

# THE PHYSIOLOGIST



A Publication of the American Physiological Society

Volume 31, Number 2

April 1988

## EDITORIAL

### Wheel of (mis)Fortune

With anticipation and excitement, the contestants spin television's Wheel of Fortune, each with the hope that the wheel will yield a grand sum of money.

Unfortunately, game show excitement does not carry over into the scientific community whose researchers are annual contestants in the federal government's own version of Wheel of (mis)Fortune or, perhaps, Jeopardy. The word clue for this year's game could be "ancient proverb," and when all of the letters are turned the answer is "Congress giveth; the President taketh away."

Last year's roller coaster associated with the support for the National Institutes of Health (NIH) and the other biomedical research funding agencies was typical in its ups and downs. From the thrill of a major increase over 1986 NIH appropriations to the proposed "extension of availability of funds" by President Reagan, the scientific community faced a year of uncertainty. Not until the President signed the massive continuing resolution on December 22 were we certain what our fate was for fiscal year 1988. The end result was an increase in NIH's appropriation for fiscal year 1988 from \$6.191 to \$6.667 billion, thus enabling the funding of approximately 6,100 new and competing research grants.

Once again it is time to spin the wheel. Faced with uncertainties in the financial markets and a continuation of record deficits, President Reagan no doubt will orchestrate a rerun of last year's recommendations; his budget for science no doubt will face resistance on Capitol Hill as it has throughout his presidency. However, this

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## Open Letter to NIH Review of Cross-Disciplinary Applications

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This letter to The National Institutes of Health (NIH) raises concern about peer review of cross-disciplinary applications, e.g., those applications involving molecular biology and cardiovascular physiology or disease. The concern lies in whether these applications are actually receiving peer review. Peer review of cross-disciplinary research presents the problem of the definition of a peer. Is a peer a person knowledgeable primarily in the technical aspects of the approach that is to be applied, or is both technical expertise and a broad knowledge of the field encompassed by the hypothesis and questions to be addressed also a requirement for designation as a peer? Thus, these applications present substantial difficulties in identifying an appropriate "peer" group. It is often difficult to recruit peers whose expertise fully encompasses the proposed cross-disciplinary research. If such a peer group cannot be gathered, review by persons not fully familiar with the scope of research can prove perilous. In regard to cross-disciplinary research reviewed at NIH, this question appears to have been answered by the Division of Research Grants by placing emphasis primarily on technical considerations in the peer definition.

The NIH peer review system is based on two sequential levels of review, referred to as the "dual-review system." The first level involves panels of experts, generally established along lines of scientific disciplines, such as molecular biology, cell biology, biochemistry, pharmacology, physiology, etc. The Initial Review

Groups, the Study Sections, have as their primary function the review and evaluation for scientific merit of the research grant applications submitted to NIH for consideration of support. In the current system, applications are given a raw priority score and percentile ranking within the applications reviewed by a given Study Section. A cross-disciplinary application in which techniques are applied to a research question in another field will not be received with the same enthusiasm by a Study Section devoted to molecular biology as an application focused on an important research question in the mainstream of molecular biology itself. For example, an application that addresses a question dealing with electrical activity of cardiac membranes will not engender high enthusiasm among molecular biologists, even though some of the techniques are derived from their discipline.

Alan Porter and Frederick Rossini from Georgia Tech studied the fate of cross-disciplinary applications that were reviewed at the National Science Foundation (1). They analyzed 257 reviews received by 38 approved cross-disciplinary proposals in five different subject areas and found that reviewer decisions were more favorable when the proposal fell within the reviewer's own discipline. Porter and Rossini considered it reasonable for a reviewer to favor that which is more familiar because the person is better able to understand what is planned, may know the researchers personally or by reputation and hence ap-

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## EDITORIAL

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could change easily should the scientific community remain complacent in its view. Now is the time to communicate with your representatives to dispel the myths of the antiscientific establishment.

Communication is the only means we have to dispel the myth that the majority of research leads to little immediate value. If such opinion is not dispelled, the scientific community could be faced with a situation where the Congress would not feel compelled to restore funds and American science would thus be facing a challenge similar to that faced by British science.

Similar to the United States, Britain is facing severe financial problems that have resulted in a sharp reduction in the research budget by Margaret Thatcher. As a result, British science is in crisis; opportunities are being missed, scientists are emigrating, and whole areas of research are in jeopardy. The scientific community in Britain has united to meet the challenge under a group called Save British Science. The question is, however, whether the battle has been joined in enough time.

For the United States scientific community there are numerous groups speaking both for and against an increase in support for biomedical research. One such group is the Ad Hoc Group for Biomedical Research Funding, which is recommending \$8.237 billion for fiscal year 1989. Can this amount safely be recommended at a time of diminishing resources? It can, indeed, if we take into account rising costs of conducting research that requires complex techniques, highly trained staff, and sophisticated equipment and if the scientific community is willing to speak up for it.

The proposed budget of the Ad Hoc Group carries an additional meaning to

young scientists starting out in their research careers. They see their role models increasingly frustrated by the review process and the limitations of available funds. The proposed budget would allow for the funding of 7,400 new and competing awards in fiscal year 1989. Although investigators continue to face the NIH Peer Review, the process would be strengthened by the elimination of the financial uncertainties of a wavering appropriation.

It is up to us, the members of the scientific community, to make sure that the outcome is certain and not one of chance. Let us take the time to communicate with the sponsors of the program, our individual Congressional delegations.

Martin Frank

## G. Edgar Folk, Jr., Senior Physiologist Fund

The G. Edgar Folk, Jr., Senior Physiologist Fund has been set up through the generosity of family and former graduate students and post-docs to provide modest but helpful assistance to senior physiologists 70 years or older who no longer have grant funds available to them. The awards might be used for such purposes as attending an APS meeting to present a paper, engaging in a series of modest experiments, or completing a manuscript (paying for typists or perhaps for page charges). Recipients will be selected with the assistance of the Senior Physiologists Committee throughout the year. Names of awardees will not be made public. Mary Folk writes that the purpose of the fund is for the Senior Physiologists Committee "to have fun assisting colleagues and for Emeritus APS members to keep in closer touch with APS."

Inquiries concerning the G. Edgar Folk, Jr., Senior Physiologist Fund should be made to Martin Frank, Executive Secretary-Treasurer, APS.

*The Physiologist*  
Published bimonthly and  
distributed by  
The American Physiological Society  
9650 Rockville Pike  
Bethesda, Maryland 20814

ISSN 0031-9376

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Subscriptions: Distributed to members as part of their membership; nonmembers and institutions, \$25.00 per year in the United States; elsewhere \$35.00. Single copies and back issues when available, \$5.00 each; single copies and back issues of Fall Abstracts issue when available, \$20.00. In 1988 subscribers to *The Physiologist* will receive it and the abstracts of the Fall Meeting of the American Physiological Society. The American Physiological Society assumes no responsibility for the statements and opinions advanced by contributors to *The Physiologist*.

Deadline for submission of material for publication: Dec. 5, February issue; Feb. 5, April issue; April 5, June issue; June 5, August issue; Aug. 5, October issue; Oct. 5, December issue. If you change your address or telephone number, please notify the central office as soon as possible.

This publication is available  
in microform from University  
Microfilms International.

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University Microfilms International, 300 North  
Zeeb Road, Ann Arbor, MI 48106.



preciate their expertise, and may feel more secure in making strong recommendations. Porter and Rossini conclude that cross-disciplinary research should not be reviewed by groups whose expertise is focused on only one of the disciplines involved.

The second level of review, carried out by the National Advisory Councils of the Institutes of NIH could serve as the balance to Study Section actions for funding decisions in regard to cross-disciplinary applications, but this role is not assumed by the Advisory Councils. It is the responsibility of the Council to review the appropriateness of the technical merit review recommendations made by the Study Sections and to make a final review for scientific merit. In regard to cross-disciplinary applications, Councils do not ask whether an application that has been given a fiftieth percentile score by a Study Section focused on a field such as molecular biology is of such importance to a question involving electrical events in cardiac cell membranes that the application should be funded. In short, the Study Section is telling the Council that the technical procedures are satisfactory but the question does not engender enthusiasm within the field of molecular biology. If the dual-review system functioned optimally, the National Heart, Lung, and Blood Institute (NHLBI) Council could consider that the technical merit review arose from a very basic field but could also have high enthusiasm for use of this technology to solve an important problem in cardiac pathophysiology and recommend funding of the application. In my experience, the NHLBI Council does not ask these important questions but instead considers that all percentile rankings are created equal and have the same meaning for funding decisions regarding cardiac function and diseases whether the Study Section is made up of molecular biologists or physiologists interested in heart disease. As a result, the Study Sections need to be constituted so that all percentile rankings that reach the Council have the same meaning in regard to funding decisions for cardiac function and diseases, because the Council is not able, because of work load and composition, to assume the responsibility of assessment of the appropriateness of technical merit review by Study Sections.

Differences in mission and composition of the Study Sections and other Initial Review Groups and the Advisory Councils must be kept in mind. In theory, the Study Sections are the "producers of a product,"

namely, a summary statement ("pink sheet") and a priority score for the application, whereas the Advisory Councils are the "users of the product." Such differences in function should regularly lead to different appraisals of the importance of cross-disciplinary research that is proposed and whether it deserves a high percentile ranking for funding. However, the Study Sections are functioning not only as producers of a product, the critique, but also as users of the product to produce a percentile ranking that is considered by Study Section and Council members alike as inviolable for funding decisions. This attitude is not correct. Rather, Study Section critiques and ranking for cross-disciplinary applications should be considered by the Advisory Council in the context of Study Section expertise and program needs of NHLBI.

Since Study Section review is the only meaningful review that most applications will receive, nomination and selection of members is a major professional responsibility of the Executive Secretary. In a single review system, the Executive Secretary has a major role in determining the future of research, particularly in regard to those research grant applications in which new scientific fields are to be explored or unique procedures are to be developed. Executive Secretaries serving the areas of cardiovascular physiology and disease must have the vision to ensure that their Study Section has the technical competence to review applications using techniques derived from basic disciplines such

as molecular biology if progress in cardiovascular research is to be sustained.

Generally, research grant applications are reviewed by duly constituted Study Sections. However, certain conditions preclude the use of such Study Sections for the review of special types of research grant applications of which cross-disciplinary applications may be an example. In such cases, Special Study Sections are organized, the membership of which reflects the review needs of a particular group of applications. Conditions that govern the assignment of a research grant application to a Special Study Section include applications of such complexity that the scientific content overlaps the review area of two or more Study Sections. I do not consider Special Study Sections to be a permanent solution to review of cross-disciplinary applications, but they could be important in the interim until permanent Study Sections can be appropriately constituted or the dual-review system made to work.

Certainly, the most subtle and most pervasive influence that fosters the support of applications in the mainstream of each discipline, as opposed to cross-disciplinary research, is the limited availability of funds. As the dollars available for research support become more and more limited, there is a tendency to invest in the mainstream activities. In such circumstances, advisors, consultants, staff members, and program managers need to be proactive in the application of new basic technologies to old but important physiological prob-

TABLE 1. Peer Review Scores for Applications Originating in Basic and Clinical Departments

Department	Number Reviewed		Mean Score	
	1979	1985	1979	1985
Basic Science	6,179	7,181	256	216
Chemistry	801	839	240	205
Biochemistry	1,109	1,205	245	207
Microbiology	717	779	263	216
Physiology	689	780	259	220
Anatomy	484	680	270	223
Pharmacology	651	789	269	224
Pathology	476	625	268	231
Clinical Science	3,605	4,389	271	231
Ophthalmology	135	191	263	218
Medicine	1,440	1,749	264	225
Neurology	174	262	258	226
Radiology	252	293	276	226
Pediatrics	410	478	278	234
Surgery	470	479	295	238
Psychiatry	116	140	287	244
Obstetrics/Gynecology	193	249	270	248

Considerable score variation exists among departments that are grouped in broad categories of basic/clinical sciences. However, aside from some expected overlap, applications from specific basic science departments average better scores than clinical science or other departments. Applications from departments of chemistry and biochemistry (basic science) averaged the best and remarkably similar scores throughout the past decade. Clinical departments such as medicine, ophthalmology, neurology, or radiology show mean scores that overlap higher score range of basic science departments, whereas those from surgery, pediatrics, and psychiatry average poorer scores. (Data are from Ref. 2.)



lems, otherwise the American people will be deprived of a truly vital research program.

In summary, cross-disciplinary applications involving application of new basic technologies to physiological problems suffer from malfunction of the dual-review system and the lack of expansion of the expertise of established Study Sections to new and important research areas. These problems must be solved to allow physiologists seeking the molecular mechanisms of physiological events to receive support for their research. This problem may be particularly important for physician scientists whose usual activities are cross disciplinary (Ref. 2, Table 1). Review of cross-disciplinary applications arising from clinical departments by basic Study Sections is one factor contributing to the poorer mean scores received by clinical applications. Young physicians with a combination of clinical and basic research training are vital to progress in our understanding of the mechanisms of disease and its treatment.

## References

1. Porter, A. L., and F. A. Rossini. Peer review of interdisciplinary research proposals. *Sci. Technol. Hum. Val.* 10: 33-38, 1985.
2. Brackett, J. A. DRG peer review trends. In: *Work Load and Actions of DRG Study Sections, 1975-1985*. Bethesda, MD: National Institutes of Health, 1987.

# Responses to Open Letter to NIH

## NHLBI Response

*"We are not required to complete the task at hand—Neither are we free from making a start."*

Babylonian Talmud  
Ethics of the Fathers  
Circa 200 BC

Dr. Morgan's open letter to the National Institutes of Health (NIH) concerning review of cross-disciplinary applications is both timely and important. It is timely, indeed, because more cross-disciplinary applications than ever are being received by the NIH and particularly by the National Heart, Lung, and Blood Institute (NHLBI), and it is important, because the phenomenon it describes is real, especially in some areas of interest to NHLBI.

Peer review is the spine of the NIH granting system in the sense that it guards the quality of the science supported by the agency and the reliability of our stewardship of the public monies entrusted to us for a public service. But it is a fragile system with the potential to be rapidly weakened by factors independent of, though related to, the science it is intended to

protect. The mounting limitations on availability of funds experienced over more than a decade have resulted in important attitudinal changes on the part of the peer reviewers who constitute the initial review groups. In addition, the changing nature of research proposed by applicants and the ever increasing sophistication of experimental approaches have made the appropriate balance of reviewer expertise and the tasks expected of the reviewers much more complex.

Those who formulated the NIH review procedures in the late forties viewed it as a dual system to assure checks and balances. As Dr. Morgan points out, the system includes product "producers" (the Study Sections) and the product "users" (the National Advisory Councils). Dr. Morgan rightly identifies present shortcomings of initial peer review groups and he underscores difficulties faced by Councils in discharging their responsibilities. Although I am not fully cognizant of the practices of all NIH National Advisory Councils, I can comment on those of the National Heart, Lung, and Blood Advisory Council. By and large, our Council has an immense respect for the priority score and the resultant percentile given an application. Because a recommendation to fund one grant will mean not funding another, the Council is very reluctant to deviate from a percentile ranking. Even more important, Council members do not find it possible to read all the summary statements that are sent to them, because they are indeed confronted with an unmanageable work load. Therefore our Council relies primarily on the percentile and on staff comments to formulate their own recommendations. As a consequence, as pointed out by Dr. Morgan, "the NHLBI does not ask (these) important questions."

Yet, more than ever before, exciting scientific opportunities based on cross-disciplinary approaches do exist to understand pathogenic processes in heart, lung, and blood diseases; these opportunities are recognized by the scientific community and the Institute and its advisors, but they may not be appreciated by the current composition of the Study Sections. There-

## Travel Fellowships for Minority Physiologists

The American Physiological Society has been awarded a grant by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) to provide fellowships for young minority students and physiologists to attend the Spring and Fall Meetings of the Society. At the national meeting, fellows will be hosted, introduced to prominent investigators, and exposed to a variety of research areas. Funds will provide transportation, meals, and lodging. The specific intent of this award is to increase participation of pre- and postdoctoral minority students in the physiological sciences. Applicants do not need to be members of the American Physiological Society but should be United States residents.

Advanced undergraduate and pre- and postdoctoral scientists, who have obtained their undergraduate education in Minority Biomedical Research Program (MBRS) and MARC-eligible institutions, may apply, as may students in the APS Porter Development Program. Applications may also be submitted by minority faculty members at the above institutions.

Applications should include information on

- 1) academic background and experience;
- 2) a written statement of interest in research in physiology;
- 3) a letter of recommendation from the applicant's mentor;
- 4) a list of publications, if available;
- 5) a statement indicating the ethnic minority with which the applicant identifies himself/herself;
- 6) an estimate of required travel and per diem expenses.

Submit applications to NIDDK Travel Fellowships, c/o Dr. Martin Frank, Executive Director, American Physiological Society, 9650 Rockville Pike, Bethesda, Maryland 20814.

The deadline for receipt of completed applications for the Fall Meeting is June 30, 1988.

fore, to maximally reap the benefits of these opportunities, I fully agree with Dr. Morgan that many cross-disciplinary applications should be receiving a special initial review where both the importance of the proposed research (relative to its field) and its feasibility (i.e., scientific potential) will be equally assessed. Thus peer review groups should be composed of experts in physiology and clinical problems coupled with experts in new basic technologies. I strongly believe that this should be done to achieve further advances for the Institute programs, particularly those that depend on use of new basic technologies. As it was said in the Babylonian Talmud, "neither are we free from making a start."

Claude Lenfant  
Director  
National Heart, Lung,  
and Blood Institute

## DRG Response

Dr. Morgan's comments about the review of research grant applications at the National Institutes of Health (NIH) are of special interest and validity because he has served on the Study Section and an Advisory Council. Thus, he has participated in both levels of the NIH dual-review process.

Although I agree with much of what Dr. Morgan says, I believe there is some confusion over the meaning and characterization of "cross-disciplinary" research. Much of today's biomedical research is cross- or multidisciplinary, and those projects often represent important advances in knowl-

edge and sophistication. It seems to me that the concern expressed is not with cross-disciplinary research but rather with better assessments of the relevance, challenge, or opportunity of an investigation to a system or "field," e.g., cardiovascular function or disease. Such judgments, in the NIH dual-review system, are often referred to as "program relevance" and that responsibility rests primarily with the staff of the funding Institute and the Advisory Council.

Indeed, to some considerable extent, the organization of NIH reflects these distinct, but overlapping, responsibilities. The study sections are structured primarily on the basis of scientific disciplines, but not exclusively so. The Institutes (and their Councils) have been organized primarily on the basis of organs, systems, and diseases, but not exclusively so. As the number, diversity, and complexity of research proposals have increased, problems have arisen at both levels of review. Reviewers do indeed seem to be most comfortable with what they know best.

It should be noted that the initial review phase has, inherently, more flexibility than the Advisory Council/Board phase of review. In 1987, for example, 8.1% of the regular research grant applications reviewed in the Division of Research Grants were reviewed by ad hoc, special study sections. These review groups are constituted with care to ensure that there is in-depth, tailor-made coverage for the tasks at hand.

However, even beyond that special effort there is, within the regular study section, deliberate efforts to broaden the membership and to obtain, where neces-

sary, additional expert advice. With respect to the latter, Table 1 provides data for eight "fundamental" study sections in 1987. It is noteworthy that at all of the 24 meetings special, ad hoc reviewers were present to provide advice and assistance (on the average there were 6 such reviewers per meeting). At these study section meetings, 1,900 applications were reviewed, and 146 of these (7.7%) were reviewed with the benefit of additional outside mail opinions.

I believe that, despite the large and growing review work load, there are significant efforts to obtain additional, often cross-disciplinary, advice. I do not know whether those efforts are sufficient; they do not yet appear to be optimal. Dr. Morgan is right on target when he reminds us all that "advisors, consultants, staff members, and program managers need to be proactive . . . otherwise the American people will be deprived of a truly vital research program."

The NIH peer review system is certainly not perfect. Careful adjustment and experimentation is warranted, and some of that is now under way. In the meantime, I believe biomedical and behavioral research scientists need to be reminded that service on these review and advisory groups is a responsibility and obligation. Last year, approximately 11% of the scientists who received a formal invitation to serve on one of the Division of Research Grants Study Sections declined.

J. G. Green  
Director, Division  
of Research Grants

TABLE 1. Selected "Fundamental" Study Sections in NIH Division of Research Grants

	1987 Data*							
	Biochemistry (1)	Biochemistry (2)	Cellular Biology and Physiology (1)	Cellular Biology and Physiology (2)	Molecular Biology	Molecular Cytology	Physiological Chemistry	Physiology
No. of meetings								
Regular	3	3	3	3	3	3	3	3
Regular, with special, ad hoc reviewers attending	3	3	3	3	3	3	3	3
Ad hoc review meetings conducted by Execu- tive Secretary	0	1	0	0	0	2	2	8
No. of special, Ad Hoc reviewers								
At regular meetings	25	19	9	13	18	17	20	21
At ad hoc meetings	0	5	0	0	0	11	6	44
No. of research grant applications reviewed at regular meetings								
Total	251	195	259	221	227	251	269	227
Applications with out- side, mail reviews	21	24	4	10	9	36	22	20

\* Does not include applications for Career Development Awards, Small Business Innovation Research, or AREA grants.

## PUBLIC AFFAIRS

### iiFAR: A New Grassroots Voice Supporting The Use of Laboratory Animals In Research

In the six years I have been writing this column my rule has been to present facts objectively and limit opinions to the space provided for editorials and letters to the editor. This month I am bending that rule.

There is a relatively new nonprofit organization that deserves consideration for support from those who believe that animal models are needed in the search for treatment, cure, and prevention of disease.

The organization is iiFAR (pronounced "eye far") and the acronym stands for the incurably ill For Animal Research. Its national headquarters is in Tucson, AZ, and its active membership is composed of persons with an incurable disease and those who have received benefits of medical advances made possible through animal research.

The purpose of iiFAR is to support the use of laboratory animals in medical research and it functions primarily at the grassroots through local chapters. Already iiFAR has had an impact in several states in rebuffing animal rights initiatives seeking to prohibit the release of unclaimed pound animals to research institutions.

The organization was formed in 1985 by Rick Simpson, a multiple sclerosis (MS) patient who then was participating in a drug therapy program at the University of Arizona Medical Center in Tucson. The program consisted of testing the effect of high doses of cyclosporine to see whether it would control the immune system, which is overactive in MS patients to the point where the T-lymphocytes begin destroying the myelin coating of nerves in the spinal cord and brain.

When Simpson was asked whether he would like to join 80 other MS patients in the experimental drug program, he recalled, "I really hadn't thought much about it (animal testing) before, but the first thing I did ask was whether the stuff had been tried on animals first."

Of course cyclosporine had been tested on animals. In fact, it has been used successfully for several years in preventing rejection among organ transplant recipients, but it never had been administered to humans at the high dosages MS patients would need. Animal testing was essential in determining the safety of such dosages and in determining the possible side effects so the patient could be monitored properly.

The cyclosporine worked wonders for Simpson. Within three days he had regained the bowel and bladder control he had been without for nearly six years.

A few days after Simpson had started the program he saw on television an interview with a local animal rights activist whose protest group was picketing the University of Arizona Medical Center for using laboratory animals. Because of the benefits of animal research that he and others were experiencing, Simpson called a meeting of MS patients to discuss forming a pro-animal research organization composed of mainly incurably ill patients.

The incurably ill For Animal Research was formed the next day.

The incurably ill members of iiFAR consider animal rights activists as a major threat to science and its efforts to find cures for their illnesses. They believe they are being victimized by the activists who trash research facilities, destroy research in progress, and threaten research workers.

One of the roles iiFAR has taken is to be a public voice speaking in defense of researchers whose statements often are described by animal rights activists as self-serving. Their goals are to inform the public of the validity and necessity of animal research and to put animal rights into perspective with human rights.

To accomplish this, iiFAR has developed chapters to carry its message. At this time, a majority of the chapters are in West Coast cities, but there has been rapid growth and interest in chapters in the Southeast, Northeast, and Midwest.

Chapter membership is generated by a variety of means including support by local medical and health sciences centers and voluntary health agencies. Potential chapter members are those suffering from illnesses such as MS, Alzheimer's disease, arthritis, asthma, cystic fibrosis, muscular dystrophy, and other diseases for which there are no cures at the present time and those individuals who have benefited from animal research, such as organ transplants, cancer treatments, and cardiovascular surgeries.

Although only the incurably ill (or legal guardian of an incurably ill child) are eligible to become officers or directors, membership also is open to healthy persons, who are needed to supplement participation in physical activities.

Anyone who would like additional information about iiFAR should contact its executive director Steve Carroll, who has osteomyelitis, a rare and untreatable infectious inflammation of the bone. Address: P.O. Box 56093, Tucson, AZ, 85703. Phone: (602) 682-5749.

### PETA Accelerates Efforts To Remove Silver Spring Monkeys from Primate Center

PETA (People for the Ethical Treatment of Animals) has accelerated its efforts to remove the remaining nine so-called Silver Spring monkeys housed at the Delta Regional Primate Center in Covington, LA.

Last year five control monkeys were transferred from the Louisiana facility to the San Diego Zoo for resocialization. The two-year resocialization project is being underwritten by several research-intensive institutions and a major medical association.

Ever since the 17 laboratory monkeys were confiscated by Montgomery County, MD, police in the September 1981 raid on the Institute for Behavioral Research (IBR) in Silver Spring, PETA has waged an extensive campaign to have the monkeys removed from federal custody. The court gave custody of the monkeys to the National Institutes of Health as a part of the settlement in the trial of researcher Edward Taub. However, ownership of the primates—both at Delta and at the zoo—remains with IBR.

In negotiating with the zoo officials PETA has been reported as saying it would underwrite all expenses, including new facilities and equipment, if the zoo would take the eight deafferented and one control monkeys now housed at Delta. (Three monkeys have died since the confiscation.)

In a counter move, five national societies, including APS, sent a joint letter to the zoo officials asking that they not negotiate with an animal rights group about the disposition of any research animals. The letter also revealed that the scientific community and IBR have been providing funds for the care of the monkeys at Delta and plan to continue such support. The support by the scientific organizations has been made to blunt both animal rights and Congressional cries about the use of tax dollars to care for the monkeys.

In addition to APS the letter was signed by the American Psychological Association, Association of American Medical Colleges, Federation of American Societies for Experimental Biology, and the Society for Neuroscience.

Supporting PETA in its efforts is Rep. Bob Dornan (R-CA), who represents a Southern California district, and Rep. Robert Smith (R-NH), who has sponsored a bill (HR 2883) that would force by legislation the removal of the monkeys from federal custody. Smith's bill would transfer the monkeys to an animal rights supported primate facility in Texas.

## Oregon Man Convicted For Participation In 1986 ALF Break-In

A 56-year-old Oregon man has been convicted for his part in an October 1986 break-in at the University of Oregon where 156 animals were taken by the Animal Liberation Front.

Roger Troen of Portland was found guilty on charges of first degree theft, conspiracy to commit second degree burglary, and second degree burglary. He could have received a maximum sentence of five years in prison and a fine of \$100,000 on each charge.

Shortly after the break-in police found in a private garage, three of the 100 rabbits that had been stolen from the university. The garage owner told police that Troen asked her to take the rabbits, which he said had been taken from the university. After an extensive investigation, Troen was charged by police last July.

Troen's lawyers tried to use the choice-of-evils defense, contending that Troen's actions were justifiable inasmuch as he was trying to prevent "cruel, repetitive, and inhumane treatment of animals." The prosecutor, however, charged that the choice-of-evils defense requires an emergency situation and that Troen was not reacting to an emergency inasmuch as the break-in took time to plan and execute.

In supporting the prosecution, the judge said, "The real issue here is whether a person in our society is privileged to commit crimes because that individual disagrees with what is taking place in some particular other part of our society. We cannot allow individuals to pick and choose which of the criminal laws we are going to obey unless they can fulfill the stringent requirements of the statute of choice-of-evils."

Ingrid Newkirk, the national director of PETA, said that her organization "would pursue every legal channel in helping Troen (appeal his convictions)." Troen is a PETA member. As for the University of Oregon, Newkirk said, "I am going to put our resources behind cleaning the dump up."

William M. Samuels

## APS NEWS

### APS/ASPET Fall Meeting Montreal, Quebec, Canada October 9-13, 1988

#### Theme: Growth, Development and Aging

#### Symposia

Oxygen Stress on Aging  
Cellular Mechanisms in the Development of Respiratory Control  
Changes in Receptor Responses and Neurotransmitters with Age  
Thermoregulation: Development and Decline with Age  
Age-Related Changes in Excitation-Contraction Coupling Mechanisms in the Heart  
Regular Exercise, Growth and Development  
Nutritional and Physiological Approaches to the Study of Aging  
Angiogenic Polypeptide Growth Factors  
Theories of Biology of Aging  
Factors Affecting Drug Action in the Elderly  
Changes in Organ Systems with Age  
Changes in Receptor Responsiveness and Neurotransmitter

#### Short Course on Molecular Biology

Molecular Biology of the Cardiovascular System  
Practicum of Molecular Biology Techniques

#### Canadian Physiological Society Symposia

Renal Growth and Development  
The Development of Motor Control  
Intestinal Growth and Development  
Age-Related Changes in Adrenergic Control of the Cardiovascular System

#### IUPS—Commission on Gravitational Physiology Symposia

Recent Space Flight Results in Gravitational Physiology  
Current Concepts in Gravitational Physiology  
Gravity and the Lung

**Deadline for submission of abstracts is June 3, 1988.** *Information:* APS/ASPET '88 Meeting Office, 9650 Rockville Pike, Bethesda, MD 20814. Phone: (301) 530-7010.

#### Satellite Symposium

A satellite symposium to the 1988 ASPET Meetings, Molecular Biology of Receptors, Pumps, and Channels: Pharmacological Targets, will be held August 22-24, 1988, in Cincinnati, OH. The meeting will be sponsored by the Department of Pharmacology and Cell Biophysics, University of Cincinnati College of Medicine. *Information:* Kathy Smiddebusch, ASPET Satellite Symposium (Receptors), Department of Pharmacology and Cell Biophysics, University of Cincinnati College of Medicine, 231 Bethesda Avenue, Cincinnati, OH 45267-0575.

#### Call For Papers

Have you received your call for papers? Deadline for receipt of abstracts is June 3, 1988. Contact APS Fall Meeting Office, 9650 Rockville Pike, Bethesda, MD 20814. Phone (301) 530-7010



## Future Meetings

1988	
FASEB Annual Meeting	May 1-5, Las Vegas
Joint APS/ASPET Fall Meeting	October 9-13, Montreal
1989	
FASEB Annual Meeting	March 19-23, New Orleans, LA
APS Fall Meeting	October 15-18, Rochester, MN
1990	
FASEB Annual Meeting	April 1-5, Washington, DC
APS Fall Meeting	October 7-10, Orlando, FL
1991	
FASEB Annual Meeting	April 14-18, Atlanta, GA
APS Fall Meeting	September 29-October 3, San Antonio, TX
1992	
FASEB Annual Meeting	April 5-9, Anaheim, CA
1993	
FASEB Annual Meeting	March 28-April 1, New Orleans, LA

## Sections

### Special Functions

#### FASEB Spring Meeting May 1-5, 1988

(Las Vegas Hilton Hotel, unless otherwise indicated)

**Cardiovascular Dinner**  
Wednesday, 6:30 P.M.  
Pavilion 9  
Las Vegas Hilton Hotel

**Cell and General Physiology**  
Banquet and Lecture  
Wednesday, 6:30 P.M.  
Ballroom F

**Comparative Physiology**  
Social and Scholander Award  
Tuesday, 5:30 P.M.  
Room 2, Convention Center

**Comparative Physiology**  
Business Meeting  
Wednesday, 5:00 P.M.  
Room 2, Convention Center

**Endocrine and Metabolism**  
Cocktail Hour  
Monday, 5:30 P.M.  
Continental Salon

**Environmental, Thermal, and Exercise Physiology**  
Business Meeting  
Tuesday, 5:30 P.M.  
Pavilion 11

**Epithelial Transport**  
Group Meeting  
Tuesday, 8:00 P.M.  
Pavilion 10

**Gastrointestinal Physiology**  
Dinner Meeting and Award Lecture  
Tuesday, 6:30 P.M.  
Pavilion 6

**History Luncheon**  
Wednesday, 12:00 Noon  
Room 14

**Nervous System**  
Steering Committee Meeting  
Tuesday, 5:00 P.M.  
Room 10

**Renal Dinner**  
Wednesday, 6:00 P.M.  
Chin's Restaurant

**Respiration**  
Business Meeting  
Wednesday, 5:00 P.M.  
Ballroom F

**Respiration Dinner**  
Wednesday, 5:00 P.M.  
Mt. Charleston Hotel

**Teaching of Physiology**  
Business Meeting  
Tuesday, 8:00 A.M.  
Embassy Salon

**Water and Electrolyte Homeostasis**  
Business Meeting  
Monday, 4:45 P.M.  
Ballroom F

**Regulation of Respiration**  
Dinner  
Tuesday, 6:30 P.M.  
Ballroom D

**Temperature Regulation**  
Dinner  
Tuesday, 6:30 P.M.  
Ballroom G

## Andre Frederic Cournand (1896-1988)

A 44-year member of the American Physiological Society who shared the 1956 Nobel Prize for medicine and physiology died in February.

Andre Frederic Cournand died of pneumonia at his home in Great Barrington, MA. He was 92 and was a retired Columbia University professor.


Cournand, who was a physician and physiologist, was awarded the Nobel Prize for his work in perfecting the catheterization process used in charting the interior of the human heart. His methods proved to be simple and reliable for examination of the heart muscle and are used to determine the nature and extent of heart disease and to tell whether the patient can withstand surgical procedures.

The catheter is a hollow plastic tube inserted in the arm, through 26 inches of a large vein, and into the heart with no pain to the patient. The procedure permits the measurement of blood volume, pressure, and oxygen content in the heart; the withdrawal of blood for examination; and the injection of fluids so that the heart muscles can be viewed by X ray.

Cournand teamed with Dickinson W. Richards, a colleague at Columbia, in researching practical uses of the heart catheter, which had been invented in 1929 by German scientist Werner Forssmann. All three shared the 1956 Nobel Prize.

Cournand was born in Paris and graduated from the University of Paris in 1913. Later he earned degrees from that institution in medicine and advanced sciences. During World War I he served with the French army as a medical corpsman and battalion surgeon and was awarded the Croix de Guerre with three stars and the Legion of Honor.

In 1932 Cournand came to the United States as an assistant resident at the Columbia University division of the Bellevue Hospital in New York where he later was named chief resident and director of the division's cardiopulmonary laboratory. He began his teaching career at Columbia's College of Physicians and Surgeons in 1934, from which he retired in 1964.

Cournand was elected to membership in the Society in 1944. He also was a past chairman of the cardiovascular study section at the National Institutes of Health and was a contributor to journals and served scientific editorial boards in both the United States and in Europe. 



## News From Senior Physiologists

### Letters to Roy O. Greep:

**Irving Rothschild** writes of his new career. By the time his last grant ran out in 1982, choroidal sclerosis had made it exceedingly difficult to read. Faced with a difficult choice of relying heavily on readers and technicians to guide him in laboratory research or finding a new career, he decided to satisfy a long-held urge to write by doing so vicariously, i.e., by translating the works of other authors. It was love at first sight when he encountered the Dutch language while staying at Peter van Rees' home in Leiden in 1962. During his year as a Boerhaave Professor at the University of Leiden in 1977-78, he became fluent in Dutch. He is now busy translating the works of three Dutch fiction writers who have never been successfully rendered into English: Marnix Gijsen, Willem Elschot, and Marten Toonder. "It requires no grant application, no lab, no more expensive equipment and supplies than a good typewriter and paper, and in my case a TV screen magnifier." Translating is "an ideal replacement for research, because like doing biological research, it requires imagination, ingenuity, patience and wit, in a word creativity . . . The resemblance to my life as a researcher is astounding. Even the investment in a project, in time, money, emotion, etc., when you don't know whether the results will be of any value" is similar. "We come back to the same point about why we do research. It's because it's fun. It's as simple as that."

**Lee Langley** writes that as of last August he retired from the University of Missouri-

Kansas City (mandatory retirement) and has also ended his 30-year career as a textbook writer. "None of this bothers me at all, and since I periodically keep myself and my hand in my first love, namely teaching, all is well. This allows adequate time for the first time in my life, to catch up with my reading, to prevent the decline of my tennis game from becoming too precipitous, and to swim at least once a day." He seriously thinks of moving to the island of Kauai. He continues to attend the meetings of APS, and for the most part enjoys them, sincerely believing "that exercising one's brain is as important as exercising one's muscle in order to prevent atrophy."

**Jane Sands Robb Johnson**, who became a member of APS in 1924, celebrated her 94th birthday last November. She reports that her physical condition hasn't altered greatly, except for gradual aging; she still enjoys reading large print. Her life is much enriched by frequent visits and letters from around the world from family members.

**Leslie E. Edwards** writes that he is still operating a small beef farm in Sandston, Virginia, and maintaining physical fitness by farming, hunting, and a great deal of walking in the woods. He has been active in the Oak Hall Ruritan Club, a community service club. He observes that although he can relate to rural problems better than most politicians, people in his neighborhood have no knowledge of what a physiologist does. "I guess I am saying that of all the preclinical subjects Physiology is the least understood by the layman."

**Frank Barrera** writes from Miami that he is honored to become a member of the club. "I have read and continue reading in the *The Physiologist* the letters of my fellow members, many of which I knew per-

sonally, and find them fascinating. I will continue to do so."

**Cosimo Ajmone-Marsan** writes that he is not yet retired, although he left active experimental work some 10 years ago. Since leaving NIH (NINCDS) in 1979, he has joined the Department of Neurology at the University of Miami School of Medicine as Professor and Director of the EEG Laboratory. He enjoys training residents and lecturing. Over the past few years he was fortunate enough to be selected for the W. Lennox Award, W. Penfield lectureship, and H. H. Jasper Award, all related to his past work in the field of epilepsies.

**Joseph Katz** writes that he is now 73 years old and is continuing research as before at Cedars-Sinai Medical Center in Los Angeles; he is applying to NIH for further support.

## Book Program

The Publications Committee recently completed a two-year review of the American Physiological Society's book program. One of the principle outcomes was a recommendation to Council that the book program be moved to a commercial publisher. After interviews with six publishers, Oxford University Press was selected as most suited to the Society's needs. The Council approved a five-year contract with Oxford University Press, effective January 1, 1988.

Under the terms of the contract Oxford University Press will publish all new APS book titles, promote and sell APS books, and give members a 35% discount on book purchases. The Society will continue to determine book topics and will appoint book editors.

"The Society's financial resources will not be tied up in the book program; members will receive greater discounts; authors, editors, and the Society will receive royalty payments; and the quality of APS-sponsored books will be maintained," according to APS President Harvey V. Sparks, Jr.

APS has conducted a book program for 25 years. ☛

## 1988-1989 Directory Update

All APS members should (have) receive(d) the 1988-1989 directory update card in late March. To facilitate a change in the current directory listing, the card must be returned to the Directory Office no later than June 1, 1988. Notifying the Society of any change (address, title, telephone number, etc.) will not automatically update your entry.

### John F. Perkins, Jr., Memorial Award

APS invites applications for the John F. Perkins, Jr., Memorial Fellowships. The fund is designed to provide supplementary support to the families of foreign physiologists who have arranged for fellowships or sabbatical leave to carry out scientific work in the U.S. Applications by U.S. physiologists who require supplementary assistance to work abroad will also be considered.

It is the interest of the Perkins Fund to develop the full potentialities for cultural benefit associated with scientific exchange. Preference will be given to physiologists working in the fields of respiratory physiology, neurophysiology, and temperature regulation.

Each application should be made by

both the visiting scientist and his host. Ordinarily, the joint applicants will have made financial arrangements for the visiting scientist before applying to the Perkins Fund for family support. The application should contain an account of these arrangements with a description of the proposed scientific work and a brief account of how the visitor and his family intend to make use of the cultural benefits.

Each award ranges from \$3,000 to \$7,500, depending on the estimated needs of the family over and above that available to the visiting scientist.

Application forms may be obtained from APS, 9650 Rockville Pike, Bethesda, MD 20814.

### APS Membership Applications

Membership applications may be obtained from APS Membership Services, 9650 Rockville Pike, Bethesda, MD 20814. Applications received between February 1 and July 1 are considered for nomination by Council at the Fall Meeting, and those received between July 1 and February 1 are considered for nomination at the Spring Meeting of the Society.

## APS Membership Statistics

Total Membership 6,559

### Distribution by Employment (6,370 Respondents)

	No.	%
Medical schools	4,097	64
Physiology departments	2,053	32
Other preclinical departments	513	8
Clinical	1,461	23
Administration	70	1
Hospitals and clinics	284	4
Veterinary schools	137	2
Dental schools	49	1
Public health and graduate schools	121	2
Undergraduate schools	756	12
Commercial companies	188	3
Government	412	6
Institutes and foundations	205	3
Private practice	54	1
Other, emeritus or inactive	67	1

### Distribution by Racial Background and Heritage (Optional personal data)

	Total respondents
American Indian or Alaskan	10
Asian or Pacific Islander	325
Black	42
White	4,903
Hispanic	92

### US States With More Than 100 Members

(50 States plus Puerto Rico and Virgin Islands)

California	680
New York	627
Texas	371
Maryland	346
Pennsylvania	338
Massachusetts	320
Illinois	311
Ohio	246
Michigan	187
North Carolina	180
Florida	176
New Jersey	169
Missouri	151

Virginia	131
Connecticut	121
Wisconsin	114
Tennessee	114
Minnesota	110

### Distribution by Sex (Optional personal data)

	Total respondents
Female	801
Male	5,796

### APS American Membership

US	6,110
Canada	280
Mexico	8
Brazil	7
Chile	5
Argentina	4
Venezuela	4
Panama	1
Peru	1

### Canadian Provinces with 5 or More Members

Ontario	105
Quebec	76
Alberta	31
British Columbia	25
Manitoba	22
Nova Scotia	10
Saskatchewan	8
Other provinces represented	
New Brunswick	
Newfoundland	
Prince Edward Island	

### APS Membership Outside North America

Countries with 5 or more members	
Japan	42
United Kingdom	35
Federal Republic of Germany	34
Switzerland	24
Italy	16
Australia	15
Israel	13
France	13
Sweden	12
Netherlands	12
Belgium	8
Denmark	8
Spain and Canary Islands	8
Norway	7
Austria	5
Taiwan	5

### Distribution by Earned Degree (6,277

Respondents)  
(Includes 856 individuals with multiple doctorate degrees)

	No.
Ph.D.	4,355
M.D.	2,462
D.V.M.	151
D.D.S. and other	151

### Principle Type of Work (6,425 Respondents)

	%
Research	70
Teaching	14

Administration	8
Clinical	7
Other	1

Statistics represent membership as of February 1988.

### Distribution by Age (Optional personal data)

	Total respondents
70+	604
60-69	1,102
50-59	1,590
40-49	1,968
30-39	1,149
20-29	92

### Distribution by Primary Specialty (5,857 Respondents)

	%
Cardiovascular	22
Neurophysiology	12
Respiration	11
Endocrine	9
Renal	6
Muscle and exercise	6
Electrolyte and water balance	5
Gastrointestinal, food, and nutrition	6
Cellular and tissue	4
Environmental	3
Comparative	3
Blood	2
Energy metabolism and temperature regulation	2
Pharmacology	2
Reproduction	2
All other categories (none >1%)	7

### Other countries represented

Bahrain
British West Indies
Czechoslovakia
Greece
Hong Kong
Hungary
Iceland
India
Kuwait
Lebanon
New Zealand
Nigeria
Peoples Republic of China
Poland
Portugal
South Korea
Saudi Arabia
South Africa
USSR
Yugoslavia
Zimbabwe

### Moving?

If you change your address or telephone number, please notify the APS office (301-530-7171) as soon as possible.

# Association of Chairmen of Departments of Physiology Annual Questionnaire Results

Allen W. Cowley, Jr., and Jane Brennan

Department of Physiology, Medical College of Wisconsin, Milwaukee, WI

Physiology department chairpersons were again asked to fill out a questionnaire concerning various aspects of departmental operation. This past year 150 departments received the survey, with 100 (67%) responding. The majority of the respondents were from the United States, with a few from Canada and one from Puerto Rico.

All figures relating to salaries, stipends, and budgets are in whole American dollars. Those dollar values which were reported as Canadian dollars were converted to American dollars as follows: \$1.00 Canadian = \$0.78 American. Minimum, maximum, and mean salaries have been determined for chairmen, professors, associate professors, assistant professors, and instructors along with percent change from last year's average. This year we have also calculated the same for women professors, associate professors, assistant

professors, and instructors. Average salaries have been determined with respect to the number of years a faculty member has been at his/her current position. In addition, this year we have also included minimum, maximum, and average salaries by region (Northeast, Midwest, South, West, Canada, and Puerto Rico).

As was done last year, the amount of extramural research funds has been compared with research space and number of faculty. Departments were ranked according to research space and assigned a "space rank" with 1 being the department with the greatest amount of space. The top, middle, and bottom 10 departments according to funded outside research grants are listed along with total space, grant income, and space per faculty.

Information regarding graduate programs (stipends, sources of support, areas of study/research) has also been included.

One hundred fifty surveys were sent out to Chairmen of Departments of Physiology. These results are from 100 completed surveys received by December 31, 1987. Surveys were received from universities in the United States, Canada, and Puerto Rico. For some of the analysis, surveys were divided into three categories: 1) those from public medical schools (those with M.D. programs), 2) those from private medical schools (also with M.D. programs), and 3) those from nonmedical schools (including dental, osteopathic, podiatric, and veterinary schools). Unless otherwise stated, all numbers represent totals from all surveys and numbers in parentheses represent the average number per department.

## Type of Institution

Physiology department primarily in a medical (M.D.) (92) or nonmedical (8) school. If nonmedical, specify type of school: dental (2), podiatric (1), osteopathic (2), veterinary (2).

Primary affiliation: public (67) or private (33).

## Numbers of Faculty With Academic Appointments (Regular or Joint) in Your Department

Figures shown are for the total number of faculty. Numbers in parentheses are average number of faculty per department. Although the sum of each side of each row should add up to the number in column 5 (total), this is not always the case because some surveys were not filled out completely.

	1	2	3	4	5	6	7
	SUM = TOTAL = SUM						
	Degree(s) Held	No. of		Tenured		Not	
	Ph.D. M.D. Both Other	Faculty		Tenured		Tenured	
Entire salary paid through your department:							
Full time	1,156 (11.92)	75	54	38	1,323 (13.64)	847 (9.41)	438 (4.08)
Part time	57	13	2	17	89	35	50
Part of salary paid through your department associated with:							
Another basic	51	1	2	1	55	40	14
sci. dept.							
A clinical dept.	29	17	4	0	50	26	18
No salary paid through your department associated with:							
Another basic	112	2	1	10	125	67	45
sci. dept.							
A clinical dept.	160	143	33	9	345	147	107
Other (emeritus, etc.)	177	36	15	7	235	76	121

## Unfilled Positions

Number of unfilled positions in each rank in all departments:

Professor	15	Associate Professor	19
Assistant Professor	73	Instructor	3

Number of unfilled positions due to:

Creation of new FTEs	31	Failure to promote/tenure	11
Death	2	Retirement	23
		Resignation	27
		Other	12

Estimated number of junior positions expected to become vacant in the next 5 years due to retirement, new FTEs, etc:

yr 1	43	yr 2	49	yr 3	38	yr 4	30	yr 5	32
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## Current Graduate Students and Postdoctoral Fellows

Number of graduate students enrolled in all departments'	1,225
Ph.D. programs	
Number of postdoctoral fellows currently in all departments	637
Number of vacant postdoctoral positions	84

## Training Support

Number of departments with/without training grants that support predoctoral trainees	Yes (38)	No (57)
Number of departments with/without training grants that support postdoctoral trainees	Yes (36)	No (58)

	Predocctoral (78 departments)	Postdoctoral (71 departments)
Average starting stipend per year for trainees	min \$4,500 max \$11,460 mean \$7,847 NIH level \$6,552	\$14,000 \$25,000 \$19,783 \$15,996
Amount of tuition paid by predoc- toral trainees (% of departments responding)	58%—student pays no tuition 27%—student pays all tuition 15%—student pays some tuition	
Number of pre- and postdoctoral trainees supported by:	Doctoral	Postdoctoral
Training grants	158	113
Individually federally funded awards	39	59
Research grants	357	334
State funds	306	18
Private foundations	48	43
Institutional awards	175	15
Medical Scientist Training Program	18	1
Other	81	28
Not specified	43	26

Other sources of support for trainees: U.S. Army, minority program, university graduate school stipends, department funds, VA, endowments, other university funds, minority biomedical research support grants, American Heart Association, UK Department of Surgery, NMFS (NOAA), NORAD, World Health Organization, National Science Council (Taiwan), self supporting, and several foreign governments including Jordan, Sweden, Argentina, Germany, Indonesia, Taiwan, and Saudi Arabia.

*Number of Trainees Who Have Finished Doctoral or Postdoctoral Work During the Year Ending June 30, 1987*

	Doctoral	Postdoctoral
Total number finishing	143	146
Females	38	45
Blacks	3	1
Other minorities	15	9
Positions needed for placement	4	8
Research area (of those finishing):		
Aging	0	1
Biomathematics	1	0
Cardiovascular	32	41
Cell/tissue	13	26
Comparative	2	1
Endocrine	17	14
Environmental	2	0
Gastrointestinal	8	9
General	2	4
Muscle/exercise	6	9
Neural	29	15
Pharmacology	1	0
Renal	11	8
Reproduction	8	4
Respiration	6	9
Temperature regulation	1	0

*Applicants to Graduate Program*

Number of applicants to 80 departments' Ph.D. programs this year	1,670 (20.9)
Number of these applicants accepted to Ph.D. programs	487 (6.1)
Number of those accepted actually enrolled in Ph.D. programs	288 (3.6)

*Approximate Average GRE Score of Those Accepted*

Because of the ambiguity to this question, averages are given for each method of reporting GRE scores.

3 surveys gave one score—avg = 630

6 surveys gave two scores—avg = V, 513; Q, 655

45 surveys gave all three scores—avg = V, 533; Q, 628; A, 585

1 survey gave one percentage—avg = 67%

4 surveys gave three percentages—avg = V, 70%; Q, 74%; A, 63%

5 surveys said GRE scores were not available

2 surveys said GRE scores are not required

*Departmental Faculty—1,427 Total Faculty (% of Total)*

Number of faculty who are

Black	28 (1.96%)
Other minority	81 (5.68%)
Female	199 (13.95%)

*Departmental Budget for Fiscal Year 1986–1987 (Salaries and Operation)*

	Mean	Minimum	Maximum
Institutional sources	902,495	15,000	2,355,502
Outside research grants	1,301,399	0	4,948,997
Training grants	83,441	0	654,489
Other budget support	70,037	0	1,462,105
Total	2,357,097	75,000	6,513,866

TABLE 1. Faculty Salaries for Fiscal Year 1987–1988

	Mean	% Change from 1986–1987 Survey	Minimum	Maximum	No. of Faculty
Chairmen					
All schools	\$86,409	↑8.4	\$31,884	\$127,177	89
Medical public	89,239	↑11.2	42,560	121,000	51
Medical private	86,082	↑1.2	31,884	127,177	30
Nonmedical	69,593	↑11.9	52,000	81,536	8
Professors					
All schools	64,998	↑8.4	30,000	148,450	531
Medical public	65,574	↑10.8	32,093	148,450	346
Medical private	66,317	↑2.2	30,000	107,400	134
Nonmedical	57,623	↑14.5	35,279	82,300	51
Women	64,050		44,000	101,106	(19)
Associate Professors					
All schools	47,161	↑7.1	25,637	71,000	384
Medical public	48,013	↑10.3	30,200	71,000	226
Medical private	46,418	↑0.5	25,637	65,000	127
Nonmedical	43,993	↑11.4	29,178	61,300	31
Women	45,900		33,869	66,558	(22)
Assistant Professors					
All schools	37,047	↑7.9	19,366	78,000	313
Medical public	37,099	↑10.7	19,366	78,000	192
Medical private	36,935	↑2.4	26,000	51,817	97
Nonmedical	37,093	↑3.9	25,200	51,900	24
Women	35,285		23,000	46,095	(27)
Instructors					
All schools	26,279	↑11.9	14,307	44,500	42
Medical public	26,650	↑18.1	18,259	38,900	28
Medical private	26,424	↑4.5	14,307	44,500	10
Nonmedical	23,316		20,664	24,600	4
Women	22,526		21,927	23,125	(2)



Other sources of support: graduate school research grants, biomedical research support grants (BRSG), foundations, industry, private contributions, university research support, affiliated institutions, fellowships, endowed resources, start-up funds, earned income, clinical revenues, state funds, research and development funds, computer fund, reserve funds, small instrumentation grant, dental school, indirect costs, library/shop, university physicians practice group profits, special physiology research fund, industrial contracts, income fund reimbursement, research incentive funds.

#### Space Assigned to Your Department (Excluding Lecture Rooms) in Sq. Ft.

	Mean	Minimum	Maximum
Research	12,332	0	50,000
Teaching	1,859	0	15,000
Office	3,175	0	10,899
Storage	400	0	2,135
Other	1,493	0	12,500
Total	19,255	2,340	54,000

Of the 98 surveys listing space, 49 had departmental teaching labs, 34 had no teaching labs, and 15 shared multidisciplinary teaching labs.

TABLE 2. Average Salary by Number of Years at Position

Chairmen			Professors			Associate Professors			Assistant Professors			Instructors		
Years	Salary	No. of Faculty	Years	Salary	No. of Faculty	Years	Salary	No. of Faculty	Years	Salary	No. of Faculty	Years	Salary	No. of Faculty
0-5	\$79,518	35	0-5	\$60,639	162	0-5	\$45,780	213	0-5	\$36,761	257	0-5	\$27,132	34
6-10	89,509	24	6-10	63,715	116	6-10	49,624	84	6-10	39,316	29	6-10	21,476	2
11-15	95,070	15	11-15	66,474	100	11-15	48,396	53	11-15	40,826	7	11-15	28,258	2
16-20	87,838	8	16-20	68,355	94	16-20	47,405	17	16-20	36,436	7	16-20	19,919	3
21-25	83,529	4	21-25	71,332	32	21-25	46,467	5	21-25	33,150	2			
26+	98,733	3	26+	68,545	14									

TABLE 3. Starting Salaries

	Professor	Associate Professor	Assistant Professor	Instructor
All schools	\$50,548	\$40,628	\$32,657	\$23,933
Medical public	51,019	41,198	33,462	25,249
Medical private	53,848	41,782	32,158	23,468
Nonmedical	45,600	38,689	32,200	19,250

TABLE 4. Salaries by Region

	Minimum	Maximum	Mean	No.
Chairmen				
Northeast	\$52,000	\$126,034	\$91,944	20
Midwest	50,200	127,177	85,246	25
South	31,884	121,000	87,642	27
West	66,324	119,100	88,464	11
Canada and PR	34,000	109,014	63,491	6
Professors				
Northeast	44,000	107,400	69,999	116
Midwest	42,000	93,580	63,210	144
South	36,328	108,000	64,166	123
West	35,774	148,450	66,513	111
Canada and PR	30,000	87,305	54,491	37
Associate Professors				
Northeast	25,637	66,558	49,114	100
Midwest	29,952	65,000	47,555	100
South	28,200	61,000	46,317	124
West	31,228	71,000	47,982	37
Canada and PR	28,000	59,093	40,193	23
Assistant Professors				
Northeast	25,320	51,817	37,287	71
Midwest	19,366	52,500	37,284	102
South	26,000	78,000	37,807	88
West	24,000	51,900	38,005	28
Canada and PR	23,000	45,000	31,432	24
Instructors				
Northeast	20,000	44,500	24,655	10
Midwest	19,764	33,700	25,369	7
South	18,951	33,390	26,551	16
West	18,259	38,900	28,835	6
Canada and PR	14,307	35,728	24,012	3

Northeast Region: ME NH VT NY MA RI CT NJ PA MD DE DC.  
Midwest Region: MI OH IN IL WI NH IA MO KA NE ND SD.  
South Region: VA WV KY TN NC SC GA FL AL MS AR LA OK TX.  
West Region: AK HI MT WY CO NM AZ MT ID NV WA OR CA UT.

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Physiological  
Society**



TABLE 5. Departmental Ranking According to Outside Research Grants

Rank	Grant Income	Grant Income/ Faculty	Research Space (sq. ft.)	Research Space/ Faculty	Space Rank	No. of Faculty
Top Ten						
1	\$4,948,997	\$141,400	26,263	750	5	35
2	4,086,308	204,315	21,211	1,060	11	20
3	3,665,855	183,293	21,604	1,080	9	20
4	3,492,803	205,459	17,625	1,037	21	17
5	3,421,900	263,223	13,961	1,074	30	13
6	3,178,084	158,904	20,000	1,000	14	20
7	3,000,000	125,000	19,083	795	15	24
8	2,829,441	176,840	11,094	693	51	16
9	2,759,773	102,214	13,101	485	34	27
10	2,679,504	107,180	18,617	745	16	25
<b>Avg</b>	3,406,266	166,783	18,256	872	21	21.7
Middle ten						
43	1,339,442	53,578	12,900	516	36	25
44	1,334,344	102,642	6,599	508	79	13
45	1,303,344	217,224	2,500	417	94	6
46	1,298,276	99,867	7,500	577	71	13
47	1,214,000	86,714	8,700	621	64	14
48	1,200,000	70,588	18,000	1,059	18	17
49	1,198,200	108,927	7,200	654	74	11
50	1,194,176	74,636	17,732	1,108	20	16
51	1,121,279	56,064	6,821	341	77	20
52	1,086,379	108,638	12,000	1,200	43	10
<b>Avg</b>	1,228,944	97,888	9,995	700	58	14.5
Bottom ten						
89	172,590	21,574	2,771	346	93	8
90	171,032	24,433	10,545	1,506	53	7
91	90,000	11,250	34,000	4,250	3	8
92	60,000	10,000	1,755	292	96	6
93	49,800	16,600	0	0	98	3
94	47,298	5,912	10,000	1,250	58	8
95	40,000	10,000	2,102	525	95	4
96	20,000	3,333	3,000	500	92	6
97	0	0	3,690	461	90	8
98	0	0	1,600	320	97	5
<b>Avg</b>	65,072	10,310	6,946	945	77	6.3

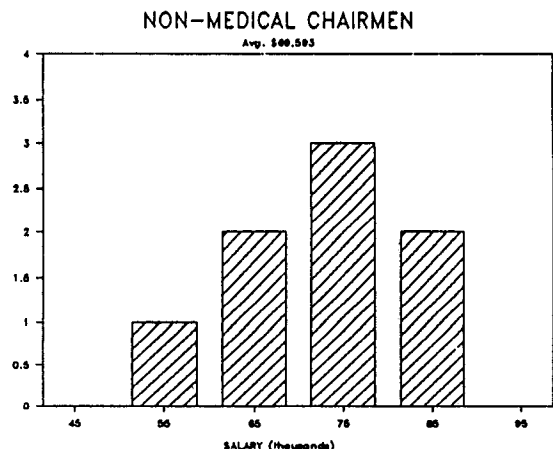
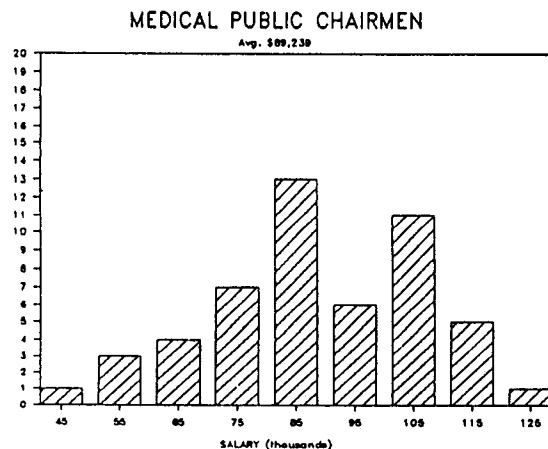
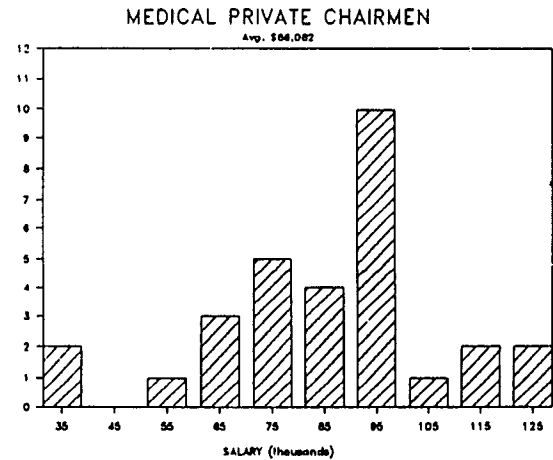
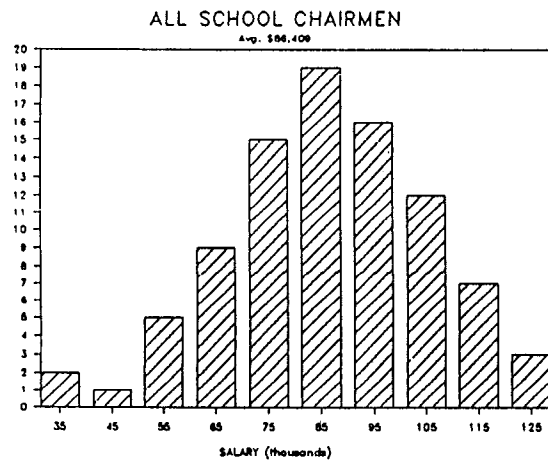
TABLE 6. Pre- and Postdoctoral Trainees

	Year								
	1987	1986	1985	1984	1983	1982	1981	1980	1978
Ph.D.s granted	143	98	113	135	153	137	165	190	167
Degrees to minorities									
Female	38	32	40	42	32	40	41	33	39
Black	3	2	1	3	2	4	3	7	3
Others	15	1	7	7	8	9	12	18	10
Area of study									
Cardiovascular	32	29	19	47	52	25	33	37	31
Cell/Tissue	13	15	14	34	32	26	6	17	10
Comparative	2	3	1	2	5	2	1	18	1
Endocrine	17	11	8	50	49	41	38	33	28
Environmental	2	1	0	8	4	3	1	1	5
Gastrointestinal	8	6	0	6	5	6	7	3	4
General	2	0	2	3	29	4	17	11	36
Muscle/Exercise	6	5	9	6	9	6	7	4	6
Neural	29	19	22	32	31	30	28	45	34
Renal	11	3	6	9	8	12	11	8	12
Respiratory	6	6	9	12	8	7	10	7	5
Ph.D. students in program	1,225	1,002	1,040	1,329	991	1,043	1,036	1,060	907
Postdocs in program	637	497	524	534	534	475	493	472	476
Vacant postdoc positions	84	59	59	64	52	51	53	75	78
Postdocs finishing work	146	118	111	130	132	147	131	160	109
Faculty positions available	110	97	78	99	92	84	87	92	97
Stipends									
Ph.D. students	7,847	7,530	7,244	6,600	5,845	5,609			
Postdocs (1st yr)	19,783	17,120	16,890	15,634	14,689	14,097			

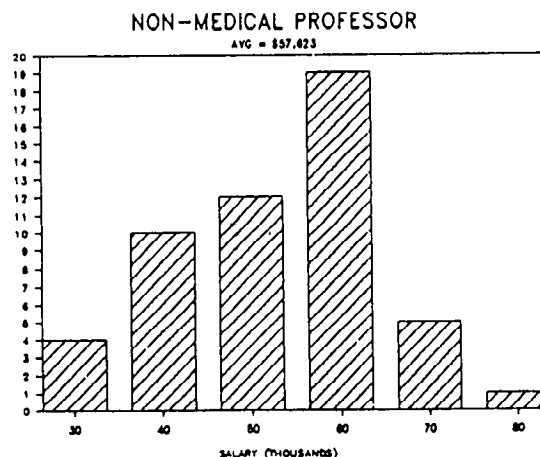
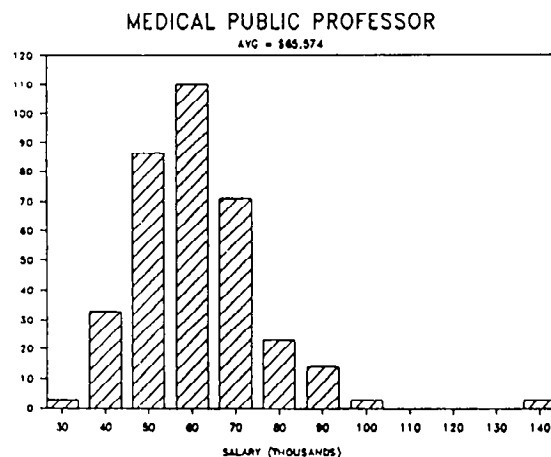
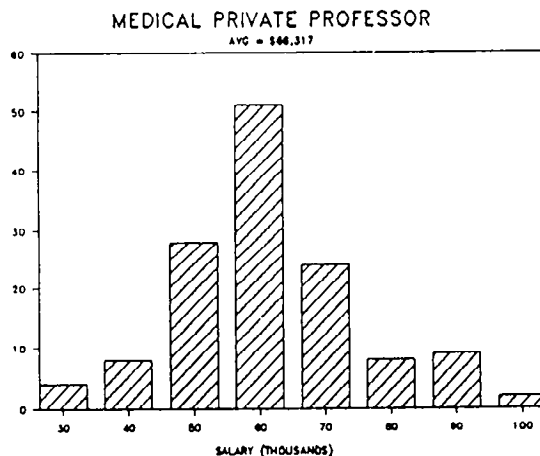
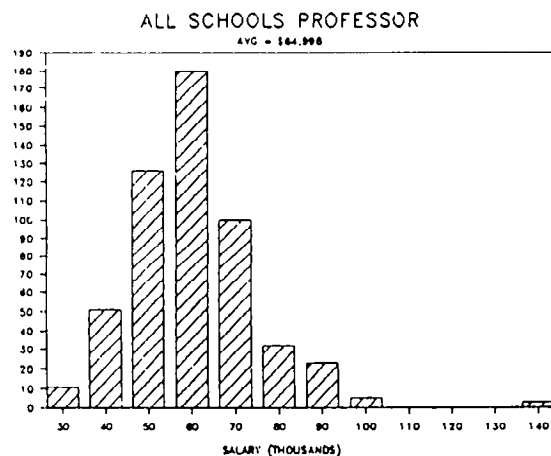
TABLE 7. Training Support

	Total No. of Trainees Supported (% total/yr)					
	1987	1986	1985	1984	1983	1982
Predoctoral						
Training grants	158 (13)	108 (12)	113 (12)	177 (16)	189 (20)	149 (16)
Individ. federally funded awards	39 (3)	36 (4)	32 (3)	37 (4)	19 (2)	18 (2)
Research grants	357 (30)	239 (26)	229 (24)	248 (22)	223 (23)	241 (26)
State funds	306 (26)	283 (31)	285 (30)	281 (25)	253 (27)	279 (30)
Private foundations	48 (4)	34 (4)	37 (4)	34 (3)	32 (3)	17 (2)
Institute awards	175 (15)	134 (14)	184 (19)	221 (20)	149 (16)	134 (14)
Medical scientist training programs	18 (2)	19 (19)	23 (2)	46 (4)	22 (2)	33 (3)
Other	81 (7)	67 (7)	49 (5)	75 (7)	46 (5)	63 (7)
Postdoctoral						
Training grants	113 (18)	88 (18)	92 (18)	89 (22)	100 (20)	110 (24)
Individ. federally funded awards	59 (10)	94 (19)	79 (15)	88 (22)	89 (18)	97 (21)
Research grants	334 (55)	206 (41)	232 (45)	130 (32)	197 (40)	174 (38)
State funds	18 (3)	21 (4)	27 (5)	14 (3)	17 (4)	21 (5)
Private foundations	43 (7)	51 (10)	39 (8)	48 (12)	56 (11)	34 (7)
Institute awards	15 (2)	21 (4)	32 (6)	15 (4)	18 (4)	13 (3)
Medical scientist training programs	1 (<1)	1 (<1)	4 (<1)	2 (1)	5 (1)	2 (<1)
Other	28 (5)	15 (3)	15 (3)	18 (4)	12 (2)	11 (2)

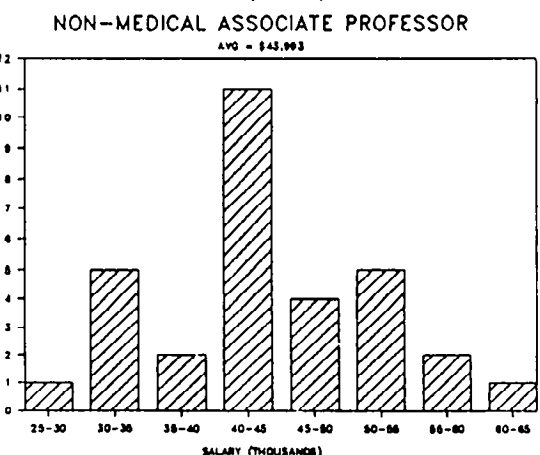
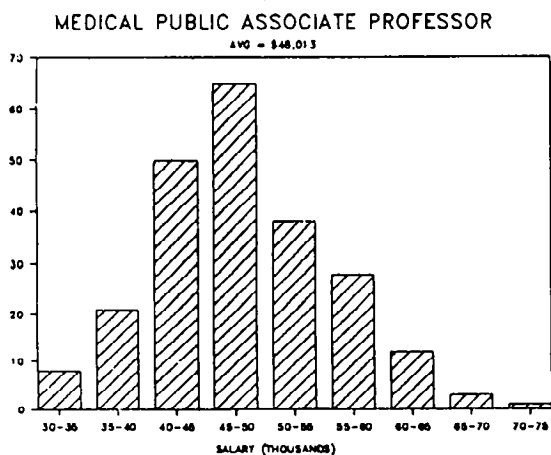
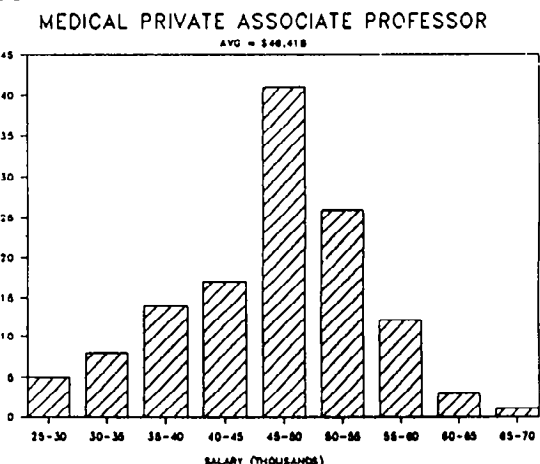
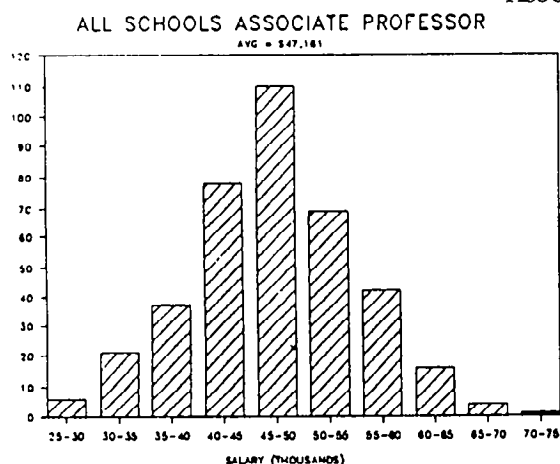
## Chairmen



## Professors



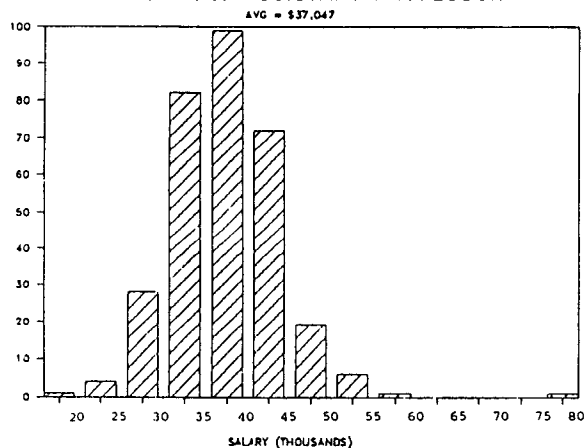
## Associate Professors



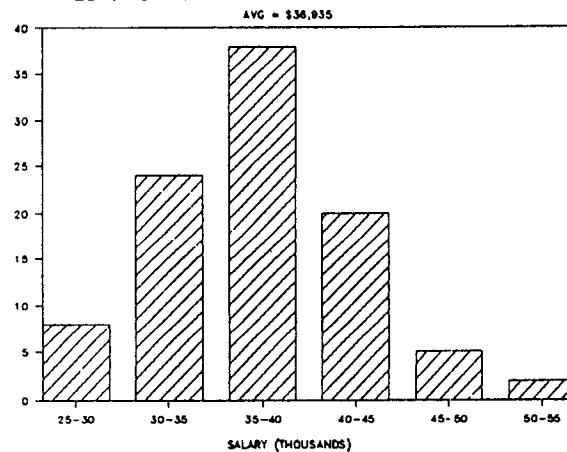


## Assistant Professors

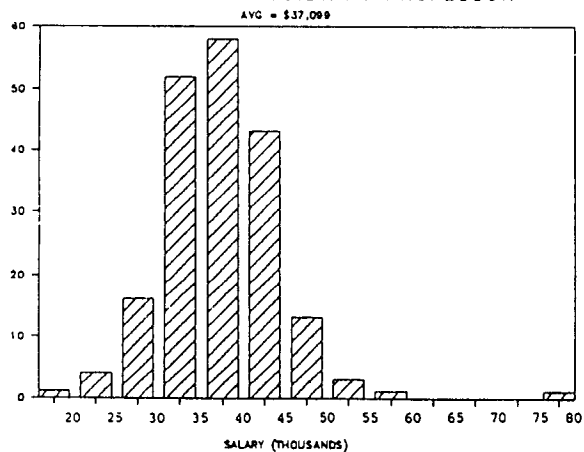
ALL SCHOOLS ASSISTANT PROFESSOR



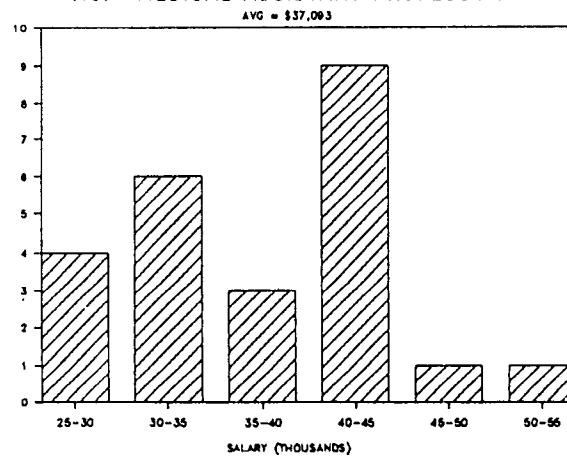
MEDICAL PRIVATE ASSISTANT PROFESSOR



MEDICAL PUBLIC ASSISTANT PROFESSOR

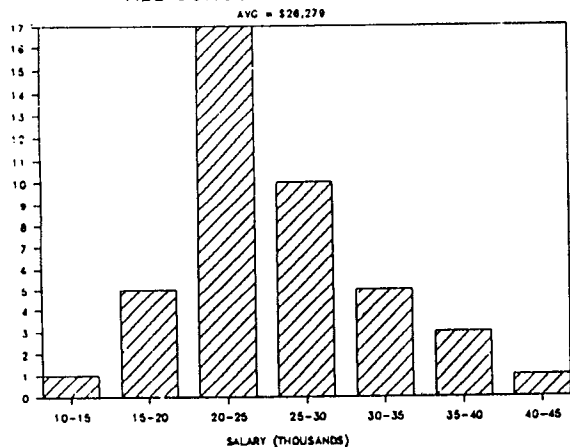


NON-MEDICAL ASSISTANT PROFESSOR

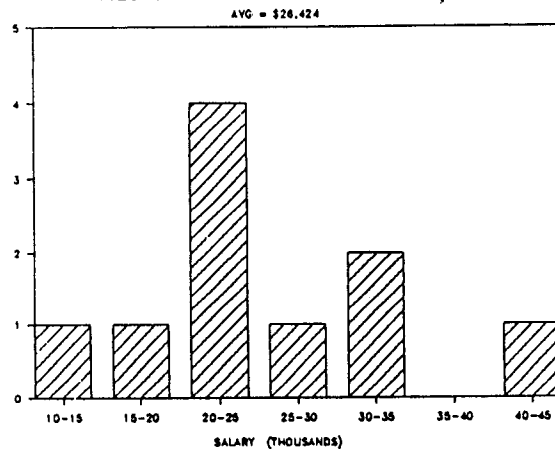


## Instructors

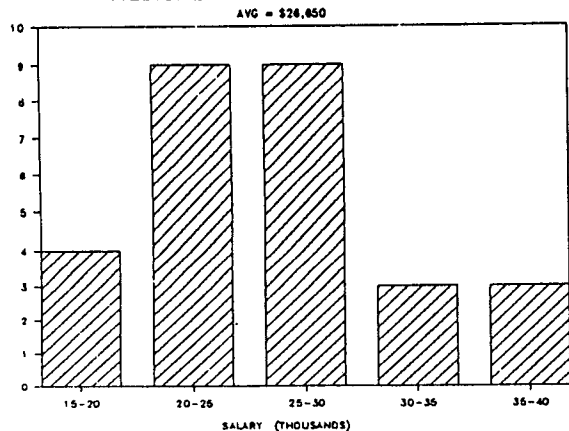
ALL SCHOOLS INSTRUCTORS



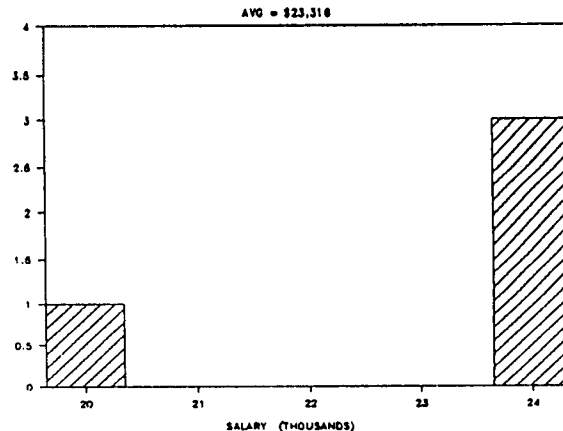
MEDICAL PRIVATE INSTRUCTORS



MEDICAL PUBLIC INSTRUCTORS



NON-MEDICAL INSTRUCTORS



## PEOPLE AND PLACES

**John A. Williams, M.D., Ph.D.**, has accepted the chairmanship of the Department of Physiology, University of Michigan School of Medicine, Ann Arbor. Williams was formerly in the Department of Physiology at the University of California, San Francisco.

The Assembly of the Association of American Medical Colleges has elected



**Ernst Knobil, Ph.D.**, to Distinguished Service Membership for having made important contributions to the Association through service on its councils and committees. Knobil, President of the APS in 1979 and a member since 1955, is chairman of the Long-Range Planning Committee.

Formerly at the Mount Zion Hospital and Medical Center, San Francisco, **Craig D. Logsdon, Ph.D.**, is now at the University of Michigan School of Medicine, Ann Arbor.

**Robert F. Bond, Ph.D.**, former chairman of the department of physiology at Oral Roberts University, has moved to the University of South Carolina, Columbia.

The dean and executive faculty at Temple University School of Medicine has appointed APS member, **Peter R. Lynch**, Chairman of the Department of Physiology.

**Rey Elizondo, Ph.D.**, has been appointed dean of the College of Science, University of Texas at El Paso. Elizondo, a member since 1972, was head of the Department of Physiology, Indiana University.

On October 8, 1987, **John B. West, M.D., Ph.D.**, was given a Doctor Honoris Causa degree by the University of Barcelona, Spain, at a very colorful ceremony. West, active in the Society since his election to membership in 1970, was President in 1984.



John B. West, right, accepting a Doctor Honoris Causa degree from the University of Barcelona.

People and Places notices come almost exclusively from information provided by members and interested institutions. To ensure timely publication announcements must be received at least *three months* (by the 5th of the month) before the desired publication date. Send all information to Martin Frank, Editor, *The Physiologist*, APS, 9650 Rockville Pike, Bethesda, MD 20814.

**Aram V. Chobanian, M.D.**, professor of medicine and pharmacology, has been named dean of the School of Medicine, Boston University. APS member Chobanian has been director of the Cardiovascular Institute at that institution.

The Upjohn Company announced that **Norman B. Marshall, Ph.D.**, formerly Vice President, Products Development, has been appointed Vice President, Medical Affairs Support.

**Louis Ramazzotto, Ph.D.**, formerly at Fairleigh-Dickinson University, has joined the staff of Long Island Jewish Medical Center as Director of Research Facilities. Ramazzotto has been an active member of the APS Animal Care and Experimentation Committee and represents the Society on Board of Trustees of the American Association for the Accreditation of Laboratory Animal Care.

### Humboldt Foundation Award

APS member, **Arnost Fronek, M.D., Ph.D.**, professor of bioengineering in the department of applied mechanics and engineering sciences and professor of surgery at the University of California, San Diego, received the Senior U.S. Scientist Award from the Humboldt Foundation of the Federal Republic of Germany. Fronek will spend six months at the Institute for Vascular Disease in Engelskirchen, West Germany, introducing physicians from West Germany and other western European countries to noninvasive techniques used in vascular disease diagnosis. ☞

## POSITIONS

### Position Available

**Biomathematician—Assistant Professor.** Nominations and applications are invited for a tenured track assistant professorship. We are seeking a theoretician in the biomedical sciences capable of carrying on independent research and training graduate students. Priority areas for hiring are the neurosciences and physiology; strong candidates with other biomedical interests are encouraged to apply. Candidates will be judged on the realism and relevance of their biological modeling, command of appropriate applied mathematical techniques, ability to communicate findings, and potential for interaction with existing faculty within the department and medical school. Salary is negotiable. Send curriculum vitae and statement of research and teaching interests to Chair, Department of Biomathematics, School of Medicine, University of California, Los Angeles, CA 90024-1766. Also have three letters of evaluation sent to the above address. [EOAAE]

### Position Wanted

**Physiology Laboratory Assistant.** Czechoslovakian political refugee, with Canadian surgical residency training, seeks research-oriented employment in the U.S. Czech M.D. degree (MUDr., Komensky University), good knowledge of pathology and medical physiology and fluent in English. Humane, experienced surgeon qualified for live research animal or pathology work. Will consider all offers. *Inquiries:* Dr. Joe Keller, P.O. Box 29, Deerfield, MO 64741.

### Positions Available

There is a \$25 charge per issue for each position listed. A check or money order payable to the American Physiological Society must accompany the copy. Purchase orders will not be accepted unless accompanied by payment. Ads not prepaid will not be printed. Copy must be typed double-spaced and 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 where given on original copy. Copy deadline: copy must reach the APS office before the 15th of the month, 2 months preceding the month of issue (e.g., before December 15 for the February 1987 issue). Mail copy to APS, 9650 Rockville Pike, Bethesda, MD 20814.

# ANNOUNCEMENTS

## Wellcome Visiting Professorships

The Federation of American Societies for Experimental Biology invites nominations for the 12th series of Wellcome Visiting Professorships in the Basic Medical Sciences, sponsored by The Burroughs Wellcome Fund. Administered by the Federation, the Professorships are offered annually to medical schools, universities, and other scientific research institutions with the U.S. The purpose of the Visiting Professorships is to stimulate interest in the basic sciences and to enhance communication with scientists in Physiology, Biochemistry, Molecular Biology, Pharmacology, Pathology, Nutrition, Immunology and Cell Biology. Selected U.S. institutions will receive distinguished scientists from within the U.S. or abroad whose interests relate to the above disciplines. Twenty-one awards will be made annually, of which up to four awards will be made to non-U.S. Visiting Professors. Each scientist will serve as a Wellcome Visiting Professor and spend two to five days at the institution engaged in teaching and discussion with students and faculty. During the visit, each Visiting Professor will deliver a Wellcome Lecture on a subject pertinent to his/her discipline. An announcement of the Wellcome Lecture in the basic medical sciences will be prepared and publicized in advance by the institution. Deadline for receipt of applications is May 1, 1988. **Information:** The Wellcome Visiting Professorship Program, Executive Office, FASEB, 9650 Rockville Pike, Bethesda, MD 20814. Phone: (301) 530-7090. Deadline for receipt of applications is May 1, 1988.

## ASCB Summer Research Conference

The American Society for Cell Biology is sponsoring a summer conference, Algal Experimental Systems in Cell Biological Research, to bring together investigators and students to discuss basic cell biological phenomena being studied with algal models. There will be workshops/demonstrations on immunomicroscopy, potentials of image analysis, fluorescence/flow cytometry, and microinjection and electrofusion techniques. The organizers for the conference are Drs. A. W. Coleman, Brown University, Providence, and L. J. Goff, University of California, Santa Cruz. **Information:** ASCB Summer Research Conference, National Office, 9650 Rockville Pike, Bethesda, MD 20814. Phone: (301) 530-7153.

## LSRO Workshop

The Life Sciences Research Office (LSRO) of the Federation of American Societies for Experimental Biology (FASEB) announces a two-day workshop, sponsored by the National Institute on Aging, that will examine research opportunities on the role of folate and vitamin B12 in neurotransmitter metabolism and neurologic

degeneration in aging. The workshop will be held May 19–20, 1988, at the FASEB Conference Center in Bethesda, MD, and will consist of an introductory plenary session of presentations by invited speakers to review the current status of understanding with emphasis on gaps in knowledge; two informal working sessions; and a final plenary session to compile the results from the working sessions and identify future research opportunities. Scientists active in the disciplines of nutrition, neurology, gerontology, clinical medicine, epidemiology, physiology, cell biology, immunology, and biochemistry are invited to participate. **Information:** Sue Ann Anderson, Senior Staff Scientist, LSRO, 9650 Rockville Pike, Bethesda, MD 20814. Phone: (301) 530-7030.

## Commission on Professionals in Science and Technology

**Stagnant or declining participation of women and minorities threatens U.S. technological competitiveness.** Washington, DC—After years of rapid growth, the participation of women in the student population in science and engineering has not only reached a plateau, but in many areas is actually dropping. Although there was no comparable growth of non-Asian minorities in these fields, there was upward movement during the 1970s, but that, too, has stopped and in some cases is declining. However, women continue to increase their participation in many of the professional fields, including the medical areas, business, accounting, and law, and minorities also show small gains. These trends, along with other sobering data, appear in a new edition of *Professional Women and Minorities*, published by the Commission on Professionals in Science and Technology. The 1987 edition delineates the professional labor force in the U.S. by employment sector, field and subfield, and highest degree. Both historical and current data on enrollments and degrees are provided by subfield, and all tables are broken down by sex and/or minority status.

Data from the book indicate:

- Decreasing interest in engineering by women and little progress for non-Asian U.S. minorities. As a percentage of first-year engineering students, women increased from 2% in 1970 to 17% in 1983. By fall 1986, they made up only 15% of the freshman class. Total freshman enrollment peaked in fall 1982. Among bachelor's graduates in engineering, the percentage of women rose from 3.6% in 1976 to 14.4% in 1986; Hispanics rose from 1.8 to 2.4%; blacks rose from 2 to 2.7%, and Asians rose from 2.8 to 6.2%. Except for Asians, these percentages did not increase in 1986 since 1985.
- In most fields of science, the percentage of women and minorities among bachelor's graduates already has peaked.

For example, the proportion of women among bachelor's graduates in the geological sciences rose from 11% in 1971 to 25% in 1980 but dropped one percentage point by 1986. Women earned 35% of mathematics master's degrees in 1977, exactly the same proportion as in 1986. Even in computer sciences, where women earned 37% of bachelor's degrees by 1984, their share dropped 1.4 percentage points

by 1986. There are continuing small increases in the representation of women among graduates at all levels in the biological sciences, but the rapid increases of the 1970s have ended. Psychology is the only science field where women reached and now slightly exceed half the doctoral degree awards. From 1979 to 1985, the percentage of blacks among new bachelor's graduates in science dropped from 6.4% of the total to 5.6%. Hispanics dropped from 3.3 to 2.7%, Native Americans stayed steady at 0.4%, while Asians rose from 2.0 to 3.2%.

- Lack of progress for minorities is not limited to technical or professional fields. From 1981 to 1985, both the number of bachelor's degrees earned by blacks and their percentage of total degree awards dropped from 6.5 to 5.6%. Hispanics earned 2.3% of all bachelor's degrees in 1981 and 2.6% in 1985. For American Indians, the percentage remained at 0.4%. Asians increased their share from 2.0 to 2.4%.

- The number and proportion of women earning professional degrees in business, law, medicine, and pharmacy continue upward, but growth has slowed in all of these fields, and women do not yet constitute a third of the graduating classes except in law (38.5%) and pharmacy (54.3%). Blacks, who are 12% of the population, now earn 5% of medical degrees, but less than 4% of those awarded in law and business. Hispanics earn less than 3% of professional degrees in any field, although they are a growing 7.8% of the U.S. population.

- At the doctoral level, the number of Ph.D. recipients in science and engineering who are U.S. citizens dropped 6.6% from 1975 to 1985 despite a 68% increase in the number of American women earning such degrees. This change results principally from a 23% drop in the number of white American men earning doctorates in these fields. Although the numbers of Hispanics and Asians among degree recipients increased slightly, there was a decline in the number of science and engineering Ph.D. awards to blacks over that decade, and the number earned by black men dropped 17% in those 10 years.

- Women have made more progress in moving into the professional labor force than have underrepresented minorities. For example, among all personnel and labor relations managers in 1980, 36% were women, 6.5% were black, and 1.5% were Hispanic. In 1986, 49% were women, 5.5% were black, and 3.5% were Hispanic. Between 1980 and 1986, the percentage of chemists who were women rose from 20 to 23%, while blacks dropped from 5 to 3%, and Hispanics grew half a percentage point to 3%. Women were 30% of economists in 1980 and 39% in 1986. Blacks, on the other hand, dropped from 4% of the total to 3%.

- Data on freshman plans for their college majors indicate a continuation in these recent disturbing trends for women. The proportion of freshman women indicating plans to major in engineering and in the allied health professions (including nursing) peaked in 1983; those planning majors in computer science topped out in 1982, and those planning to major in physical sciences, biological sciences, and mathematics were highest in 1984. Fields indicating further increases in the percentage of women, based on freshman plans in 1986, include many of the

# APS Sustaining Associate Members

The Society gratefully acknowledges the contributions received from Sustaining Associate Members in support of the Society's goals and objectives.

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traditional fields for women, such as education, arts and humanities, and social sciences as well as the nontraditional fields of business, agriculture, and forestry.

Blacks, Hispanics, Asians, and American Indians make up an increasing proportion of the U.S. population, and their proportional growth is fastest among the school and college age groups. The number of college-age Americans, the source for most science and engineering graduates, is dropping and will continue to drop through 1998. The implications of minority population growth in a decreasing college-age population, if not accompanied by a parallel growth in representation in higher education and among professional workers, raises serious questions about U.S. ability to maintain its technological competitiveness. Of special concern to academic institutions and many large corporations is the drop in production of U.S. doctoral scientists and engineers needed as faculty and/or researchers.

The statistics needed to assess both the attainment of women and minorities in entering the professional labor force and forecasting the probable number and characteristics of persons available for employment in various fields are provided in the seventh edition of *Professional Women and Minorities—A Manpower Data Resource Service*. This 272-page volume provides a comprehensive statistical picture of yesterday's, today's, and tomorrow's professional work force in the U.S. in the natural and social sciences, engineering, arts, humanities, and education and all the professions. Data in all fields from more than 200 sources are detailed by sex and/or minority status, and the volume includes a comprehensive bibliography of data sources and a detailed cross-index. Copies are available for \$85 from the Commission on Professionals in Science and Technology, 1500 Massachusetts Ave., NW, Suite 831, Washington, DC 20005.

## International Symposium on Cardiopulmonary Mechanics

A symposium, *Frontiers in Cardiopulmonary Mechanics*, will be held June 2–4, 1988, in Charlottesville, VA. The symposium will include five sessions: cardiovascular regulation; microvascular dynamics; mechanics of pulmonary circulation; cardiopulmonary control; and volunteer presentations in the above-mentioned area. *Chair*: J. S. Lee. *Information*: Pat Hanson, Dept. of Biomedical Engineering, Box 377, University of Virginia Medical Center, Charlottesville, VA 22908.

## Undersea and Hyperbaric Medical Society Annual Scientific Meeting

The Undersea and Hyperbaric Medical Society (UHMS) will hold its 1988 Annual Scientific Meeting at the Fairmont Hotel in New Orleans, LA, June 6–10, 1988. The meeting will include sessions on research and clinical applications in diving and hyperbaric medicine as well as a program for baromedical nurses. In addition, there will be a one-day Instructional Course on the Clinical Application of Hyperbaric Oxygen. *Information*: J. Dunne, UHMS. Phone (301) 571-1817.

## Second Annual East Coast Conference on Temperature Regulation

Environmental Medicine Department, Naval Medical Research Institute, is sponsoring the Second Annual East Coast Conference on Temperature Regulation. The conference will be held June 24, 1988, at the FASEB Conference

Center, in Bethesda, MD. Professor William Keatings will be the guest speaker, and an informal poster session of current research by contributing laboratories will be given. *Information*: Lt. R. Hesslink, MS11 EMD, Bethesda, MD 20814.

## M.I.T. Summer Course

The Massachusetts Institute of Technology (M.I.T.) will offer a one-week elementary course titled *Design and Analysis of Scientific Experiments*, July 11–16, 1988. Applications will be made to the physical, chemical, biological, medical, and industrial sciences and to experimentation in psychology. The course will be taught by Professors Harold Freeman and Paul Berger. *Information*: Director of the Summer Session, Rm E19-356, M.I.T., Cambridge, MA 02139.

## Second International Congress of Comparative Physiology and Biochemistry

The International Union of Biological Sciences is sponsoring the Second International Congress in Comparative Physiology and Biochemistry, August 1–5, 1988 in Baton Rouge, LA. There will be 40 symposium sessions in 8 major themes on comparative neurophysiology; metabolic regulation; osmoregulation and renal and epithelial transport; cardiovascular, respiratory, and pH regulation; environmental physiology; environmental biomechanics and biophysics; hormonal control; and molecular biology. *Information*: T. Dietz or W. Stickle, c/o IUBS, Short Courses and Conferences, Louisiana State University, Baton Rouge, LA 70803. Phone: (504) 388-1132.