chief of the *Journal of Medicine*, a journal which publishes both clinical and basic science material. I was recently elected

as far away as London to attend the ceremony.

Helen Fitzgerald graduated from Middlebury College in 1960 with an honors degree in Chemistry and a Phi Beta Kappa key. She began her graduate studies in the Division of Medical Sciences at Harvard, absolutely determined to embark on an academic career in physiology and biophysics. Not many young women took that road in 1960, and she was in the vanguard of the talented women scientists who are only now beginning to take on senior positions in academia and make their fair share of contributions to science.

Thirty-five years ago physiologists had to construct most of their own equipment for research, including complicated vacuum tube amplifiers, transducers, and recording equipment. Radioactive tracers were still novel in medical research. Our graduate students were advised to take courses in electrical engineering, nuclear physics, and physical chemistry, and Helen was no to membership of the National Academy of Science of Hungary and I am currently preparing to give my inaugural address at the Spring, 1995, meeting of the Academy. I try to spend some time at my farm in Boston, NY, where we breed horses and recently set up an experimental breeding program for falcons."

"I am not sure I have any important wisdom to impart, except that probably it is healthiest to stay busy and to continue in research, teaching, and service as long as it is possible. My wife (Clara M. Ambrus, MD, PhD, FACP, Professor of Pediatrics, Obstetrics/Gynecology, Pharmacology) told me not long ago that she plans to take "early" retirement at the young age of 100!"

exception. She competed successfully for honor grades with students in the Departments of Applied Physics and of Chemistry, and she became adept with a soldering iron to wire up amplifiers for physiological research. Her experiments often lasted until far into the night, and then, after clearing up, she had to walk back to her apartment on Mission Hill in Roxbury, which even then was crime ridden and one of the most dangerous areas in Boston. When Helen was growing up in Alaska, one of her hobbies was racing dog teams, and she often brought to the laboratory a well-trained but nevertheless formidable Siberian husky that lay at the foot of her operating table until she was ready to go home late at night. However, she also had some noncanine guardians in the form of medical students who kept coming in and out of the laboratory in a furtive sort of way. That was none of my business, but I was not at all surprised when she announced her engagement to Bob Cserr in 1962. He was a

fourth-year student and headed for a one-year internship at the University of Virginia. Helen, in the meantime. was well along on her thesis research and entirely capable of continuing it all on her own. The Professor of Physiology at Virginia, Parker Anslow, very kindly let her have some laboratory space and a teaching assistantship, and we were able to supply her with a total of \$750 for equipment and supplies. When she and Bob returned to Boston the following year. Helen handed me a check for \$420.68, which she said was the unexpended balance from the \$750. She had completed almost all the experimental work needed for her PhD thesis and was ready to start writing. In addition, she had conquered the Department of Physiology at Virginia as she had conquered my department at Harvard.

After completing her PhD and publishing the first of her many subsequent papers in American Journal of Physiology, Helen continued in my laboratory as a postdoctoral fellow and then as a regular instructor in the department. It was in this period that she did her first important work on the comparative physiology of the choroid plexus and blood-brain barrier, showing that the ionic composition of the brain is regulated in elasmobranchs and cyclostomes as it is in mammals, even though the glial barriers are very different anatomically. Much of this work was carried out at the Marine Biological Laboratories at Salsbury Cove, ME, where she later became a Trustee and member of the Executive Committee.

At this stage Helen consolidated her own work on the formation and circulation of cerebral extracellular fluids by writing an extensive review of the literature. The review was originally requested for a chapter in a specialized textbook, but some of us thought it would be appropriate for the more prestigious Physiological Reviews, a journal that is widely read by biomedical scientists in all fields related to physiology. The editors agreed enthusiastically, and Helen's review was published in 1970, just six years after her PhD thesis. This review not only laid the groundwork for subsequent research in this field, but it also helped to place Helen on the academic ladder at Brown University and to establish her reputation worldwide. In the years that followed she became a leader in collaborative research with colleagues from many laboratories, especially from the National Institutes of Health, the Salsbury Cove Biological Laboratories in Maine, the August Krogh Institute of Zoophysiology in Copenhagen, and the Department of Physiology at Kings College, London.

Helen's scientific contributions involved the transport of fluid and large proteins from brain interstitial fluid to the perivascular spaces and thence to the cervical lymphatics. Because this included antigenic protein, it brought her to the realm of neuroimmunology, and she became one of the pioneers in this new and important field. Her collaborative work with foreign colleagues led her to spend many months abroad. especially in Copenhagen and in London where she made many close friends. She was quite at home in England where she was elected to the British Physiological Society as well as to the Royal Society of Medicine. On several occasions she was invited to lecture in Japan, Hungary, East Germany, and other countries, and in recent years scientists from abroad came to work with her here at Brown University.

Her international activities and her work at Salsbury Cove during the summers often took her away from home base for several weeks or even months. and we, her friends, often wondered how she could possibly manage this and at the same time maintain such a beautiful home and gardens as she did at North Dighton, MA. All of this she did with apparent ease and with obvious love for both her work, her home, and her family. With the support of Bob Cserr and their daughter Ruthie, Helen was able to combine a truly distinguished academic career with a balanced family life and the creation of a beautifully adorned home.

> John Pappenheimer Professor of Physiology (Emeritus) Harvard University

Moving?

If you have moved or changed your phone, fax, or eMail number, please notify the APS office at

301-530-7171

or eMail to internet: LBucker@aps.faseb.org

Be sure to include your name, degree(s), title, department, institution, complete mailing address, telephone and fax numbers, and eMail address.

APS Urges Investment in NIH

Federally funded biomedical research at the NIH is an important investment that the government must continue, APS Executive Director Martin Frank told the House Appropriations Subcommittee on Labor-HHS-Education. Despite the emphasis on "privatization" of government functions contained in the Contract With America signed by many House Republicans, the NIH "is not one of those functions of government that can be transferred to the private sector," Frank declared.

Public witness hearings, such as the one on January 31 where Frank testified, are usually held in the spring after the administration has submitted its budget. However, in order for House Republicans to achieve their ambitious agenda for the first one hundred days of the 104th Congress, new Labor-HHS-Education Appropriations Subcommittee Chairman John Edward Porter (R-IL) plunged into hearings in January.

Frank discussed the contribution of creative science to NIH's success, noting examples of fundamental research that had practical applications to apparently unrelated problems. He pointed out other reasons why the nation should invest in NIH, such as the economic activity generated by NIH research. He cited a recently released study by the State of Maryland that estimated the economic impact of NIH's \$10 billion FY 1993 budget to have been \$44.6 billion in gross sales and \$17.9 billion in employee income across the US. That economic activity included support for more than 726,000 jobs nationwide for scientists, laboratory technicians, and administrative personnel, as well as jobs in companies that provide equipment and supplies for biomedical research. He further pointed out the contribution our investment in NIH makes toward building up our nation's intellectual capital. "This is an investment in ourselves as a technologically advanced nation, and it is eminently worth making," Frank told the subcommittee.

Frank also spoke favorably on behalf of administration proposals to simplify and improve indirect cost reimbursement and asked Congress to give the administration time to implement them before making its own cuts to indirect costs. "However," Frank noted, "in this time when everyone is asked to state their priorities, let me make certain that you know where ours are: We urge you above all else to assure a stable *direct* cost base for our nation's biomedical research."

In closing, Frank urged the panel to look beyond the appropriations process to new ways to increase funding for NIH research. Given NIH's contributions to resolving health

Message to Congress: Support NIH Research

In the past, NIH was virtually assured of strong bipartisan support on Capitol Hill in both the House and the Senate. But that dynamic has changed, particularly in the House. The long-time members of the House Appropriations Subcommittee on Labor-HHS-Education are still supportive of NIH, especially the new Chairman, Rep. John Edward Porter (R-IL). However the five newly appointed Republicans include some who are skeptical if not openly hostile to the NIH.

In a recent New York Times article, one new member, Rep. Jay Dickey (R-AR) was quoted as describing the NIH advocates who had testified before the Labor-HHS-Education Subcommittee as being "in a state of denial" with respect to the meaning of last year's election. "Voters gave us a ticket to a different train, which may be going in a different direction," Dickey told the New York Times. "NIH will have to take some cuts." The article also noted that staff aides designated by several of the new Republicans to handle NIH funding issues had previously worked at organizations such as the National Taxpayers Union Foundation, the Heritage Foundation, and the conservative Free Congress Foundation. Physiologists need to let the five newest Republican members of the subcommittee (Istook, Miller, Dickey, Riggs, and Wicker) know about the many benefits our nation derives from NIH-funded research. The above article on APS testimony will provide some details in this regard. It would be helpful also to let Chairman Porter know that you appreciate his efforts to sustain the NIH.

All members of the subcommittee can be contacted through the US House of Representatives, Washington, DC 20515.

House Appropriations Subcommittee on Labor-HHS-Education

Republicans: John Edward Porter (IL) C.W. "Bill" Young (FL) Henry Bonilla (TX) Ernest Jim Istook (OK) Jay Dickey (AR) Dan Miller (FL) Frank Riggs (CA) Roger Wicker (MS) Democrats: David Obey (WI) Carl Stokes (OH) Steny Hoyer (MD) Nancy Pelosi (CA) Nita Lowey (NY) problems, including ones caused by occupational and environmental factors, alcohol, drugs, and violence, "there is justification to looking towards the sectors of our society that may have harmed our citizen's health" and to ask these sectors "to contribute more directly toward the furtherance of NIH research," he said. Because NIH findings set standards for medical care that health insurers rely upon, the insurance industry is also indebted to NIH. "What I am suggesting," Frank said, "is that we should find ways to let NIH research funding get something back from those who have benefitted the most from it."

FBR Publishes Animal Research FAQ

The Foundation for Biomedical Research (FBR) has just published a brochure entitled "Frequently Asked Questions About Animal Research." The brochure offers responses to the kinds of questions individuals involved in animal research often find themselves facing, such as, "How can research results derived from animal testing be extrapolated to humans?" and "Why can't alternatives such as computer models and cell cultures replace animal research?"

The brochures cost \$0.25 each and are available from FBR at 818 Connecticut Ave., NW, Suite 303, Washington, DC 20006. For more information call 202-457-0654.

Clinton Submits Funding Request

In the budget sent to Capitol Hill February 6, President Clinton proposed a funding level of \$11.773 billion in FY 1996 for NIH. This represents an increase of \$468 million, or 4.1% above the comparable FY 1995 level. According to NIH, this budget could fund a total of 23,874 research project grants (RPGs), plus an additional 1,195 for the small business grants known as SBIRs and STTRs. (SBIRs/STTRs are being counted separately from RPGs in the FY 1996 budget.) This would mean funding for 22 more RPGs in FY 1996 than the 23,852 expected to be funded in FY 1995, plus 153 new SBIR/STTRs. New RPGs would total 6,046, which is 522 fewer than the number of new grants expected to be awarded in FY 1995. The proposed budget would provide an FY 1996 success rate of 23% compared with a 24% success rate anticipated in FY 1995.

VA Medical and Prosthetic Research, which has had a relatively stagnant budget for the past several years, was recommended for a modest 2.1% increase. The NSF as a whole got a 3% increase, but a much higher increase of 7.6% was recommended for Research and Related Activities overall, as well as a 7.6% increase specifically for the Biological Sciences Directorate. A decrease of \$100,000 was recommended for APHIS Animal Care activities, including Animal Welfare Act (AWA) Enforcement, which has also been stagnant for a number of years.

President's FY 1996 Budget Request Compared with FY 1995 Funding (dollars in millions)				
Agency	FY 1995 Enacted	FY 1996 Request	\$ Change FY 1995-96	% Change FY 1995-96
NIH	\$11,305.5	\$11,773.0	+\$467.5	+4.1%
VA Medical and Prosthetic Research NSF	\$251.7	\$257.0	+\$5.3	+2.1%
Research and Related Activities (total)	\$2,280.0	\$2,454.0	+\$174.0	+7.6%
- Biological Sciences Directorate	\$301.0	\$324.0	+\$23.0	+7.6%
APHIS Animal Care	\$9.6	\$9.5	-0.1	-1%

OMB Asks Comments on Indirect Cost Changes

On February 6 the Office of Management and Budget (OMB) published two *Federal Register* notices proposing changes in how institutions recover indirect costs for federally sponsored research. The first notice announced that OMB was going to incorporate cost accounting and disclosure statement principles of the federal Cost Accounting Standards Board into OMB Circular A-21, which is one of the key documents governing indirect cost reimbursements.

The second notice recommended eight revisions to A-21 and asked for comments on additional areas where revisions were under consideration. The proposals in this notice were developed as part of a "comprehensive review" of the indirect cost system the administration promised it would incorporate into its FY 1996 budget. Comments on these proposals are to be submitted before April 7, 1995, but comments received later will be considered to the extent possible. The address for comments is OMB Office of Federal Financial Management, Room 6025, New EOB, Washington, DC 20503.

The proposals up for current consideration include:

- Clarify the policy governing the transition from use allowance to depreciation and examine useful life schedules for equipment so that institutions may only recoup the remaining depreciation expense representing the rest of the useful life of an asset when the institutions switches from use allowance to depreciation methodology.
- Decrease the disparity of cost recovery rates among institutions by no longer permitting so-called "special cost analysis studies" to justify higher rates for utility, library and student services costs.
- Make the total cost of a grant predictable from the outset by using the indirect rate in effect during the first year throughout the term of the grant.
- Prohibit universities from charging the cost of dependent tuition benefits to sponsored agreements.
- Provide more consistency on interest allowability by establishing criteria for appropriate reimbursement of interest costs, i.e., where there is a favorable lease/purchase analysis, a reasonable rate of interest, and an offset of investment earnings against interest costs.
- Make the federal agency providing an institution with the largest amount of funding responsible for overseeing all its government-funded sponsored agreements.

- Establish an interagency task force to develop further recommendations for revising indirect cost policies and to suggest pilot projects to test ways to streamline operations, reduce costs, or improve delivery.
- Replace the term "indirect costs" with the terms "facilities costs" and "administrative costs."

For further information on these proposals or the issues still under consideration, contact APS Public Affairs Officer Alice Hellerstein at 301-530-7105 or Norwood Jackson of the OMB's Office of Federal Financial Management at 202-395-3993.

Jane Goodall to Speak at NABR Conference

Chimpanzee expert Jane Goodall will be a featured speaker at the 1995 Conference of the National Association for Biomedical Research (NABR) to be held in Washington, DC, April 30 to May 2. Last year Dr. Goodall sent an open letter via the Internet calling for public fora to be held to discuss the use of animals in research and education in which she asserted that the way animals are treated in laboratory experiments is a matter of public concern. Goodall noted a number of possible discussion issues but seemed most interested in ethical questions such as appropriate limitations on animal pain and the usefulness of animal research. The letter said, in part, that "researchers state that animal experiments are conducted for reasons such as advancing knowledge and curing disease. But treating our fellow creatures as we do, on the scale we do, raises critical questions. Failure to examine them honestly is a failure of our own humanity." Dr. Goodall's address to the NABR conference will be followed by a discussion with the audience to be moderated by NABR Board member Franklin M. Loew, Dean of the Tufts University School of Veterinary Medicine.

Other featured speakers at the conference will include Animal Welfare Institute Executive Director Cathy Liss, Doris Day Animal League Executive Director Holly Hazard, and Jon Entine, who is author of several articles concerning the Body Shop, Inc., a cosmetics firm that has heavily traded on its claims that it does not use animal-tested products. Attendance at the conference will be limited to representatives of NABR member institutions, state network organizations, and certain government agencies. For further information and conference registration, contact NABR at 202-857-0540.

Bloom New Editor-in-Chief for Science

It was announced by the American Association for the Advancement of Science (AAAS) that APS member Floyd E. Bloom has been named as the new Editor-in-Chief of Science. Bloom. who studies chemical control of neuronal activity, will continue his research career and remain as chairman of the Department of Neuropharmacology at Scripps Research Institute in La Jolla, CA after taking on his new duties in spring 1995. Past honors for Bloom include election to the National Academy of Sciences (1977), past president of the Society for Neuroscience, board member for AAAS, and volume editor of Handbook of Physiology: The Nervous System: Intrinsic Regulatory Systems of the Brain.

Schultz Receives ACDP Distinguished Service Award



At the Association of Chairmen of Departments of Physiology (ACDP) annual meeting December 1-4, 1994, in Los Cabos, Baja California, Mexico, Stanley G. Schultz received the ACDP Distinguished Service Award presented by Antonio Scarpa. This prestigious annual award is given by the President of the ACDP, in consultation with the Executive Committee, to the physiologist who during his/her career has made a significant contribution to teaching, research, and service in the discipline of physiology.

Schultz is a past-president of APS and is currently the chairman of the Department of Physiology and Cell Biology at the University of Texas Medical School in Houston. He is the editor of *News in Physiological Sciences*, an APS journal published jointly with IUPS.

At the same meeting, the following officers were installed, all of whom are APS members: Antonio Scarpa, President; Robert D. Foreman, President-Elect; Wayne E. Crill, Past-President; R. John Solaro, Secretary-Treasurer; Paul J. De Weer, Councillor; L. Gabriel Navar, Councillor; James G. Townsel, Councillor; Ian M. Phillips, CAS Representative; Allan W. Cowley, Jr., CAS Representative; Leonard S. Jefferson, Public Affairs.

Kim Elected President of KPS



In October, 1994, APS Corresponding Member Kee Soon Kim was inaugurated as President of the Korean Physiological Society (KPS). Kim earned his PhD at Loyola University in Chicago under Walter Randall in 1968. He is currently Chair of the Department of Physiology at Hanyang University in Seoul and has recently represented the KPS at the joint APS-Taiwan Physiological Society meeting in Taipei and at the IUPS meeting in Glasgow.

Fray Wins Award



APS member John C. S. Fray, a professor of physiology at the University of Massachusetts Medical School, has been awarded the 1994 Telegram & Gazette Visions 2000 Enterprise Award. This community service award is given annually in recognition of an outstanding contribution to the quality of life in Central Massachusetts through an invention, idea, or technological advance. Fray was given the Enterprise Award for his research into the treatment of diabetes and other disorders with drugs extracted from herbs. In addition to pursuing his research career at the University of Massachusetts, Fray recently founded a small biotechnology firm, Jamaika Biotek. The award carries with it a \$5,000 prize.

OPS Annual Meeting

The Ohio Physiological Society announced that their 10th annual meeting will be held September 28 and 29, 1995, in Toledo, OH. For more information, contact Patricia J. Metting, PhD, President, Ohio Physiological Society, Department of Physiology and Molecular Medicine, Medical College of Ohio, Toledo, OH 43699-0008. Tel: 419-381-4415; fax: 419-381-3124.

Hesslink to Host Radio Talk Show

APS member Robert L. Hesslink, Jr., will coordinate and teach ergonom-



ics at University of California, San Diego, for a certificate program in Safety and Ergonomics that he developed for UCSD. In addition, "Working Well with Dr. Robert Hesslink, Jr.," a radio talk show on AM 1000 KCEO, debuted on December 24, 1994. The program is directed at highlighting current trends in the workplace related to the well-being of the employee and employer. Hesslink has also begun publishing a newsletter, "Working Well Weekly."

APS Members Benefit From von Humboldt Foundation

The Alexander von Humboldt Foundation recently announced the recipients of selected awards designed to promote international research collaboration. **Alan Kim Johnson**, University of Iowa, and **Stanley B. Prusiner**, University of California, were selected to receive funding for a German postdoctoral researcher under the Feodor-Lynen Fellowship Program. This program enables German scholars under 38 years of age who have a doctoral degree to spend as many as three years at the home institutions of former Humboldt fellows and awardees.

The Feodor-Lynen Fellowship Program is one of the several programs supported by the Alexander von Humboldt Foundation of Bonn, Germany, which provide highly qualified individuals of all nationalities with an opportunity to conduct research in Germany. For more information about the foundation and its programs, contact Dr. Bernard Stein, the Alexander von Humboldt Foundation, Suite 903, 1350 Connecticut Ave., NW, Washington, DC 20036. Tel: 202-296-2990; fax: 202-833-8514.

Shichun Bao is currently employed by the Medical University of South Carolina, Charleston, SC. Formerly, Shichun Bao was with the Department of Physiology, Indiana University, Indianapolis, IN.

Morris J. Birnbaum, formerly with Harvard Medical School, Boston, has accepted a position with Howard Hughes Medical Institute, University of Pennsylvania School of Medicine, Philadelphia, PA.

Recently moving from the Department of Physiology, University of Minnesota, Minneapolis, MN, Yi Guo is currently with the Department of Anesthesiology, University of Alabama, Birmingham, AL.

Basil G. Hanss has accepted a position with Mount Sinai School of Medicine, New York, NY. Previously, Basil G. Hanss was with the Laboratory of Oral Medicine, the National Institute of Dental Research, NIH, Bethesda, MD.

Appointed to the Vice Presidency for Regulatory Affairs, **Gregory M. Hockel** is now with British Biotech, Inc., Annapolis, MD. Prior to his appointment, Gregory M. Hockel was with G.H. Besselaar Associates, Princeton, NJ.

Betty R. Lawton has accepted a position as Exercise Physiologist at the Southern Illinois University at Edwardsville, IL. Prior to this, Betty R. Lawton was with the Exercise Physiology and Nutrition Center in Shrewsbury, MA.

Zhongyong Li has accepted a post with the Department of Orthopedics, Pennsylvania State University, Hershey, PA. Zbongyong Li was previously with the Department of Biomedical Sciences, McMaster University, Hamilton, Ontario, Canada. Now with the U.S. Environmental Protective Agency at Research Triangle Park, NC, James J. McGrath was formerly with the Texas Tech University Health Science Center of Lubbock, TX.

Kazuo Obara has accepted a position as Assistant Professor, Department of Pharmacology, School of Pharmaceutical Sciences, University of Shizuoka, Shizuoka, Japan. Prior to this position, Kazuo Obara was a Visiting Scientist in the Department of Physiology & Biophysics, University of Cincinnati, Cincinnati, OH.

Moving from the Department of Physiology & Biophysics, University of Tennessee, Memphis, TN, Andrej A. Romanovsky is now with the Thermoregulation Laboratory/BIRC of Portland, OR.

Barbara Shykoff has moved to the Department of Medicine, Millard Fillmore Hospital, Buffalo, NY. Before her new employment, Barbara Shykoff was with the Department of Physiology, State University of New York, Buffalo, NY.

Ligia G. Toro De Stefani has joined the Department of Anesthesiology, University of California, Los Angeles Medical School, Los Angeles, CA. Previously, Ligia G. Toro De Stefani was with the Department of Molecular Physiology and Biophysics, Baylor College of Medicine, Houston, TX.

Accepting a position with the Department of Surgery, Baltimore VA Medical Center, Baltimore, MD, Jian-Ying Wang has moved from the Department of Physiology and Biophysics, University of Tennessee Medical School, Memphis, TN.

Formerly with the Department of Anatomy, University of Berne, Switzerland, **Professor Ewald R. Weibel** is now with the Maurice E. Müller Foundation in Berne, Switzerland.

Professor Mario Wiesendanger has recently relocated to the Neurologische Universite Klinik of Bern, Switzerland. Professor Wiesendanger was previously with the Institut de Physiologie, Fribourg, Switzerland.

Bucket Diagrams: A Problem-Solving Approach to Renal Physiology

Herbert F. Janssen

Lubbock, TX: Texas Tech University Press, 1994, 224 pp., illus., index, \$17.50. ISBN: 0-89672-323-2

In recent years, problem-based learning (PBL) has emerged as the fashionable strategy for curriculum reform in medical education. Problem-solving skills are challenging for medical students to grasp, as their undergraduate educational experience usually emphasizes and rewards memorization. Moreover, instructors are faced with the formidable task of adapting to this new teaching style. Because PBL has only recently been implemented into many curriculums, there are few resources from which instructors can derive problems and strategies for PBL sessions. Bucket Diagrams eases the transition for both parties by providing a programmed text for the study of renal physiology through the PBL format. Originally developed as a teaching aid and study guide in a comparative animal physiology course, Bucket Diagrams is divided into the following sections: 1) basic rules, symbols, and definitions, 2) glomerular capillary filtration, 3) inulin excretion, 4) p-aminohippurate (PAH) excretion, 5) glucose excretion, 6) urine concentrating mechanisms, 7) body fluids, 8) corrections, and 9) self-test questions.

The first section of the book sets the ground rules utilized in the preparation of the book. These rules range from the obvious (i.e., values are rounded off for ease in performing mathematical calculations) to more informative disclaimers (i.e., many of the values given or calculated in the problems cannot be obtained experimentally in the laboratory). The author takes this opportunity to note some simplifying assumptions (i.e., splay is ignored in problems involving solute transport, and renal plasma flow is considered to equal effective renal plasma flow). These concepts, and their impact on renal function and its assessment, are addressed in the section on corrections. The first section of the book also provides definitions and equations on which the student must rely to begin solving the ensuing problems.

The subsequent six sections of the book guide the student through important concepts in renal and body fluid physiology. Each section begins with an introduction of varied length, followed by sections on objectives, examples (problems and their step-by-step explanations), and a summary. The problems are posed as a diagram and an accompanying table, and there are four basic types, described below.

The glomerular capillary filtration problems provide an exercise in applying the Starling equation and Ohm's law to predict the impact of specific perturbations on glomerular function. Each diagram illustrates a glomerulus with its afferent and efferent arteriole, which has been modified slightly to depict a specific experimental perturbation (alterations in the glomerular filtration coefficient, afferent or efferent resistance, plasma oncotic pressure, etc.). The accompanying table provides data (and blank cells into which the student should be able to provide predicted or calculated values) for the various Starling forces, glomerular filtration coefficient, glomerular filtration rate, and renal plasma flow.

A second form of problem is utilized for the sections of the book involving renal handling of specific solutes (inulin, PAH, and glucose). These problems rely heavily on the student's understanding of the mass balance concept and application of this concept to handling of a solute by various portions of the nephron. Each problem is illustrated with an identical diagram of a stylized nephron and its associated vasculature. Several sites along the nephron and its vasculature are designated as sampling sites, depicted as buckets in the diagram (hence the book's title). The sampling sites are afferent arteriole, Bowman's space, efferent arteriole, end of the proximal tubule, end of the capillaries surrounding the proximal tubule, renal vein, and final urine. The accompanying table details volume per minute, amount per minute, tubule fluid-to-plasma (TF/P) ratio, and concentration of the solute collected in each of the buckets, as well as the clearance, extraction ratio, and transport maximum of the substance. Filtration fraction and fractional water reabsorption by the proximal tubule are also incorporated into this exercise, although the latter value is designated by a somewhat unorthodox usage of the term glomerulotubular balance (as in "the G-T balance is given as two-thirds"). According to the general format of the book, some of these values are provided and the student must derive the missing data.

Problems related to the urine concentrating mechanism are similar to those described for solute handling, except that the nephron includes additional sample sites (buckets): bend of the loop of Henle, distal convoluted tubule, cortical collecting duct, and papillary interstitium. The accompanying table has cells for osmolality, flow, inulin concentration, and TF/P inulin ratio at each sample site, as well as osmolal clearance and free water clearance. Again, given some data, the student must apply mass balance concepts to fill in the remainder of the table. The various problems depict conditions of normal, low, or high antidiuretic hormone levels.

The problems in the body fluids section are not unique, relying entirely on the classic Darrow-Yannet diagrams found in many textbooks. However, the problems are well suited to the format of the book, and the accompanying explanations are clear and concise. Finally, the student will be most pleased to find the 160 multiplechoice questions (and answers) at the end of the book, which will certainly be utilized extensively in preparation for the inevitable exam.

This reviewer's enthusiasm for the book is dampened by the numerous errors of varying degrees of seriousness. Typographical errors abound but are usually obvious to the reader and have little impact on the conveyance of information. There are cases where incorrect information (equations, definitions, etc.) is provided in the section on definitions, which is disturbing, since this portion of the book provides the groundwork for attempting to complete the problems. Fortunately, these errors are not perpetuated in the remainder of the book. There are numerous other instances of misinformation (primarily in introduction and summary narratives) that might have been avoided had the work been critically evaluated by a renal physiologist before its publication. Bucket Diagrams will not suffice as the sole source of information required for an adequate understanding of renal and body fluid physiology by medical students. The book is intended to serve as a study guide and PBL tool; thus, many concepts are oversimplified or omitted from the book. As a result of this approach, well-read students will usually be unnecessarily challenged when attempting to solve the first problem of a section (especially since some pertinent assumptions are stated in the following explanation, rather than in the introduction). This is not too much of a hindrance, since the learning process in this book sometimes becomes merely one of repetition. Overall, however, the student will be well served by systematically completing the entire series of PBL exercises in this book. There is no doubt that a firm grasp of important physiological concepts is necessary to successfully complete these exercises and that, in turn, the student's understanding of these concepts will be strengthened by the process.

> Pamela K. Carmines University of Nebraska Medical Center

The Electroencephalogram: Its Patterns and Origins

John S. Barlow

Cambridge, MA: The MIT Press, 1993, 456 pp., illus., index, \$95.00. ISBN: 0-262-02354-7

This is an excellent book written by one of the pioneers and internationally recognized experts in the field of EEG. Dr. Barlow admirably displays his dual expertise in both electrophysiology and clinical encephalography.

The central theme introduced in the first few pages of the book and emphasized throughout is that the EEG signal is the result of the modulation of a self- oscillatory system by two independent means. One means is the modulation of extrema, which the author defines as the peaks and valleys of waves. This modulation changes both the amplitude and the duration of the waves (hence the frequency), but the slope of individual waves remains constant. Extrema modulation differs from amplitude modulation, in which only the amplitude is changed, and from frequency modulation, in which only the frequency is changed. The other means of modulation is the modulation of slopes. Thus the basic hypothesis Barlow presents and tests is that any EEG pattern can be considered as though it were composed of oscillations, the extrema and slopes of which can be modulated independently. The oscillator in Barlow's system is a voltage-controlled oscillator having a triangular wave output modified so that both the slopes and the extrema of the triangular waves can be modulated independently. The electronics and other instrumentation required to accomplish this task are not complex but are too detailed to outline in this review.

Barlow's hypothesis was tested by three methods: 1) simulation of actual EEG patterns, 2) testing of predictions concerning actual EEGs using a variety of standard analytical techniques and several special techniques designed specifically for the model, and 3) by reconstituting on-line, real-time signals. The results of these tests showed that it was possible to simulate a wide variety of wellrecognized EEG patterns.

Having shown that the simultaneous extrema and slopes modulation is capable of simulating a large number of frequently encountered EEG waveforms, the only weakness in the book comes in relating the simulated waveforms to the physiological electrical activity of the brain.

The author presents an excellent summary of what is known and what has been postulated regarding the generating mechanisms of familiar waveforms, but links between the model and neuronal activity remain elusive.

The author acknowledges that "in view of enormous complexities of the cortex, the possibility of specifying the details of the generating mechanisms for the respective modulating signals for extrema and slopes, envisaged in the extrema-slopes hypothesis, appears remote." The author also emphasizes "that the basic extrema-slopes hypothesis was originally evolved as a unifying approach to account for a wide variety of EEG patterns, and in this respect 'stands on its own feet', irrespective of the speculative inferences that have been attempted concerning possible physiological implications of the hypothesis in relation to basic EEG generating mechanisms."

The book is divided into sections such that the reader can select those of interest without having to read the entire book. This results in some redundancy required to allow each section to be complete in itself. The book is not for the beginner in electrophysiology or for the clinical interpreter of EEG patterns. It is directed to the basic scientist concerned with elucidating the sources and pathologies of the EEG and recording and analyzing waveforms quantitatively. The book is virtually devoid of mathematics but alludes to high-level techniques for waveform analysis. Block diagrams of electronic data processing systems are abundant but are used to show only the flow of information and the necessary steps in processing. For clarity in presenting his hypothesis and evaluating its merits, the author has omitted many details that could be distracting. The book is an excellent source for references containing a total of 611 ranging over time from Berger (1929) up to 1993.

> Lee E. Baker University of Texas at Austin

Synaptic Plasticity: Molecular, Cellular and Functional Aspects

Michael Baudry, Richard F. Thompson, and Joel L. David (Editors)

Cambridge, MA: The MIT Press, 1993, 263 pp., illus., index, \$50.00.ISBN: 0-262-02359-8

The mechanisms of neuronal plasticity are interesting to neuroscientists from diverse areas, including development, aging, learning and memory, and cellular functioning. The editors of Synaptic Plasticity: Molecular, Cellular and Functional Aspects have attempted to compile a set of chapters that reviews the current theoretical and empirical answers to a few questions regarding synaptic plasticity. These questions include how many plastic processes exist, what are the plastic processes, and how do they subserve behavior. Accordingly, the book includes a fine collection of chapters to achieve that goal. For the most part, the chapters are approachable by many readers independent of their individual area of expertise, making the book appealing to researchers from many fields.

The answers to the editors' questions, provided by leading experts in their field, show a convergence of thinking despite different scientific perspectives. For example, it appears that there are only a few types of plastic processes. In general, two types of synaptic alterations have been demonstrated, long-term potentiation (LTP) and long-term depression (LTD). Researchers study these forms of plasticity both in vivo and in vitro. There appear to be at least two forms of each type of plasticity. In vitro studies have revealed LTP may or may not depend on *N*-methyl-D-aspartate receptors (chapter 4) and LTD can be homo- or heterosynaptic (chapter 7). In vivo studies have revealed the functional aspects of these plastic processes, including maturation of visual and motor systems (chapters 1 and 7), fear conditioning (chapter 11), eyeblink conditioning (chapter 11), and passive avoidance in the chick (chapter 10), depend on mechanisms that share many points in common with LTP and LTD. The editors also ask what the molecular mechanisms of plasticity are and how do these processes theoretically link to information processing. Several chapters address the underlying mechanisms of plasticity, including structural changes at the synapse (chapter 2), neuronal regeneration studies (chapter 3), and in vitro studies of LTP and LTD (chapters 4- 7). These investigations have led to the conclusion that a few processes are responsible for synaptic plasticity. All forms of plasticity appear to depend on calcium influx and, ultimately, changes in gene expression that produce long-term modifications of the structural and functional aspects of an individual neuron. The alterations in synaptic weighting map directly onto theoretical computational models of information processing to predict how learning and information storage might occur (chapter 8 and 9).

The editors provide theoretical and empirical evidence throughout the book. However, there are a few chapters that deserve recognition for clearly describing their research and its implications, providing the readers with a complete understanding of the relevant questions. Chapter 2 by Oswald Stewart examines potential structural changes at synaptic sites and strikes a fine balance between theory and data. The chapter points to critical questions that need answers and the logistics of getting those answers. This chapter was extremely readable and informative. Artola and Singer (chapter 7) provide a comprehensive review of LTD, including comparing and contrasting hetero- and homosynaptic LTD. The chapter was clearly written and well organized at a technical level consistent with most of the book. Steven Rose has written a chapter (chapter 9) that within itself takes the reader from cellular to functional aspects of the changes that occur in learning in the chick. These chapters alone make the book worth reading.

> Stacey L. Young University of Vermont

NMR in Physiology and Biomedicine

Robert J. Gillies (Editor)

San Diego, CA: Academic Press, 1994, 471 pp., illus., index, \$95.00. ISBN: 0-12-283980-3

Magnetic resonance, due in part to its noninvasive nature and unique analytical capability, has become the method of choice for research problems in physiology and pathophysiology. The use of magnetic resonance imaging and magnetic resonance spectroscopy in clinical medicine has allowed rapid progress in diagnosis and therapeutic treatment in some previously poorly understood disease states. The combined ability to perform clinical, physiological, and biochemical measurements on cell systems, animal models, and human subjects empowers the technique of magnetic resonance as one without rival in various biomedical applications. As pointed out in the forward, much of the primary literature in the field and texts reviewing magnetic resonance focus on nuclear magnetic resonance (NMR) theory and very specific clinical and biophysical applications of this technique. The editor and contributing authors of NMR in Physiology and Biomedicine have done an excellent job of filling a crucial niche describing in vivo biological magnetic resonance.

This book is broadly divided into two parts. The first part focuses on theoretical considerations, and this section benefits from a very well-written introductory chapter. Even though the mathematical relationships describing magnetic resonance are inherently difficult, the authors clearly diagram these concepts without oversimplifying the underlying chemical and physical principles. The second part, which is clearly two-thirds of the content of the book, focuses on clinical, physiological, and biochemical applications. This section includes descriptions of some novel experimental systems and innovative applications of NMR techniques. Chapters 15 and 16 are particularly well written in this regard; they focus on informative approaches to the study of pathophysiology in smooth muscle and the mix of molecular biology and NMR used to determine structure-function relationships.

Although each chapter addresses very specific applications, they all follow the same general format: an explanation of the theoretical basis of the techniques, applications, limitations of the approach, conclusions, and importantly, for those not active in the field, future directions and research perspectives. This organization makes the material easier to assimilate and allows this book to be readily used as a reference. In those instances where the research applications are not illustrated with examples, the authors of these chapters have included extensive reference lists. The inclusion of a glossary was imperative; it familiarizes the reader with the jargon of NMR. The editor has also included three appendices, compiling information on biologically relevant NMR nuclei and their applications, ¹³C-NMR shifts, and ³¹P-NMR chemical shifts; the first of these is necessary to initiate the new researcher, and the latter two are important for those already in the field.

The editor points out that current concepts have been emphasized at the expense of historical perspective. This decision actually turns out to be an asset to the book, since the authors of the various chapters, particularly in the introductory sections, have cited the historically relevant work, without devoting valuable space to a chronological listing of events. In some instances the authors have gone so far as to point out the degree of technical difficulty of the reviews they have cited; this allows the uninitiated reader to familiarize himself/herself with the relevant historical information at his/her own comfort level.

The purpose of this book is described as twofold: to comprehensively review in vivo biological magnetic resonance and to introduce NMR techniques to "working physiologists." The book is successful in both regards; the chapters provide clear, up-to-date information on the use of NMR in physiological and biochemical systems, technical limitations, and future perspectives.

One of the few shortfalls of the text, and only a minor one, is the absence of a discussion of the use of NMR in nucleotide, protein, and especially membrane structural studies. Although these applications have been more extensively reviewed elsewhere, a single chapter describing these NMR methods would have allowed the reader to become more familiar with NMR applications and would have accentuated the power of magnetic resonance spectroscopy. A more detailed discussion of nuclei other than ¹³C, ¹H, and ³¹P (i.e., ¹⁹F and ¹⁴N) would have been helpful; however, space considerations may have made this prohibitive. Students of biotechnology would benefit greatly from this book, and it can be used in advanced undergraduate or graduate instrumentation or spectroscopy courses.

> Kathleen Boesze-Battaglia UMD-New Jersey

Human Cardiovascular Control

Loring B. Rowell

New York, NY: Oxford University Press, 1993, 500 pp., illus., index, \$65.00. ISBN: 0-19-507362-9

This book provides a superb synthesis and compendium of what is known-and not known-about cardiovascular function in people during exercise. Rowell gives excellent examples of integrative physiology in his description of the complex interplay of critical variables that maintain cardiopulmonary homeostasis during standing and dynamic exercise. *Human Cardiovascular Control* is a new textbook written to express and share new ideas about the control of the circulation, to clarify and expand previously presented ideas, and to provide a book suitable for teaching. Rowell has succeeded.

Some basics and the nature of the problem that gravity imposes on the cardiovascular system of bipeds are presented first. Reflex control during orthostasis, neural-humoral adjustments, and orthostatic intolerance are clearly and critically discussed. The main thrust of the book is human response to dynamic exercise. The concept of cardiovascular functional capacity; a description of the critical variables, including the role of the heart; and the nature of the control of regional blood flow in exercise are nicely presented. Cardiovascular control during isometric exercise is contrasted to that of dynamic exercise. Factors limiting oxygen uptake are described. Rowell then reviews the interacting and redundant mechanisms that control the circulation during severe exercise: mechanisms of central control, reflexes originating from receptors in active muscle, and the nature and role of the arterial baroreflexes. When I finished the book, I realized even more vividly the complexity of the problem but felt that I had a much better understanding of the control of the human cardiovascular system during severe exercise.

Of fundamental importance is our understanding of the nature of the cardiovascular responses that lead to successful adjustments to exercise. What is regulated? Is it correction of mismatches between blood flow and metabolic demands ("flow error"), or is it correction of mismatches between cardiac output and vascular conductance ("pressure error")? Woven throughout the text is critically evaluated evidence that "it is as though arterial pressure were the primary variable regulated." Consequently, some reflexes seem to jeopardize blood flow to maintain arterial pressure. Rapid resetting of the arterial baroreceptor operating point via the central nervous system is a key element in Rowell's model of cardiovascular control during dynamic exercise, as is the role of muscle chemoreflexes. Maybe both types of error are minimized to a degree, depending upon the conditions. The author occasionally attempts to make an "either/or" conclusion concerning concepts that others consider to be, as yet, inadequately supported by definitive data.

Much available evidence is analyzed to support the concept that "the primary reflex controllers of the renin-angiotensin-aldosterone system and of vasopressin are the arterial receptors" during changes in thoracic blood volume in humans. The role of atrial distension and the release of atrial natriuretic peptide (atriopeptin) is considered to be minor in the control of diuresis. (Is the synthesis and release of these potent peptides one of the redundant systems of cardiovascular control that is normally minor, if not trivial? Many scientists who have studied these peptides will disagree.) An interesting and thought-provoking analogy is made between the response to severe isometric skeletal muscle contraction and the cerebral ischemia response (the Cushing reflex) as displaying a positive feedback with destructive consequence when prolonged and extreme.

The dilemma of how large amounts of blood are moved to the heart from active skeletal muscle without intolerable capillary pressure elevations in the muscle is attributed to actions of the skeletal muscle pump, the second heart. Research from Rowell's laboratory, published since this book went to press, has provided even more hard evidence about this effective mechanism.

The role of the pericardium in limiting stroke volume has not been well developed in most textbooks. With an intact pericardium, a large end-diastolic volume of the left ventricle limits increases in right ventricular volume. The author's synthesis of available information helps explain why prolonged exercise training is needed to expand the pericardium to permit the markedly increased stroke volumes required for cardiac outputs over 30 l/min at the athlete's maximal oxygen uptake. Rowell explains the consequences of various kinds and levels of exercise training and also the importance of engaging a large fraction of the muscle mass to increase the maximal oxygen uptake.

Each chapter is well developed, informative, and provocative. Rowell's style is to present questions and hypotheses rather than to state dogmatic opinions. He does not hesitate to clearly state his conclusions, however. The questions at the beginning of many subsections and periodic summary paragraphs help the reader grasp the complex relationships discussed. Many of the hypotheses and ideas raised will require further extensive research using minimally invasive techniques that are currently unavailable.

Even though this is a 500-page book, there is so much to describe that in attempting to be brief a few of the paragraphs are so cryptic and the graphs so complex that the reader may need to consult the sources for a full understanding. The extensive list of references for each chapter makes this book a valuable monograph and reference and not just another textbook.

Rowell maintains his focus on human physiology, resorting to studies of other animals only for support, for contrast, or when important data from humans are unavailable. He has summarized, throughout the book, the many important studies resulting from three decades of careful research in his laboratory.

Many aspects of the neural and hormonal and even the mechanical control of the circulatory system are, as yet, but dimly perceived. Integrative physiology, as an analysis of the dynamic interaction of the many subsystems of the cardiopulmonary system, requires continuing research. The last words on the topics will be far in the future, and very very far in the future unless enough scientists are trained to do sophisticated research at the whole body level.

Human Cardiovascular Control should be readily available to all cardiologists, cardiovascular physiologists, and those involved with exercise and sports who want to understand and be abreast of this discipline. It is an excellent and provocative textbook for advanced students of cardiovascular physiology. Advanced Nutrition: Macronutrients. Carolyn D. Berdanier. Boca Raton, FL: CRC Press, 1995, 277 pp., illus., index, \$50.00. ISBN: 0-8493-8500-8.

Advances in Chromatography, Volume 35. Phyllis R. Brown and Eli Grushka (Editors). New York, NY: Marcel Dekker, Inc., 1995, 448 pp., illus., index, \$165.00. ISBN: 0-82477-9361-7.

Advances in Industrial Ergonomics and Safety VI. Fereydoun Aghazadeh (Editor). Proceedings of the Annual International Industrial and Safety Conference, San Antonio, Texas, 1994. Bristol, PA: Taylor & Francis, 1995, 803 pp., illus., index, \$195.00. ISBN: 0-7484-0085-0.

Clinical Anatomy for Medical Students, Fifth Edition. Richard S. Snell. Boston, MA: Little, Brown and Company, 1995, 898 pp., illus., index, \$52.95. ISBN: 0-316-80135-6.

The Differences Between the Sexes. R.V. Short and E. Balaban (Editors). New York, NY: Cambridge University Press, 1994, 479 pp., illus., index, \$100.00/Hardback; \$29.95/Paperback. ISBN: 0-521 44411-X/HB; 0-521-44878-6/PB.

Essentials of Biochemistry, Second Edition. Dorothy E. Schumm. Boston, MA: Little Brown and Company, 1995, 382 pp., illus., index, \$29.95. ISBN: 0-316-77531-2.

Eye Movements in Reading. J. Ygge and G. Lennerstrand (Editors). Oxford, England: Elsevier Science Ltd., 1994, 374 pp., illus., index, \$125.00. Wenner-Gren International Series, Vol. 64. ISBN: 0-08-042509-7.

Flow-Dependent Regulation of Vascular Function. John A. Bevan, Gabor Kaley, and Gabor M. Rubanyi (Editors). Clinical Physiology Series. New York, NY: Oxford University Press, 1995, 371 pp. illus., index, \$85.00. ISBN: 0-19-507842-X.

Human Thermal Environments: The Principles and The Practice. K.C. Parsons. Bristol, PA: Taylor & Francis, 1993, 359 pp., illus., index, \$49.50. ISBN: 0-7484-0041-9.

Information Processing Underlying Gaze Control. J.M. Delgado- Garcia, E. Godaux and P.-P. Vidal (Editors). Pergamon Studies in Neuroscience, No. 12. Oxford, UK: Elsevier Science Ltd., 1994, 460 pp., illus., index, \$134.00, ISBN: 0-08-042506-2.

Intravenous Feeding of the Neonate. Victor Y.H. Yu and Robert A. MacMahon (Editors). Boston, MA: Little, Brown and Company Medical, 1992, 290 pp., illus., index, \$110.00. ISBN:0-340-55241-7.

Keep On Running: The Science of Training and Performance. Eric Newsholme, Tony Leech, and Glenda Duester. New York, NY: John Wiley & Sons, 1994, 288 pp., illus., index, \$17.95. ISBN: 0-471-94314-2.

Medical Physiology. Rodney A. Rhoades and George A. Tanner (Editors). Boston, MA: Little, Brown and Company, 1995, 839 pp., illus., index, \$59.95. ISBN: 0-316-74228-7.

Nutrition for the Hospitalized Patient: Basic Science and Principles of Practice. Michael H. Torosian. New York, NY: Marcel Dekker, Inc., 1995, 720 pp., illus., index, \$150.00. ISBN: 0-8247-9292-0.

Physiology and Pathophysiology of Leukocyte Adhesion. D. Neil Granger and Geert W. Schmid- Schönbein (Editors). New York, NY: Oxford University Press, 1995, 501 pp., illus., index, \$85.00. ISBN: 0-19-508102-1.

Regulation of Breathing. (Second Edition, Revised and Expanded). Jerome A. Dempsey and Allan I. Pack (Editors). Lung Biology in Health and Disease Series/79. Claude Lenfant (Executive Editor). New York, NY: Marcel Dekker, Inc., 1994, 1219 pp., illus., index, \$195.00. ISBN: 0-8247-9227-0.

Renal Function, Third Edition. Heinz Valtin and James A. Schafer. Boston, MA: LIttle, Brown and Company, 1995, 314 pp., illus., index, \$27.95. ISBN: 0-316-89560-1.

Future Meetings			
1995 Experimental Biology '95	April 9-13, Atlanta GA		
APS Conference Understanding the Biological Clock: From Genetics to Physiology	July 8-12, 1995 Hanover, NH		
APS Conference New Discoveries Within the Pancreatic Polypeptide Family: Molecules to Medicine	November 8-11, 1995 Newport Beach, CA		
1996 Experimental Biology '96	April 14-18, Washington, DC		
APS Conference pHysiology of Acid-Base Regulation: From Molecules to Humans	To Be Announced		
APS Conference Neural Control of Breathing: Molecular to Organismal Perspectives	To Be Announced		
APS Intersociety Meeting The Integrative Biology of Exercise	October 1996 Vancouver, British Columbia		
1997 Experimental Biology '97	April 6-10, New Orleans, LA		

Professor/Chair of Physiology and Biophysics. The University of Alabama at Birmingham Schools of Medicine and Dentistry invite applications and nominations for a tenured. professorial position as Chair. Person will assume the leadership of a strong, well-funded, nationally recognized department with major areas of expertise in membrane transport, neurophysiology, and cardiovascular physiology. The chair will have an opportunity to expand the department. The department presently includes 18 FTE, 25 postdoctoral fellows, and 30 graduate trainees. Applicant must have PhD, MD, or equivalent degree, international recognition for his/her research, a commitment to graduate and medical education, and experience as a leader in administrative activities. The successful candidate will be an established scientist with an independent, funded research program. Send curriculum vitae and the names of three references by March 31, 1995 to Amy Thompson, UAB, MEB 310, Birmingham, AL 35294-3293. [EOAA]

Director, Life Sciences Research Office. The Federation of American Societies for Experimental Biology (FASEB) invites nominations and applications for the position of Director of its Life Sciences Research Office (LSRO). eporting to the FASEB Executive Director, the LSRO Director provides administrative oversight and coordination for all activities of LSRO. These activities include solicitation of funding and development of responses to proposal requests. selection of expert panels and staff support for panel deliberations, drafting of interim and final reports, and publication of completed studies in scientific journals or as monographs. In particular, the Director ensures that scientific liaison is maintained with public agencies, private and corporate sponsors, groups with research programs in biomedical and life sciences, and institutions of higher learning. The Director also serves as project leader for selected projects when expertise is appropriate. Founded in 1962, the Life Sciences Research Office draws on the expertise of the members of FASEB's Member Societies to provide expert evaluation of timely and important scientific issues through review by qualified scientists. Sponsors of LSRO studies have included government agencies, private foundations, and corporate sponsors. The office is currently staffed by 15 scientists and other professionals. Candidates for this position are expected to have a doctoral degree in a biomedical or life science, a record of productive scholarship, demonstrated ability to work effectively with sponsor agencies, and experience providing direction and coordination for a research team managing diverse projects. Applications and nominations should be submitted to: FASEB, Office of Human Resources, 9650 Rockville Pike, Bethesda, Maryland 20814-3998. [EEO]

Postdoctoral Fellowship. The Legacy Research Department has an open postdoctoral position beginning July 1995. A successful candidate will conduct basic thermophysiological research on the mechanisms of fever and/or endotoxin shock in the laboratory of Dr. A. A. Romanovsky. Requirements include MD and/or PhD degree in physiology or related sciences, peer-reviewed publications in the field, good surgical skills, and experience of conducting chronic experiments in laboratory animals. Computer, biochemical, and histological skills are welcome. This is a one-year position with an option of extension for a second year. Stipend and benefits are very competitive. Application deadline is May 30, 1995. Please send curriculum vitae, reprints of published papers, a description of research interests, experiences, and career goals, as well as names and phone numbers of at least two references to L. A. Kiesow, MD, PhD, Chief, Legacy Research, 2801 N. Gantenbein Avenue, Portland, OR 97227. [EEO]

Positions Available

There is a \$50 charge for each position listed. Positions will be listed in the next available issue of *The Physiologist* and immediately upon receipt on the APS Gopher Information Server. Listings will remain on the APS Information Server for three months.

A check or money order payable to the American Physiological Society must accompany the position listing. Purchase orders will not be accepted unless accompanied by payment. Ads not prepaid will not be printed. Copy must be typed double spaced and is limited to 150 words. All copy is subject to the editorial policy of *The Physiologist*. EOAAE indicates Equal Opportunity/Affirmative Action Employer and appears only when given on original copy. Copy deadline: copy must reach the APS office before the 15th of the month, two months preceding the month of issue (e.g., before February 15th for the April issue). Mail copy to APS, *The Physiologist*, 9650 Rockville Pike, Bethesda, MD 20814-39911.

Scientific Meetings and Congresses

Gene Therapy, May 1-3, 1995, Bethesda, MD. Information: International Business Communications, 225 Turnpike Road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.

Cell Adhesions Molecules: Targeting CAMs for Terapeutic and Diagnostic Application, May 15-16, 1995, San Francisco, CA. *Information*: Internal Business Communications, 225 Turnpike Road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.

Workshop on Advanced Methods of Pharmacokinetic and Pharmacodynamic Systems Analysis, May 19-20, 1995, Marina del Ray, CA. *Information*: David Z. D'Argenio, Biomedical Simulations Resource, University of Southern California, Los Angeles, CA 90089-1451. Tel: 213-740-0342; fax: 213-740-0343.

Short Course on Bioengineering Approachess to Pulmonary Physiology and Medicine, May 20, 1995, Seattle, WA. *Information*: Michael C. K. Khoo, Biomedical Simulations Resource, University of Southern California, Los Angeles, CA 90089-1451. Tel: 213-740-0342; fax: 213-740-0343.

Human Anatomy and Physiology Society, May 20-25, 1995, Hyatt Regency at Union Station, St. Louis, MO. *Information*: Kevin Patton, SCCCC Life Science, 4601 Mid Rivers Mall Dr., PO Box 76975, St. Peters, MO 63376-0975. Tel: 314-922-8000 ext. 4338; fax: 314-922-8352; e-mail: kpatton@chuck.stchas.edu.

Advances in the Understanding and Treatment of Multiple Sclerosis, May 22-24, 1995, Cambridge, MA. *Information*: Internal Business Communications, 225 Turnpike Road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.

Seventy-Seventh Annual Meeting of the Endocrine Society, June 14-17, 1995, Washington, DC. *Information*: The Endocrine Society, 4350 East West Highway, Suite 500, Bethesda, MD 20814-4410. Tel: 301-941-0200; fax: 301-941-0259.

Fourth IBRO World Congress of Neuroscience, July 9-14, 1995, Kyoto, Japan. *Information*: Congress Secretariat, Fourth International Congress of Neuroscience, c/o International Communications Specialists, Inc., Kasho Bldg., 2-14-9, Nihombashi, Chuo-ku, Tokyo 103, Japan. Tel: 81-3-3272-7981; fax: 81-3-3273-2445.

American Institute of Biological Sciences 46th Annual Meeting, August 6-10, 1995, Town and Country Hotel, San Diego, CA. *Information*: AIBS Meetings Department, 730 11th St., NW, Washington, DC 20001-4521. Tel: 1-800-992-2427 or 202-628-1500; fax: 202-628-1509.

Fourth International Congress of Comparative Physiology and Biochemistry, August 6-11, 1995, Birmingham, UK. Information: International Union of Biological Sciences, Ltd., China Court Business Centre, Ladywell Walk, Birmingham B5 4RX, UK. Tel: 44-121-622-3644; fax: 44-121-622-2333.

Third International Head-Out Water Immersion Symposium, August 28-29, 1995, Copenhagen. *Information*: Peter Norsk, DAMEC Research A/S, Rigshospitalet 7522, Tagensvej 20, DK-2200 Copenhagen N, Denmark. Tel: 45-35-36-14-64;fax: 45-35-36-22-82.

Society of General Physiologists' 49th Annual Symposium: Organellar Ion Channels and Transporters, September 6-10, 1995, Woods Hole, MA. *Information*: David Clapham, Department of Pharmacology, Mayo Clinic and Foundation, Rochester, MN 55905. Tel: 507-284-5881; fax: 507-284-9111. Surfaces in Biomaterials Symposium, September 7-9, 1995, Minneapolis, MN. *Information*: Surfaces in Biomaterials Foundation, c/o ARDEL Management, Inc., PO Box 26111, Minneapolis, MN 55426-0111. Tel: 612-027-6707.

Inflammation '95: World Congress on Inflammation, September 17-22, 1995, Brighton, UK. *Information*: Kay Dorelli, Inflammation '95, Triangle House, Broomhill Rd., London SW18 4HX, UK. Tel: 81-877-9920; fax: 81-877-9308.

Targeting of Novel Therapeutics to the Liver and GI Tract, September 21-22, 1995, Bethesda, MD. *Information*: The Digestive Diseases Interagency Coordinating Committee Office, 11426 Rockville Pike, Suite 410, Rockville, MD 20852. Tel: 301-594-5168; fax: 301-594-1171.

Biomedical Engineering Society 1995 Annual Fall Meeting, October 6-9, 1995, Boston University, Boston, MA. *Information*: Kate Straus, BMES Fall Meeting 1995, 45 Avon Rd., Wellesley, MA 02181. Tel/fax: 617-237-2277; e-mail: bmes95@aol.com.

Transcriptional Activation in Response to Cytokines and Growth Factors, October 6-9, 1995, Keystone, CO. *Information:* Barbara A. Gordon, American Society for Biochemistry and Molecular Biology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7145; fax: 301-571-1824; e-mail: asbmb@asbmb.faseb. org.

The Role of Lipid Messengers in Signal Transduction Pathways, Cellular Regulation, and Disease, October 20-23, 1995, Keystone, CO. *Information*: Barbara A. Gordon, American Society for Biochemistry and Molecular Biology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7145; fax: 301-571-1824; e-mail: asbmb@asbmb.faseb.org.

Receptor Engineering, October 27-30, 1995, Granlibakken, Lake Tahoe, CA. *Information*: Barbara A. Gordon, American Society for Biochemistry and Molecular Biology, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-530-7145; fax: 301-571-1824; email: asbmb@asbmb.faseb.org.

Third International Glycobiology Symposium, November 29-December 1, 1995, San Diego, CA. *Information*: Paddy Batchelder, California Separation Science Society, PO Box 370, Pleasanton, CA 94566. Tel: 510-426-9601; fax: 510-484-3024.

Bioartificial Organs: Science and Technology, July 21-26, 1996, Nashville, TN. *Information*: Barbara Hickernell, Engineering Foundation Conferences, 345 E. 47th Street, New York, NY 10017. Tel: 212-705-7836; fax: 212-705-7441; e-mail: engfnd@aol.com.

VI World Conference on Clinical Pharmacology and Therapeutics and VI Congress of the Interamerican Society for Clinical Pharmacology and Therapeutics, August 4-10, 1996, Buenos Aires, Argentina. *Information*: CPT96 and ISCPT VI, Marcelo T. de Alvear 1980, 1122 Buenos Aires, Argentina. Tel: 54-1-81-6650; fax: 54-1-814-2733.

Second World Congress on Alternatives and Animal Use in the Life Sciences, October 20-24, 1996, Utrecht, The Netherlands. *Information*: World Congress Alternatives 1996, FBU Congress Bureau, PO Box 80.125, 3508 TC Utrecht, The Netherlands. Tel: 31-30-53-5344/2728; fax: 31-30-53-3667; email: l.donkers@pobox. ruu.nl.

Microgravity Environment Research Report

The National Heart, Lung, and Blood Institute (NHLBI), NIH, and the National Aeronautics and Space Administration (NASA) announce the availability of the Report of the Workshop on Research in the Microgravity Environment Related to Cardiovascular, Pulmonary, and Blood Functions and Diseases. The purpose of the Workshop was to identify areas in which investigations conducted in microgravity have the potential to advance knowledge of human biology and improve diagnosis and treatment of disease. This report provides a summary of accomplishments to date, highlights new scientific opportunities, and identifies recommendations for possible future NHLBI and NASA collaboration on microgravity research related to cardiovascular, lung, and blood diseases. To obtain a copy of the report, you may access NHLBI's Gopher server on the Internet at gopher:nhlbi.nih.gov, port 70; NASA's Gopher server on the Internet at Lifegopher.hq.nasa.gov; or contact National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; tel: 703-487-4650. Cost of paper copy is \$27.00; microfiche, \$12.50 (order no. PB95-144218).



Fondation de Physiopathologie Pr Dautrebande Prize

The Fondation de Physiopathologie Professor Lucien Dautrebande announces competition for the physiopathology Pr Dautrebande prize, which will be awarded in 1997. This international prize is awarded to an established investigator(s) involved in a long-term research project related to animal or human clinical physiopathology, preferably involving therapeutic implications. The possibility exists for two awards to be given to individuals or groups, with some preference given to a younger investigator. The prize consists of approximately \$150,000, with the possibility of a \$30,000 prize for a young investigator.

Candidates should submit three copies of the following to the Foundation before December 1, 1996: 1) curriculum vitae, including a list of all awards and funds received in the past five years; 2) summary of research (maximum of three pages); 3) publication list, with a separate listing of 20 of the most significant papers; 4) other reports, published or unpublished, summarizing the totality of the candidate's career (leaflets, books, booklets); and 5) letters of two persons who are full or associate members of National Academies, university lecturers, or previous awardees.

Further information can be obtained from President Dr. Jean Stalport, "Maison Batta", Avenue Batta no. 3, B.4500 Huy, Belgium.

Biological Transport Group 33rd Annual Meeting

Lake Cumberland State Resort Park Jamestown, Kentucky June 18 - 21, 1995

Central Theme: Biological Transport -Cell or Molecular Biology

For Information contact:

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