

THE PHYSIOLOGIST



A Publication of the American Physiological Society

Volume 30, Number 6

December 1987

EDITORIAL

Encounter on the Airwaves

This article, describing the poignant feelings of our Executive Director as he defended the use of animals in research on a Washington-based radio talk show, is important for you to read to grasp the real intent of animal rights activists and to formulate a means of communicating the importance of animal research to local citizens when you are called on to defend our laboratory practices. I urge you to relate to Dr. Frank your attitudes on what is, perhaps, the most important issue facing our Society: the use of animals in research.

Aubrey E. Taylor

With anticipation I waited in my office for the telephone call that would enable me to rebut the accusations made by Ingrid Newkirk, National Director of People for the Ethical Treatment of Animals, who had condemned scientists as uncaring and unfeeling individuals who consciously treated laboratory animals inhumanely. She also spoke glowingly to her radio audience of the exploits of terrorists who infiltrate and break into laboratories to liberate animals. To my dismay, her discussion of raids was met by the host's announcement that he would like to join her compatriots during the next raid.

While such words are shocking to all of us, it is our responsibility to stand up for the rights of the sick and infirmed who hope for cures through discoveries employing laboratory animals. With that in mind, I was willing to participate in a telephone interview on the Ernie Davis Show where I could respond to callers to provide the perspectives of the biomedical community.

As a physiologist, I have done research on animals and treated them with the same respect I give to any living creature. I can explain easily why animal research is important and list numerous medical advances that were dependent on animal research. An uncertainty prevailed, however,

(Continued on p. 266)

Teaching of Physiology in American Medical Schools

C. Michael Moriarty,* Francis J. Clark,* and Katherine L. Kastent†

*Department of Physiology and Biophysics, College of Medicine, and †Department of Educational Administration and Supervision, College of Education, University of Nebraska at Omaha

Medical education has recently come under scrutiny with the publication of *Physicians for the Twenty-First Century: The GPEP Report* by the Association of American Medical Colleges. We, like many of our colleagues, wanted to assess our program in physiology in light of the criticisms and recommendations expressed in this report. We wondered how our program compared with other physiology programs and what changes others contemplate. We decided to ask, and this report is a compilation of the results of a survey conducted in early 1986. It is hoped these results will provide a base line of information against which to judge progress toward implementation of the recommendations contained in the GPEP report.

Methods

A questionnaire was mailed to 138 members of the Association of Chairmen of Departments of Physiology. One hundred and ten schools (80%) returned the completed questionnaire. Of these, six were dropped from the survey: five because they indicated their physiology instruction was provided in a multidisciplinary and integrated approach and one because the questionnaire was incomplete and anonymous. The results from the remaining 104 schools (75%) are reported below. The five schools using the multidisciplinary format are discussed briefly in a separate section. Unless otherwise indicated, all results relate to the primary physiology course taught to medical students.

Results and Discussion

The average Department of Physiology includes 1.4 M.D.s, 9.9 Ph.D.s, and 0.9 faculty with other terminal degrees and provides instruction to 123 students in medical physiology each year. Information about department size, number of medical students, and total number served can be obtained easily from a variety of sources and will not be repeated here. Data about the size of the responding departments are summarized in Table 1.

TABLE 1. Variation in Department Size

Number of Departments	Number of Faculty
8	<5
35	6-10
25	11-15
22	16-20
10	21-25
2	26-30
1	>30

We were curious about what factors were directly related to the size of the individual departments. Table 2 reports correlation coefficients between the number of faculty in a physiology department and a variety of factors.

Apart from the total number of students taught, there is little correlation between the number of faculty in a given department and any of these factors. However, we did find a correlation of 0.47 between the total number of students taught some

(Continued on p. 267)

CONTENTS

EDITORIAL

Encounter on the Airwaves. M. Frank	265
Teaching of Physiology in American Medical Schools. C. M. Moriarty, F. L. Clark, and K. L. Kasten	265
APS NEWS	
APS/FASEB 1988 Spring Meeting Symposia Preview	269
Deceased Members	268
Newly Elected Members	273
Women in Physiology Exhibit Travels to Medical Libraries	274
Travel Fellowships for Minority Physiologists	274
Committee Reports	275
Section Reports	276
News from Senior Physiologists	280
Second Century Founders	281
Proposed Amendments to the Bylaws	284
PUBLIC AFFAIRS	
Scientific and Educational Communities Stood Up To Be Heard—And They Were Heard	278
Authorities Pursuing Raiders of Federal Research Facility	279
OPINION	
Are Animal Activists Humane? R. L. Malvin	279
PEOPLE AND PLACES	282
POSITIONS AVAILABLE	282
ANNOUNCEMENTS	282
BOOKS RECEIVED	283

EDITORIAL

(Continued from p. 265)

because of past experience with the animal rights activists and the possibility that I would be unable to answer a no-win question, such as the classic "when did you stop torturing experimental animals?"

By morning of my encounter, I had my game plan, based largely on the need to remain calm throughout the 60-minute show. Thoughtful, informative responses would be provided by me no matter how belligerent the question. Every attempt would be made to complete my interrupted answer before addressing the interjected question. For me, the key for a successful encounter was to play the politician. Just like Reagan during his occasional press conference, my answers were for the listening audience, not for the questioner.

After the first commercials were aired at 9:00 A.M. I heard Ernie Davis make the following introduction.

"We have a guest the first hour, Dr. Martin Frank, Executive Secretary-Treasurer of the American Physiological Society. He's a scientist and these folks (sic) called up for a little rebuttal time. I guess to the lady we had, who was against the use of animals in biological experiments, which I certainly am so, we are going to see how these people can justify what they do to the guise that they are doing so much for you and I and our health.

"If by torturing, hurting, or harming some poor animals it's going to give me five or more minutes to my lifetime, then I would rather say pass. I don't know how you feel, but that's exactly the way I feel. We'll be somewhat fair, try to be.

"I'm quite honestly not extremely looking forward to my conversation with my first guest because the topic kind of depresses me. I was going to say I could almost understand why its necessary to use

animals for experiments, but no it isn't, no it isn't. There has to be some other way they can do it. Our animal friends are exactly that, only that I believe the good Lord gave them to us because we love them for companionship, and I can't see doing what they are doing."

The next 60 minutes went rapidly as I responded to a wide range of questions. The ignorance of the questioners on the importance of animals in biomedical research was apparent from the start. One man appeared to accept animal research after he agreed that he would refuse to be the first subject for coronary bypass surgery. Some callers wanted us to use cadavers or asked whether computers could be used. Ernie Davis condemned scientists for using fetuses for research and for acting as God by deciding who should live and who should die. He even suggested our research was comparable to Nazi atrocities.

Callers also suggested that the billions spent on research should be directed into educational programs, the message being those who had abused their bodies by smoking and/or fat-laden diets should be sacrificed to educate future generations. A common topic of the questioners related to cosmetic testing.

As was obvious from the outset my 60-minute encounter with the animals rights movement was not limited to the use of animals in biomedical research. However, my answers were designed to enumerate instances in which animals had contributed to improving medical care and that laboratory animals are treated humanely.

I have no idea how many people listened to that radio show, nor do I know whether they were for or against research on animals. I do know that Ernie Davis and his staff were strongly sympathetic to the animal rights movement. Each animal rights caller was allowed to ask two questions, while the caller who supported the use of animals was cut off before he completed his statement through the magic of the seven-second delay between reception and transmission of the callers' remarks.

Richard Malvin indicates in the issue of *The Physiologist* in his opinion piece, "Are Animal Activists Humane?", the arguments presented in defense of animal rights positions often times are irrational. This was apparent throughout my radio encounter. Because of this, it remains imperative for all scientists to speak up for animal research if we are to continue to work on animals. Whether on radio or in small groups, all scientists must take the offensive, dispelling the myths trumpeted by animal rights activists. The inhumanity of animal rights activists must be stopped.

Martin Frank

The Physiologist

Published bimonthly and
distributed by

The American Physiological Society
9650 Rockville Pike
Bethesda, Maryland 20814

ISSN 0031-9376

Martin Frank, *Editor*
and
Executive Director

Harvey V. Sparks, *President*

Franklyn G. Knox, *Past President*

Aubrey E. Taylor, *President-Elect*

Vernon S. Bishop, Shu Chien, Jay A. Nadcl, and
Norman C. Staub, *Councillors*

Publications Committee: *Chairman*, Paul C. Johnson; *Members*, Francois Abboud, John S. Cook, Jean McE. Marshall, and Stephen H. White. *Acting Publications Manager*, Brenda B. Rauner; *Editorial Staff*, Renee Cox and Lorraine Tucker.

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 1987 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.

form of physiology and the total departmental FTE spent teaching (i.e., the percent time the average faculty member spends teaching multiplied by the total department FTE).

Nature of Instruction

The GPEP report gave a great deal of attention to the nature of instruction in medical schools. Recommendations particularly relevant to physiology departments were

- 1) faculty should emphasize skill development and help students become active, independent learners and problem solvers;
- 2) faculty should consider reducing lecture hours without replacing them with other scheduled activities;
- 3) faculty should have the time and opportunity to establish mentor relationships with students;
- 4) schools should promote the use of computer technology and the application of information sciences to medical education.

The responses we received indicated a predictable pattern of instruction in most programs in medical physiology. As seen in Figure 1, faculty, not surprisingly, spend more time on research than either teaching or other activities. Teaching is primarily done through a lecture format with the combined time spent in small groups (average size equals 19.5 students) and laboratories accounting for less than one-half of the time spent in lecture (Fig. 2A). The one exception was the largest department responding to the survey that reported 50% of its instructional time was spent in lectures, 25% was spent in small groups, and 25% was spent in laboratories.

Sixty-seven departments reported using written course objectives, but only half of these departments described the course objectives as "detailed, rigorously fol-

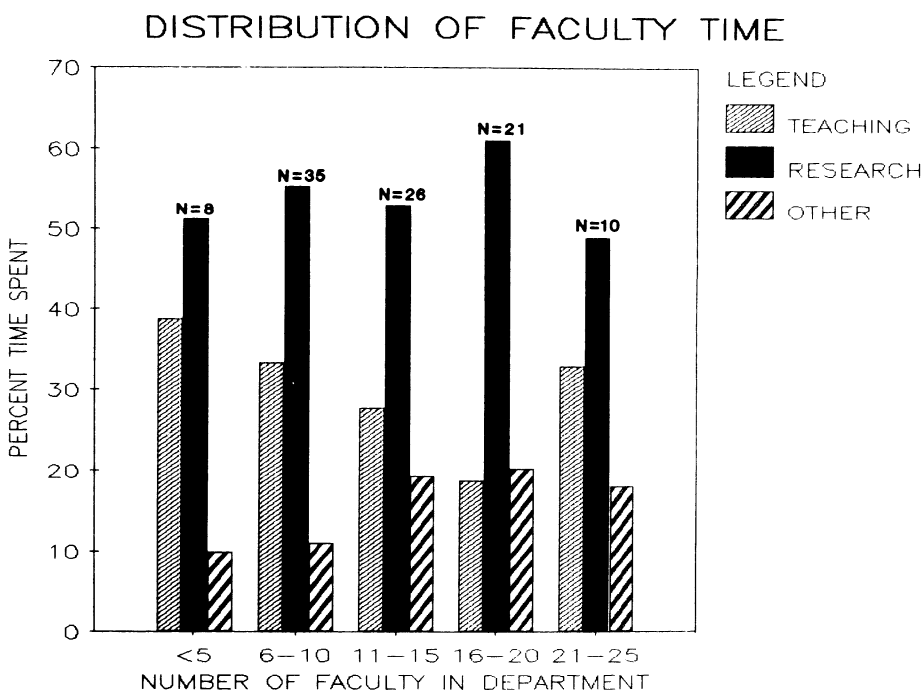


Fig. 1. Percentage of time physiology faculty spend in teaching, research, and other (service, administration, and unspecified) as a function of department size. N, no. of departments responding.

lowed in planning lectures or writing examinations" or "perceived as useful by students." Taped demonstrations were reported as being used routinely by only six departments, and only sixteen departments reported that they frequently used live patient demonstrations. Anecdotal clinical examples are the most frequently reported clinical correlations used in medical physiology; however, only 35 departments report routine use. Frequent use of computers in laboratories, clinical simulations, remedial instruction, or testing was reported by fewer than 10% of the departments. At least 60% of the departments reported they never use computers for any of these purposes.

Eighty-three percent of the departments have a required text. *Physiology*, by Berne and Levy, Mosby, St. Louis, MO, was the overwhelming favorite (49% of such departments) followed by Guyton's *Textbook of Medical Physiology*, Saunders, Philadelphia, PA (21%).

Evaluation of Students and Instruction

GPEP recommendations in the area of student evaluation suggest that

- 1) faculty should limit the amount of factual information students are expected to memorize;
- 2) student performance should be evaluated largely on a subjective assessment of analytical skills rather than recall of factual information;
- 3) the ability of students to learn independently should be evaluated.

By far the most typical kind of examination given in medical physiology primarily consists of multiple-choice questions (Fig. 2B). Final course grades, not surprisingly, are primarily made up of test grades (Fig. 2C). In fact, 60% of departments use test scores exclusively.

Makeup examinations are frequently used. Eighty-seven percent of all departments offer makeup examinations to students with excused absences and 15% offer them to students with unexcused absences. One-third of the departments provide a makeup examination for students failing the first attempt. The most common form of a makeup examination is a new examination specifically constructed for the makeup (45%), followed by the original examination (33%) and an old examination (2%). Of the 32 schools who permit makeups for students failing the first attempt, four schools use the original examination as the makeup. Although 61% of the departments provide separate examinations over each area in physiology,

TABLE 2. Correlation Between Number of Faculty Per Department and Various Factors

	Correlation (p)
Number of Faculty Versus:	
a. Total number of students taught physiology	0.51
b. Size of medical school class	0.38
c. Percent time faculty spend teaching	0.16
d. Total number of medical physiology lecture hours	0.13
e. Total number of medical physiology small group hours	0.09
f. Percent time faculty spend in research	0.01
g. Total number of medical physiology lab hours	0.001

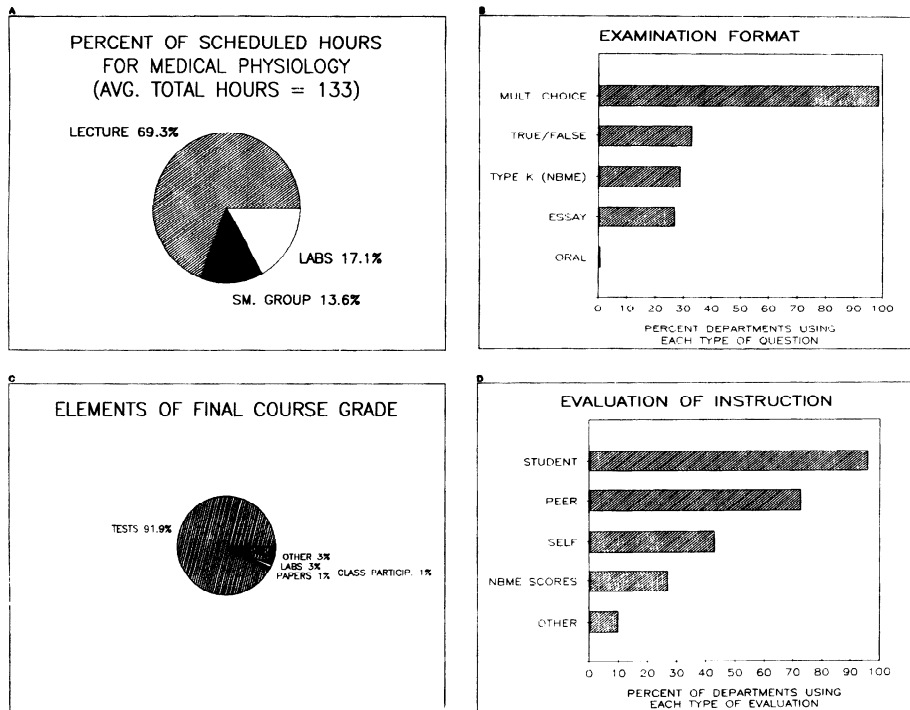


Fig. 2. A: distribution of total hours scheduled for medical physiology among lectures, small group discussions, and laboratories. B: nature of examination questions used by different departments (many departments use multiple formats). C: relative contribution of different indicators in determining final course grade. D: means used to assess quality of instruction. Many departments use multiple means.

only 13% require students to pass each examination in order to demonstrate competency. Most departments require only an overall passing score.

Students are required to take an additional comprehensive examination (apart from the regular course examinations) in 76% of the departments. This is almost always a written examination. In some cases, departments require satisfactory completion of NBME (Part I) to meet this requirement. Fifty-five percent of the schools, however, permit students to advance in their medical school program after failing such an examination. One school has introduced an oral comprehensive examination for the entire medical physiology class.

Students may be exempted from the entire physiology course in 55% of the departments, and in 13% they may be exempted from specific areas within the course. Among those departments with an exemption policy, most permitted students to qualify by written examination (57%) or evidence of a previous course (40%). A few (14%) reported using oral examinations, and many departments reported using more than one method.

As shown in Figure 2D, student evaluations are the most prevalent mechanism used to evaluate the quality of instruction. Departments report that evaluation of teaching for promotion, tenure, and salary decisions is done through assessments by chairmen, peer evaluations, and student evaluations and (in a much smaller num-

ber of departments) by outside evaluations, self-evaluation, NBME scores, and other means.

Only one-half of the departments have a procedure for regularly evaluating the content (as opposed to the instructional effectiveness) of their medical physiology course.

Schools with a Multidisciplinary Approach

Five of the responding departments teach medical physiology as a part of a multidisciplinary or integrated approach. Though it is hazardous to generalize from five cases, such departments do not appear to allow a student to bypass the course or any section of the course by demonstration of competence. These departments use live patient demonstrations considerably more than other schools. All offer makeup examinations for students failing the first attempt. Four of the five schools had made no substantive changes in the course during the past two years, nor did they expect to do so in the next two years. The remaining school anticipated returning to the traditional disciplinary approach of teaching physiology.

What the Future Might Hold

Implementing recommendations of the GPEP report would require substantial changes in teaching methods by most physiology departments. Of the departments responding to our questionnaire, two-thirds reported having made no substantive changes in their medical physiol-

ogy course during the last two years, and three-fourths of those departments anticipated no changes for the next two years. That is to say, one-half of all departments have not made substantive changes in the past two years, nor do they expect to in the next two years. Looking at the data more positively, one-third of all departments have made changes over the past two years, and one-third (not necessarily the same third) plan changes over the next two years.

In an open-ended question, chairmen were asked to indicate the most important issues or challenges facing their departments in the area of medical physiology education. Thirty-eight departments failed to identify any important issue. Perhaps even more surprising in the face of the GPEP report, only 28 departments identified the GPEP report or any one of its recommendations as a major issue. Of these 28, 17 plan no substantive changes in their medical physiology course in the next two years.

The authors extend their appreciation to all those individuals who took the time to fill out and return the questionnaire. The authors would be pleased to respond to individuals and/or departments interested in more detailed information regarding the above results. *JS*

Deceased Members

- Sydney A. Asdell, Frederick, MD (02-21-87)
- Mario G. Baldini, Brookline, MA (Jan. 1987)
- John W. Bean, Ann Arbor, MI (01-18-87)
- E. Lovell Becker, New York, NY (April 1987)
- L. Joe Berry, Austin, TX (02-26-87)
- Ian E. Bush, White River Junction, VT (April 1987)
- Vivian B. Hartman, Potomac, MD (Sept. 1987)
- Paul W. Han, Taipei, Taiwan (April 1987)
- Hebbel E. Hoff, Houston, TX (05-01-87)
- John Hunter, Toronto, ON (May 1987)
- Raymond C. Ingraham, Port Charlotte, FL (03-25-87)
- Kjell Johansen, Aarhus, Denmark (03-04-87)
- Robert E. Kuttner, North Chicago, IL (02-19-87)
- Thomas P. K. Lim, Omaha, NE (Sept. 1987)
- Harold A. Menkes, Baltimore, MD (Sept. 1987)
- Robert S. Morison, Petersborough, NH (12-02-86)
- William L. Nastuk, New York, NY (11-06-86)
- Richard H. Orr, Philadelphia, PA (April 1987)
- Alfred W. Richardson, Carbondale, IL (03-30-87)
- Eugene Robillard, Montreal, Quebec (May 1987)
- Wilbur K. Smith, Rochester, NY (07-20-86)
- P. Brian Stewart, Ridgefield, CT (04-01-87)
- Anthonie Van Harreveld, Pasadena, CA (08-14-87)

APS/FASEB 1988 Spring Meeting Symposia Preview
Las Vegas, NV
May 1-6, 1987

Physiology: Odds on Favorite to Win

Life-Threatening Arrhythmias in Myocardial Ischemia and Reperfusion
(Thematic Session Organized by APS)

Chairmen: D. J. Hearse and D. P. Zipes. *Speakers:* M. R. Rosen, M. L. Janse, P. B. Corr, L. S. Gettes, D. J. Hearse, R. L. Verrier, R. J. Cohen, and D. P. Zipes.

Ventricular arrhythmias occur unpredictably seconds, minutes, hours, or days after the onset of ischemia. They are often life threatening (accounting for many of the early deaths associated with evolving myocardial infarction), and their origins are complex and controversial. Arrhythmias are perhaps unique in the field of cardiac pathophysiology in that so many widely differing triggers have been proposed to explain their mechanism of origin. Some investigators see ionic perturbations at the level of the plasma membrane as being critical for establishing the scenario for arrhythmogenesis. Dr. Gettes can provide a unique overview of this field, particularly in respect to potassium, which most would agree plays a pivotal role. Dr. Gettes will, however, be asked to consider other more controversial ions such as calcium and magnesium. Other investigators see a metabolic component as being critical (e.g., the formation of lysophosphatides), and more recently free radical mediated membrane injury (including lipid peroxidation) has been proposed as a trigger and Dr. Hearse will speak about this. While controversy still rages over the genesis and pharmacological control of arrhythmias, a great deal is known about some of the fundamental mechanisms (automaticity, reentry, triggered activity, etc.), and Drs. Rosen and Janse can give masterly reviews of this vast field. In dealing with cardiac arrhythmias, it is important not to restrict our views simply to the heart: the brain and nervous system can play a major role, and Dr. Verrier is an acknowledged international expert in the way in which the autonomic nervous system influences vulnerability to arrhythmias. The advent of thrombolysis and angioplasty has focused our attention on the consequences of reperfusion, and it is now well documented that reperfusion (e.g., after transient coronary spasm) can be a potent arrhythmogenic trigger. It is possible that mechanisms differ from those of ischemia-induced arrhythmias. Dr. Corr will be asked to review this complex and rapidly changing field. Finally, many questions remain to be answered, and despite the sophistication of many techniques there is a need for new methods of studying and modeling arrhythmias, and Dr. Cohen will be asked to introduce us to the challenging ideas he has about computer modeling, critical masses, etc. The symposium as proposed will cover a vast area and no one would be better than Dr. Zipes to place it into a final perspective.

New Approaches to an Old Problem: Acute Myocardial Ischemia

(Thematic Session Organized by APS)

Chairmen: J. M. Downey and D. M. Yellon. *Speakers:* A. K. Markov, G. D. Buckberg, E. Corday, L. C. Becker, R. Bolli, J. M. Downey, and C. E. Murray.

Ischemic heart disease continues to be the number one killer of American adults. Although the etiology of acute myocardial infarction has been well understood for decades, only recently have aggressive therapies, such as thrombolysis, been developed to treat this condition. As our understanding of the cellular processes involved in the ischemic myocardium increases, more and more ways to intervene and protect the ischemic tissue become apparent. This symposium will explore some of those interventions that are particularly interesting and show promise. The organizer has chosen some very controversial subjects for this symposium. Dr. Buckberg reports that he revives ischemic myocardium even after six hours of total ischemia using the surgical resuscitation methods. Most conventional pathologists would claim that the tissue is irreversibly injured at this time. Dr. Markov has had dramatic results with fructose diphosphate, although others have been less than enthusiastic about this agent. Dr. Becker has found that coronary dilators such as dipyridamole reverse stunning in the dog model, even though the mechanism is obscure. Dr. Corday has found that the coronary sinus may be an excellent portal to the ischemic zone allowing for the deposition of nutrients and drugs. Finally, there are the oxygen radical scavengers: controversial as they are a great deal of attention has been focused on them. Dr. Bolli will recount his findings concerning the antioxidants in models of stunned myocardium, while Dr. Downey will address their performance in that ever-elusive field of infarct size modification.

Mechanisms of Cellular Injury in the Ischemic and Reperfused Myocardium
(Thematic Session, Organized by APS)

Chairmen: K. Reimer and B. Freeman. *Speakers:* K. A. Reimer, B. A. Freeman, W. Schaper, M. L. Buja, C. E. Ganote, and J. L. Zweir.

Although ischemia in the heart has been the subject of intense investigation for years, the actual mechanism by which the myocyte is injured in this process remains obscure. A number of theories have been put forth over the years but none have been proven. This symposium will explore some of the more prominent theories and examine the evidence supporting each. A variety of approaches to the problem will be examined, including histological, biochemical, physiological, and clinical approaches. It is not

likely that progress will be made in this field until the basic sequence of events in the ischemic cell are elucidated and understood. This is a field in which controversy abounds and agreement is rare.

Leukocyte-Mediated Injury in Ischemia
(Thematic Session, Organized by APS)

Chairmen: G. W. Schmid-Schonbein and R. L. Engler. *Speakers:* R. L. Engler, U. Bagge, J. McCord, B. Pryer, K. Arfors, K. Mullane, S. Werns, N. Granger, and G. Schmid-Schonbein.

Recent evidence suggests that ischemia causes microvascular occlusion and the initiation of inflammatory reactions. There is evidence that lethal cell injury is mediated by oxygen radicals and lysosomal enzyme action derived from circulating granulocytes. A tragic consequence is that reperfusion by delivering oxygen and granulocytes exacerbates the injury process. The evidence comes from skeletal muscle, heart muscle, brain, liver, and lung and from hemorrhagic shock experiments. The following are questions that require further discussion. Where and by what factors do granulocytes become activated? What forms of injury are produced by oxygen radicals? What forms are produced by lytic enzymes? Which granulocytes are involved and what type of cellular interactions exist with platelets, endothelium, and parenchymal cells? What percentage of capillaries become obstructed? Do interventions delay or prevent injury? What are the manifestations in different organs? What natural protective mechanisms exist against granulocyte injuries?

Dynamics of Thrombosis and Thrombolysis

(Thematic Session Organized by AAP)

Chairman: C. Esmon. *Speakers:* D. R. Phillips, R. Rosenberg, C. T. Esmon, T. Edgington, D. Loskutoff, and B. Collier.

Initiating Mechanisms in Vascular Disease

(Thematic Session Organized by AAP)

Chairman: M. A. Gimbrone, Jr. *Speakers:* M. A. Gimbrone, Jr., M. Bevilacqua, P. Libby, B. L. Langille, A. Penn, and R. LeBoeuf.

Molecular and Cellular Mechanisms of Tissue Repair

(Thematic Session Organized by AAP)

Chairmen: R. Ross and M. Sporn. *Speakers:* K. Sprugel, M. Klagsburn, E. Raines, A. B. Roberts, and D. B. Rifkin.

Coronary Vasospasm

(Thematic Session Organized by AAP)

Chairmen: P. M. Vanhoutte and M. Nakamura. *Speakers:* M. Nakamura, R. W. Alexander, R. A. Cohen, R. M. Robertson, H. Shimokawa, J. T. Willerson, and P. M. Vanhoutte.

Taxonomy of Plasma Membrane

Anion Exchangers

Chairman: P. Aronson. *Speakers:* M. Jennings, E. Hoffman, L. Simchowicz, P. Aronson, and S. Alper.

Recent transport studies indicate that anion exchange processes with features similar to but distinct from erythrocyte Band III are present in the plasma membranes of virtually all cells. Recent molecular biological studies indicate the presence of mRNAs for Band III homologues in multiple nonerythroid tissues. The purpose of this symposium is to compare and contrast the transport and molecular properties of the members of this important family of transport proteins.

Neural Control of the Intestinal Epithelium

Chairman: H. J. Cooke. *Speakers:* F. Sundler, A. Surprenant, H. J. Cooke, and D. C. Dawson.

This symposium will address the intrinsic neural innervation of the intestinal epithelium. It will focus on four areas of research, which include the identification of neurons and their projections within the intestine, electrical behavior of submucosal neurons that innervate the intestinal mucosa, examination of effects of neurotransmitters on intestinal transport function, and cholinergic regulation of ion channel function of epithelial cells. It brings together morphologists, neurophysiologists, gastrointestinal physiologists, and epitheliologists who are experts in their areas and who all utilize different approaches to examining the neurobiology of the intestine.

Myocardial Ischemia in the Hypertrophied Heart

Chairman: R. J. Bache. *Speakers:* S. P. Bishop, R. J. Bache, S. F. Vatner, M. L. Marcus, C. M. Boor, and C. Rose.

Myocardial hypertrophy is a useful compensatory mechanism by which the heart adapts to an increased systolic load. As the ventricular wall hypertrophies, systolic stress decreases in proportion to the increased wall thickness until stress returns to near-normal levels. Despite the apparent appropriateness of the hypertrophic response to an increased systolic load, abnormalities of perfusion and mechanical function may exist in the hypertrophied heart that result in increased vulnerability to myocardial ischemic injury and that may ultimately lead to development of cardiac failure. This symposium will review the present state of knowledge regarding mechanisms for abnormalities of perfusion and function in the chronically hypertrophied myocardium. Because abnormalities of myocardial perfusion could result from inadequate growth of coronary vasculature during the hypertrophic process or from functional abnormalities that impair perfusion of the hypertrophied myocardium, both pathological and func-

tional characteristics of the coronary circulation in the hypertrophied heart will be discussed, and the importance of the coexistence of cardiac failure on myocardial perfusion will be examined. Mechanisms responsible for the impaired ability of the hypertrophied heart to tolerate acute coronary artery occlusion will be discussed, and the effects of superimposition of exercise conditioning on myocardial hypertrophy will be examined. The role of abnormalities of oxygen transport in mediating increased vulnerability of the hypertrophied heart to ischemia will be reported. This symposium will provide a timely update of current understanding of abnormalities of perfusion, oxygenation, and function of the hypertrophied myocardium.

Regulation of Blood Flow in Endocrine Glands

Chairman: C. Desjardins. *Speakers:* J. D. Fenstermacher, G. A. Hedge, R. J. Traystman, P. R. Kvietys, and C. Desjardins.

The overall goal of this symposium is to identify the vascular mechanisms that limit or control the synthesis and secretion of hormones by endocrine cells. Speakers will provide a state-of-the-art analysis about two aspects of blood flow: 1) the physiological mechanisms that limit or control blood flow to specific glands and 2) the intravascular control over blood distribution within glandular tissues. Participants will identify deficits in our understanding of the mechanisms that serve to integrate blood flow with secretory activity. A premium will be placed on discussing new approaches to study the coupling between blood flow and the synthesis and secretion of hormones.

Excitation-Contraction Coupling in Striated Muscle: New Methodological Approaches and New Hypotheses (2 Sessions)

Chairman: A. Fabiato. *Speakers:* S. Fleischer, G. Meissner, K. P. Campbell, N. Ikemoto, R. S. Eisenberg, E. Rios, O. Shimomura, C. C. Ashley, J. L. Vergara, P. Volpe, Y. Goldman, and A. Fabiato.

The mechanism of excitation-contraction coupling in striated muscle is still unknown and remains the major stumbling block of muscle physiology. However, there has been some recent progress because of the development of new methodological approaches and of the proposal of new hypotheses. The aim of this symposium is to discuss these new developments in a forward-oriented manner without review of the classical hypotheses that have been proposed for excitation-contraction coupling. The new methodological approaches include new developments in the field of the photoprotein aequorin, which has been discovered by Professor Shimomura, remains one of the most useful tools for the study of excitation-contraction coupling. In addition, caged calcium and new fluorescent calcium probes are now available. In this field as in many others the emphasis has been recently shifted from physiological experiments to more biochemical or biophysical approaches. Excitation-contraction coupling is, indeed, likely to involve more biochemical reactions than was initially thought. This may be the reason for which the mechanism of excitation-con-

traction coupling has not been yet discovered through purely physiological approaches. The recent biochemical approaches include the isolation of the putative calcium release channel of the junctional sarcoplasmic reticulum membrane, the isolation and identification of the ryanodine and dihydropyridine binding sites, and the production of monoclonal antibodies to some of the proteins associated with the junctional region of the sarcoplasmic reticulum. High-resolution structural studies of these isolated components, one of which, the 300KD protein, forms square structures of similar dimensions and shape as the foot processes of the intact triad. A more biophysical novel approach consists of single-channel recording on the sarcoplasmic reticular membrane using patch clamp of membrane vesicles fused in lipid bilayers or patch clamp of the sarcoplasmic reticular membrane in situ in skinned fibers. The newest hypothesis is the inositol 1,4,5-trisphosphate-induced release of calcium, which will be discussed extensively. Among the classical hypotheses for excitation-contraction coupling in skeletal muscle, the charge movement hypothesis is the only one that has not yet been eliminated. Accordingly, it will be the only one discussed.

Atrial Natriuretic Peptide: Actions in Animal Models of Hypertension and Heart Failure

Chairman: R. H. Freeman. *Speakers:* E. H. Blaine, N. C. Trippodo, D. Villarreal, T. Inagami, R. Garcia, R. H. Freeman, and K. M. Verburg.

This symposium is organized around the theme of atrial natriuretic peptides in animal models characterized by chronic disturbances in renal/fluid volume and arterial pressure regulation, i.e., heart failure and hypertension. Current knowledge of this cardiac hormonal system in hypertension and heart failure is expanding rapidly. There are chronic alterations in tissue and circulating levels of the endogenous atrial natriuretic peptide in both genetic and experimental animal models of hypertension and heart failure; also, the renal and cardiovascular responses to exogenous atrial peptide infusions appear to be altered in some of these models. The symposium speakers will identify both physiological and pharmacological aspects of the atrial natriuretic peptides in chronic animal models of hypertension and heart failure. These animal models have been particularly helpful in elucidating other important hormonal mechanisms involved in these disease states. This focus on the atrial natriuretic peptide system in hypertension and heart failure will increase our knowledge of this cardiac hormonal system and extend our understanding of the hormonal processes underlying these clinically relevant problems in humans.

Pathogenesis and Impact of Insulin Resistance in Non-Insulin-Dependent Diabetes Mellitus

Chairman: J. Gerich. *Speakers:* J. Foley, G. Friedenberg, E. Ravussin, and J. Gerich.

The purpose of this symposium is to provide the most recent information by prominent workers in the field, to attempt to resolve certain

controversies, and to identify areas for future research. For example, although it is currently believed by most individuals not working in the area that reduced insulin receptor binding is the initial defect in the insulin resistance of diabetes mellitus, the data supporting this concept has come from one laboratory and has not been confirmed by many others. Evidence that defective insulin receptor kinase activity may be the cause of insulin resistance in diabetes is rapidly accumulating. An update on this concept will be presented as well as information on whether insulin tyrosine kinase activity is the basis for the action of insulin on glucose metabolism. Whether the main defect in muscle glucose metabolism in diabetes is impaired glucose transport, glucose storage, or glucose oxidation is also not resolved. Finally, it is presently controversial whether hepatic or muscle insulin resistance is mainly responsible for the hyperglycemia in diabetes. Currently, the most commonly held view is that muscle insulin resistance is most important. New data will be presented showing that the degree of insulin resistance in liver and muscle is similar in diabetes and that because the liver plays the predominant role in regulating glucose metabolism, its insulin resistance rather than muscle is a more important factor for both fasting and postprandial hyperglycemia.

Physiology and Pathophysiology of Reactive Oxygen Metabolites in the Digestive System

Chairmen: D. N. Granger and M. B. Grisham. *Speakers:* E. L. Thomas, C. Olson, J. T. LaMont, L. A. Hernandez, and M. B. Grisham.

The digestive system is well endowed with the biochemical machinery necessary for the production of potent oxidants. The overall objective of this symposium is to define and discuss the available data regarding the production and cytotoxicity of reactive oxygen metabolites in normal and diseased tissues of the digestive system. Oxidants, normally produced in saliva, appear to play an important role in the control of bacterial growth in the mouth and upper gastrointestinal tract. The epithelial lining of the gastrointestinal mucosa is protected from salivary oxidants and other lumenally derived oxidants by the mucus layer, which acts as a potent antioxidant. Oxidants produced by parenchymal oxidases and/or resident phagocytic leukocytes can injure epithelial cells. This injury is often manifested as mucosal ulceration and loss of microvascular integrity. An overproduction of oxidants has been implicated in the pathogenesis of ischemia/reperfusion and inflammatory disorders of the gastrointestinal tract. The information discussed in this symposium will help to identify areas of controversy and uncertainty regarding the role oxidants as mediators of cell injury in the digestive system.

The Cellular and Molecular Biology of Renal Hypertrophy

Chairman: M. R. Hammerman. *Speakers:* P. S. Rotwein, M. R. Hammerman, F. G. Toback, L. G. Fine, and J. L. Seifter.

It has been recognized for a century that after experimental unilateral nephrectomy of adult

animals, the contralateral kidney becomes enlarged. Enlargement involves primarily the renal cortex and reflects a true hypertrophy of the convoluted tubules. The physiological "signal" that triggers such hypertrophy and the mechanism by which hypertrophy is effected are unknown. The purpose of this symposium is to explore several approaches that are currently being taken toward achieving an understanding of the physiological basis for renal hypertrophy through the use of cellular and molecular biological techniques. Technical aspects relating to the use of peptide, RNA, and DNA probes to aid in understanding tissue growth will be reviewed briefly. The bulk of symposium will review current research employing these techniques toward an understanding of renal hypertrophy. Speakers will address specifically the potential roles of polypeptide growth factors in kidney growth, patterns of gene expression in models of renal cellular hypertrophy, and the potential role of the $\text{Na}^+\text{-H}^+$ exchanger as an initiator of proximal tubular hypertrophy.

Regulation of Cerebral Blood Flow

Chairman: D. D. Heistad. *Speakers:* P. M. Vanhoutte, W. G. Mayhan, H. A. Kontos, H. R. Winn, R. J. Traystman, D. W. Busija, and M. A. Moskowitz.

Progress has been relatively slow in our understanding of factors that regulate cerebral circulation. It is not entirely clear why understanding of this important vascular bed has lagged behind understanding of circulation to other vascular beds. It seems that because the anatomical arrangement of cerebral vessels is unusually complex, limitations imposed by methods have retarded our understanding of the cerebral circulation. Two factors make this a propitious time for an intensified effort to understand cerebral blood vessels. First, recent discoveries have opened new areas of research. Some exciting new findings relate to endothelium, the blood-brain barrier, autoregulation, and the role of adenosine, peptides, eicosanoids, and oxygen in the regulation of cerebral circulation. Second, recent advances in methodology allow several new approaches. Some important methodological advances include the ability to measure cerebral blood flow and metabolism accurately, to study the microcirculation in brain stem as well as cerebrum, and to study endothelium-dependent responses. The symposium will allow new insight into physiological regulation of cerebral blood flow and insight into pathophysiology.

Mechanisms of Epithelial Ion Transport Across the Frog Skin

Chairman: S. D. Hillyard. *Speakers:* L. B. Kirschner, S. I. Helman, W. Van Driessche, U. Katz, S. D. Hillyard, and D. H. Robinson.

The frog skin has served as a model for the study of epithelial Na^+ transport in a variety of mammalian tissues in addition to its role in amphibian osmoregulation. The symposium speakers will discuss recent advances in the following topics that relate to ion transport across the frog skin: 1) proton secretion as it relates to Na^+ uptake across the apical membrane, 2) the gating mechanisms and regulation of apical Na^+ channels, 3) apical K^+ transport

and amiloride-insensitive cation channels, 4) regulation of Cl^- transport across mitochondrial-rich cells, and 5) ontogeny of cation transport during metamorphosis. These discussions will provide a more detailed understanding of ion transport mechanisms that will be valuable to those interested in general processes of epithelial transport and to those who are interested in the zoophysiology of anurans.

Regulation of Renal Ionic Channels

Chairman: L. G. Palmer. *Speakers:* H. Sackin, H. Oberleitner, L. G. Palmer, H. Garty, and S. A. Lewis.

The major purpose of the symposium is to examine the different mechanisms by which renal ion channels are controlled. These include 1) chemical control through changes in the intracellular milieu, especially cell pH and Ca^{2+} ion activity, 2) physical factors such as the cell volume and stretch on the membrane itself, 3) activation or biosynthesis in response to hormones and hormonal second messengers, and 4) rates of degradation of the channel proteins. In addition, the symposium will bring together a number of investigators who have developed and are using different experimental approaches to study epithelial channel regulation. These techniques will include analysis of single channel behavior using the patch-clamp technique, measurements of channel-mediated ion fluxes in a cell-free preparation of membrane vesicles, impedance and noise analysis, and the use of ion-selective electrodes in isolated fused kidney cells. These diverse approaches provide different kinds of information about ion channels. The symposium is designed to provide a forum at which the integration of this information can be begun.

Cardiovascular and Renal Actions of Epoxyeicosatrienoic Acids: Novel Metabolites of Arachidonic Acid Produced by a Cytochrome P450 Monooxygenase

Chairman: K. G. Proctor. *Speakers:* J. Capedvilla, J. R. Falck, D. Schlondorff, J. C. McGiff, F. A. Fitzpatrick, K. M. Mullane, and K. G. Proctor.

A third pathway of arachidonic acid metabolism has recently been discovered. Arachidonic acid can be metabolized by cyclooxygenase, lipoxygenase, and cytochrome P450 monooxygenase enzymatic systems. The pathophysiological importance of the array of compounds from the first two pathways is universally recognized, but many of the diverse actions have been inferred from inhibitor studies. Because it is conceivable that cyclooxygenase or lipoxygenase inhibitors could redirect the metabolism of arachidonic acid to the third pathway or that the inhibitors could unmask biological actions of cytochrome P450 metabolites, some effects that have been attributed to cyclooxygenase and/or lipoxygenase metabolites might have to be reexamined. Unfortunately, the physiological and pharmacological actions of these novel substances, the epoxyeicosatrienoic acids (EETs), are generally unknown even though the fatty acid substrate and enzymatic systems are probably available to most cell types and tissues. A growing body of evidence has implicated the EETs and related eicosanoids in the regulation

of wide-spread physiological responses. The interdisciplinary group of investigators assembled at this forum will discuss the biochemistry and the known structure/activity relationships of these compounds, present evidence linking the EETs to the regulation of renal salt and water metabolism, and consider indirect evidence implicating the EETs in the regulation of vasomotor tone in the coronary and peripheral circulations.

Molecular Aspects of Epithelial and Photoreceptor Cell Polarity

Chairman: E. Rodriguez-Boulan. *Speakers:* E. Rodriguez-Boulan, W. J. Nelson, K. Mostov, Q. Al-Awqati, M. Cereijido, and R. Adler.

Model systems have become available to study the cell and molecular biological aspects of generation of Epithelial Cell Polarity. Polarity of epithelia is a fundamental biological phenomenon, key to the understanding of the function of vital organs, such as liver, intestine, and endocrine/exocrine glands. Epithelial polarity also plays an important and as yet not understood role in the development of the nervous system and the heart. This symposium will cover exciting new research in the following areas. 1) Protein targeting to apical and basolateral domains of epithelial cells and to specific neuronal compartments. In vitro cell culture model systems have become available to study these problems. Recombinant DNA work in different laboratories is providing clues on the localization of specific address markers in apical and basolateral plasma membrane proteins. 2) Role of the submembrane cytoskeleton in the regionalization of apical and basolateral proteins. Proteins are not free to diffuse in the membrane. Recent evidence indicates that specific components of the cytoskeleton (fodrin, ankyrin) are associated with the basolateral membrane and may play an important role in the maintenance of surface polarity in epithelial cells. 3) Polarity of ionic channels. 4) Polarity patterns in developing photoreceptor cells.

Control of the Pharyngeal Airway

Chairman: D. P. White. *Speakers:* J. F. Bosma, J. B. Skatrud, D. B. Bartlett, J. F. Remmers, B. T. Thach, J. A. Faulkner, and K. P. Strohl.

Until the last ten years, investigation into pharyngeal respiratory function was scant. Recently, however, there has been considerable interest in this area due to an increased awareness of the obstructive sleep apnea syndrome. In individuals with this disorder the pharyngeal airway repetitively occludes during sleep, yielding potentially severe blood gas derangements, cardiovascular abnormalities, and sleep disruption. The basic aim of this symposium is to collectively improve our understanding of the mechanisms necessary for maintaining pharyngeal patency and to determine how sleep affects these mechanisms. The pharyngeal airway will be addressed from a variety of approaches including 1) neural control of the musculature; 2) anatomy, growth, and development of the pharynx; 3) intrinsic properties of the pharyngeal muscles; and 4) and the influence of sleep on upper airway control and patency. Such an integrated approach will hopefully not only elucidate what is known about the control of this



The Las Vegas Convention Center.

airway segment but also direct us toward promising future avenues of investigation from both a physiological and technical perspective.

Metabolic Acidosis and the Circulation (Clinical Physiology Session)

Chairman: A. I. Arieff. *Speakers:* to be Announced.

Hormonal Regulation of Fluid and Electrolytes: Environmental Effects

Chairmen: J. R. Claybaugh and C. E. Wade. *Speakers:* K. B. Pandolf, M. J. Fregly, J. R. Claybaugh, S. A. Cucinell, and J. A. Krasney.

Renal Physiology: People and Ideas

Chairman: C. W. Gottshalk. *Speakers:* R. W. Berliner, L. G. Fine, G. Giebisch, B. Schmid-Nielsen, K. Thraur, and E. E. Windhager.

Regulation and Role of Vascular Capacitance

Chairman: C. F. Rothe. *Speakers:* C. Rothe, A. Shoukas, C. Greenway, W. W. Latt, S. Goldman, L. Rowell, and N. Trippodo.

Oxygen Radicals: A Target and Source of Oxidant Injury

Chairman: U. S. Ryan. *Speakers:* R. Hebbel, U. S. Ryan, K. L. Brigham, B. Freeman, and M. Ziff.

Biology of the Pulmonary Intracapillary Macrophages

Chairman: N. C. Staub. *Speakers:* N. C. Staub, B. Wismar, G. Winkler, A. Warner, G. Niehaus, K. Miyamoto, and S. Mulligan.

Impedance Techniques in Biological Systems (BMES)

Chairman: H. H. Sun and J. M. Van DeWater. *Speakers:* W. Kubicek, L. Baker, W. A. Tacker, L. Geddes, W. Judy, R. Hull, D. Bernstein, H. W. Kim, J. M. Van DeWater, and F. K. Lee.

Impedance techniques in biological systems have many applications in impedance plethysmography in general and impedance cardiography in particular. These are noninvasive techniques in measuring impedance of a particular body segment continuously. By use of the Minnesota Impedance Cardiograph with Kubicek's equation together with new miniaturized instrumentation utilizing signal-averaging techniques, impedance change can be used to evaluate overall cardiac functions in both critically ill patients

and patients with suspected cardiovascular diseases. Various indices such as heart rate, stroke volume, cardiac output, left ventricular ejection time, and ejection fraction, together with heart sounds and electrocardiogram, can be displayed in real time with each ventricular ejection with great accuracy. Electrical impedance is a simple, inexpensive, reliable, noninvasive method to determine fluid volume changes, regional blood flow, arterial and venous outflow, cardiac stroke volume, and cardiac contractility. This method has a good correlation with standard methods and high diagnostic accuracy. It is noninvasive, portable, and easy to apply to outpatients, inpatients, and critical care patients, especially in the Intensive Care Unit and Coronary Care Unit.

Measurement of Convection and Diffusion in Biological Systems (BMES)

Chairmen: R. K. Jain and F. E. Curry. *Speakers:* D. L. Taylor, R. K. Jain, J. L. Anderson, F. E. Curry, and I. Sarelius.

Transport of solute molecules in living systems occurs by convection and diffusion. Until recently it was not possible to measure these fluxes directly; hence partitioning of total flux into two components was based on assumptions that could not be verified independently. The purpose of this symposium is to discuss current efforts toward direct measurement of convection versus diffusion in the cellular, interstitial, and transvascular exchange.

Newly Discovered Actions of 1,25-Dihydroxyvitamin D₃ (SEBM)

Chairman: H. F. DeLuca. *Speakers:* H. F. DeLuca, T. Suda, M. F. Holick, J. Eisman, B. Haloran, L. Sherwood, and S. Monolagas.

Vitamin D was originally discovered because of its action in promoting mineralization of the skeleton and in the regulation of plasma calcium and phosphorus concentrations. From this angle, the active form of vitamin D was isolated, identified, and chemically synthesized. This active form, termed 1,25-dihydroxyvitamin D₃, has been found to work through a nuclear mechanism and localizes in the nuclei of target organs involved in the function of vitamin D. Besides the classical sites of intestine, kidney, and bone, it has now been determined that the active form of vitamin D localizes in the nuclei of a number of other tissues, and those tissues possess a specific protein receptor for the hormone. As a result, it is now clear that the vitamin D hormone has biological functions beyond regulating plasma calcium and phosphorus concentrations

and in the mineralization of skeleton. This symposium will be devoted to the evidence for some of these new actions.

Osteoporosis: Basis and Treatment (SEBM)

Chairman: H. F. DeLuca. **Speakers:** C. Johnston, R. Mazess, R. Recker, R. Lindsay, L. Riggs, and J. C. Gallagher.

This symposium is dedicated to presenting the latest information on what leads to the disease osteoporosis, how widespread is it, and what is available in terms of diagnosis and treatment. There has been a great deal of recent advances in understanding the hormones that govern bone metabolism and function and the hormones that regulate calcium metabolism. Furthermore, noninvasive methods of measuring bone density have been developed for detection of disease and for following treatment. Finally, some forms of osteoporosis are definitely treatable. This symposium will address all of these questions and will lay open the discussion for both basic scientists and physicians as to the current status. I anticipate it will be a very popular symposium because osteoporosis is certainly a disease that has received much recent attention.

Reconstituting Motility In Vitro (SGP)

Chairmen: J. A. Spudich and Y. E. Goldman. **Speakers:** Y. Toyoshima, T. Yanagida, M. Sheetz, and R. Vale.

Investigation of many aspects of motility and contractility requires reconstitution of a functioning motile system from isolated and purified proteins. In the past few years, great progress has been made in developing methods to assay motion of purified contractile and motility proteins including actin-based and microtubule-based systems. A highly successful technique was the observation of polystyrene beads, coated with myosin, moving along bundles of actin filaments found inside *Nitella* cells. A significant advance will be reported by Dr. Toyoshima. She is characterizing the movement of fluorescently labeled actin along a layer of carefully purified myosin subfragment-1 heads. Her experiments definitively locate the site of force generation in the head domain, even though the structural change leading to the motion is unclear. (Direct evidence for the head rotation commonly shown in textbooks is still lacking.) Dr. Yanagida, a leader in innovative methods to attempt to measure step sizes of the myosin motor, will describe those methods as well as experiments directed toward measuring force generated by

purified actin and myosin. Dr. Sheetz will then speak on computerized analysis of the movement of both myosin and kinesin, a new microtubule-based motor. His experiments show that it may be possible to resolve individual molecular events in motility. Ron Vale will end the symposium by describing a new in vitro motility assay for ciliary dynein. Properties of dynein-induced motility will be compared with kinesin-induced movement.

The Dynamics of Excitable Media (SMB) (2 Sessions)

Speakers: J. C. Alexander, J. Jalife, J. Keener, P. Monk, R. Plonsey, and R. Traub.

The topics will deal with various aspects of the dynamics of excitable cells, including an analysis of the transitions that lead to bursting, cardiac pacemaking and wave propagation in cardiac tissue, wave propagation in the aggregation phase of certain cell systems, and collective phenomena in the brain. The overall goal is to expose biologists and physiologists to some of the more theoretical work being done by mathematicians and to expose mathematicians to some of the concrete modeling work being done on particular systems.

Membership Status

Regular	4725
Emeritus	654
Honorary	19
Corresponding	167
Associate	757
Student	154
Total	6476

Newly Elected Members

Regular	Faubert, Pierre F.
Abney, Tom O.	Freund, Beau J.
Albertine, Kurt H.	Garvin, Jeffrey L.
Allen, Steven J.	Goldman, Steven
Aponte, Gregory	Gootman, Norman
Ashton, Juliet H.	Gordon, Frank J.
Atkins, James L.	Hamm, L. Lee
Bagby, Gregory J.	Horton, Bennett F.
Balaban, Carey D.	Hume, Joseph R.
Bianchi, John	Hutton, Robert S.
Bicudo, Jose E.	Iwamoto, Gary A.
Bickler, Philip E.	Javaheri, Shahrokh
Bishop, Michael J.	Johns, Bruce L.
Bond, Meredith	Joiner, Clinton H.
Borson, Daniel B.	Keefer, Linda M.
Bradley, T. Douglas	Keller-Wood, Maureen
Busath, David D.	Kenney, William L.
Canada, Robert G.	Kirsch, Jeffrey
Carey, Hannah V.	Lewis, Douglas S.
Casto, Rod L.	Lillywhite, Harvey B.
Chevalier, Robert L.	Lowy, Robert J.
Coast, J. Richard	Matuschak, George M.
Cryer, Henry M., III	Mitchell, Richard W.
Deaciuc, Ion V.	Mitchell, Susan J.
Deuster, Patricia A.	Moon, Dudley G.
Dixon, Troy E.	O'Byrne, Paul M.
Donnelly, David	O'Grady, Scott M.
Faraci, Frank M.	Perez Fontan, J. Julio

Porter, Johnny R.
Powers, Scott K.
Racotta, Radu G.
Robillard, Jean E.
Ruwe, William D.
Saluja, Ashok K.
Talan, Mark I.
Torbat, Dan
Tsien, Richard
Tucker, Diane C.
Vaishnav, Ramesh
Vallerand, Andre L.
Wann, L. Samuel
Young, Mark A.
Young, Patricia M.

Corresponding
Allessie, Maurits A.
Arts, Theo G.
Bassenge, Eberhard
Bindels, Rene Jan
Chai, Siangshu
Chen, Hsiun-ing
Genovesi, Simonetta C.
Henderson, Ian W.
Hollwarth, Michael
Jonzon, Anders
Lo, Siu Kong
Mardini, Issam A.
Nees, Stephan
Otani, Hajime
Peiris, Alan N.
Phromphetchart, Varee
Rinaldi, Gustavo J.
Rossi, Andrea
Smolander, Martti J.
Stella, Andrea
Toivonen, Hannu J.
Torres, Cesar S.
Van der Vusse, Ger J.

Associate
Alsip, Nancy L.

Bolser, Donald C.
Bredle, Donald L.
Bright, Janice M.
Chapleau, Mark W.
Duthinh, Vuong
Fantini, Gary A.
Fay, David C.
Ferguson, Jonathan L.
Fike, Candice D.
Horvath, Peter J.
Laganier, Serge
Liechty, Edward A.
Light, Douglas B.
Lin, Jer-Jar
Lund, Gregg C.
Maguire, George P.
Montrose, Marshall H.
Nekvasil, Nancy P.
Pepper, Sharee J.
Raiczky, Glenn B.
Stammers, Alfred H.
Stanek, Karen Ann
Stanley, William C.
Ulrich-Baker, Michele G.

Student
Brown-Borg, Holly M.
Burke, William C.
Checkley, Lori L.
Daristotle, Leighann
Elliott, Ann Marie R.
Guerra, Ricardo
Hanson, Wendy L.
Kuo, Lih
Malamud, Jean G.
Mulligan, Lawrence J.
Pell, Mary E.
Pivion, Richard J.
Romero, Jose R.
Turla, Mila B.
White, Barry D.
Wilson, Allison K.

Women in Physiology Exhibit Travels to Medical Libraries



Photo by Ralph Kellogg

A centennial exhibit of photographs entitled "Women in American Physiology, 1890-1940," has been traveling for the past two years to a number of medical school libraries. Organized by APS Historian/Archivist Toby Appel, it was originally shown at the FASEB Spring meeting in St. Louis, April 13-18, 1986.

Twenty-two women elected to APS before 1940 are represented in this exhibit. Their careers took on very different forms from the careers of their male counterparts in APS. They tell us much about the place of women in the sciences in the first part of this century and about the growth of the profession of physiology. Included in the exhibit are several women who achieved distinction as researchers: Florence Sabin, Mary Swartz Rose, Jane Sands Robb, Frieda Robschheit-Robbins, Evelyn Anderson, and Frances A. Hellebrandt, to name a few. Others, Jessie L. King, Abby Turner, Char-

lotte Haywood, and Esther Greisheimer, are especially remembered as outstanding teachers in women's colleges and medical schools, who by their enthusiasm for physiology encouraged their students to follow them into a scientific career.

Since April 1986, the exhibit has been on display at the Annual meeting of the American Association for the History of Medicine, Rochester, NY; the Health Sciences Library at the University of North Carolina at Chapel Hill; the Owen H. Wangensteen Historical Library of Biology and Medicine at the University of Minnesota, Minneapolis; The Library, Special Collections at the University of California, San Francisco; the Health Sciences Library, The University of Iowa, Iowa City; the Library of the University of Arkansas for Medical Sciences, Little Rock; and the Briscoe Library, The University of Texas Health Science Center at San Antonio.



NIDDK Minority Fellows, 1987 APS Fall Meeting, San Diego.

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 underrepresented minority students and physiologists to attend the Annual APS/FASEB Meeting in Las Vegas, Nevada, May 1-5, 1988. 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 need not be members of the American Physiological Society but should be United States residents.

Advanced undergraduate and pre- and postdoctoral scientists interested in research in the physiological sciences may apply. Underrepresented minority students from all institutions are eligible. Those who have obtained their undergraduate education in MBRS- and MARC-eligible institutions as well as students in the APS Porter Development Program are encouraged to apply. 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 Secretary-Treasurer, American Physiological Society, 9650 Rockville Pike, Bethesda, Maryland 20814.

The deadline for receipt of completed applications is January 15, 1988.

Candidates will be notified by March 15, 1988, of the selection committee's decision.



Committee Reports

Animal Care and Experimentation

This report covers the activities of the Society's Animal Care and Experimentation Committee for the period of March 15–September 15, 1987.

The one activity of the period was to prepare a position statement for the Society's response to the proposed Animal Welfare Act regulations. The committee members were surveyed to determine their concerns with the proposed rules. Input also was sought from the APS Council and the Public Affairs Advisory Committee.

The effort was coordinated with Dr. Francis Haddy, who is chairman of the Animal Care and Experimentation Committee for the Association of Chairmen of Departments of Physiology. It was agreed that the response should concentrate on the research and educational aspects of the proposed rules for animal care and use.

The combined APS-ACDP statement was submitted to the US Department of Agriculture in June.

David J. Ramsay, Chairman

Public Affairs

This report covers the activities of the Society's Public Affairs Advisory Committee for the period of March 15–September 15, 1987.

The committee's activities during this period were focused largely on legislative

attempts in five states (Arizona, Florida, Montana, New Mexico, and Wyoming) to repeal local and state statutes that permit the release of unclaimed pound animals to research institutions. Committee members in states where similar efforts had been attempted provided committee members in the five states with advice and experiences in this challenge by the animal rights activists. Staff provided informational materials and data. The attempts to repeal the statutes were rebuffed in each case.

Staff worked with Kentucky members in developing informational materials for Senator Wendell H. Ford (D-KY), who had introduced a bill that would virtually eliminate the use of random-source animals for federally funded research. The senator is considering amending his bill based on the information channeled through the University of Kentucky.

Because of this growing challenge to repeal local and state pound release laws and renewed congressional interest to prohibit federal funding of research that uses unclaimed pound animals, the committee is presenting a workshop on this issue at the Society's fall meeting in San Diego. A similar workshop was conducted at last year's fall meeting in New Orleans.

Staff along with other Washington-based scientific society staffs have met at congressional breakfasts to discuss with congressional staff bills concerning laboratory animals, in general, and random source animals, in particular.

In a related matter, the committee's chairman provided input to the APS Animal Care and Experimentation Committee, which developed the APS response to proposed Animal Welfare Act regulations.

Perhaps the most disappointing activity during this period was the failure to gain sufficient support for a congressional resolution recognizing APS' centennial anniversary. However, the Society's presidential officers were received by the Vice President, who accepted an APS centennial plate for the White House plate collection.

Richard Malvin, Chairman

Publications

Approximately 10% more journal pages were published during the first 6 months of 1987 than in 1986, but we anticipate that there will only be a 5% increase by the end of the year. There was a 2% increase in total number of manuscripts submitted in the same period. However, the *Journal of Applied Physiology* jumped significantly to a 9% increase over the summer. In 1988 subscription prices are being increased by approximately 9% for the *AJP* journals, *Journal of Neurophysiology*, and *Physiological Reviews* and 15% for the *Journal of Applied Physiology*. The *Physiologist* and *News in Physiological Sciences* will remain the same. The journals are operating in the black.

With Council's endorsement, the Committee is continuing to consider the establishment of a new journal, *AJP: Lung and Respiration*. The sections of the Society have been solicited for additional input and a wide variety of views has been expressed.

Dr. John Shepherd has agreed to assume the editorship of *News in Physiological Sciences* with the assistance of a group of assistant editors at Mayo. To ensure a smooth transition, Dr. Johnson and staff from APS are meeting with Dr. Shepherd at Mayo.

Two volumes of the *Handbook of Physiology* have been published in 1987: volume 4 in the Respiratory System, *Gas Exchange*, and volume 5 in the Nervous System, *Higher Functions of the Brain*. *Atrial Hormones and Natriuretic Factors*, a clinical series book, came out in April 1987 and *Physiology in the American Context* came out in May 1987. *The History of the American Physiological Society, the First Century, 1887–1987* has just been published. *Renal Physiology: People and Ideas* will be published before the end of the year. The other two *People and Ideas* books (*Membrane Transport* and *Endocrinology*) will not be out until 1988 because of the problems we are experiencing in obtaining the last two to three manuscripts.

There are five *Handbook* volumes in progress, four in the GI series and one in Renal. Manuscripts for the clinical series

Future Meetings

1988	
FASEB Annual Meeting	May 1–6, Las Vegas
Joint APS/ASPET Fall Meeting	October 9–14, Montreal
1989	
FASEB Annual Meeting	March 19–24, New Orleans, LA
APS Fall Meeting	October 15–19, Rochester, MN
1990	
FASEB Annual Meeting	April 1–6, Washington, DC
APS Fall Meeting	October 7–11, Orlando, FL
1991	
FASEB Annual Meeting	April 14–19, Atlanta, GA
1992	
FASEB Annual Meeting	April 5–10, Anaheim, CA
1993	
FASEB Annual Meeting	March 28–April 2, New Orleans, LA

book, *Clinical Physiology of Sleep*, are due in at any time. It is estimated that it will take two years to complete work in progress.

An ad hoc committee met in June in Newport Beach to discuss a technique book series. The Committee recommended that the Society publish such a series, but felt its success depended on choosing a strong editor and appropriate topics. The Committee also pointed out the necessity of having an advisory committee to select topics for this series.

The meetings of the Publications Committee on August 18 and 19 were devoted to the future of the APS book program. The Committee is planning to continue the Handbook and Clinical Series, starting a technical book series, and publishing intermittent special publications as needed. After an analysis of the costs and capital investment involved in keeping an in-house book program and a discussion of what the commercial book publishers had to offer (from correspondence, preliminary interviews, and telephone contact), the Committee unanimously agreed that APS should begin negotiations with a commercial publisher. Oxford University Press was the Committee's first choice, and negotiations have begun. A specific list of criteria that a commercial publisher should be able to meet has been prepared.

Paul C. Johnson, Chairman

Section Reports

Cardiovascular Annual Report

The material below was presented to the Section membership at the Annual Dinner and Business Meeting on Wednesday evening, April 1, 1987, at the International Ballroom East, Washington Hilton Hotel, Washington, DC. Over 200 members attended.

Section Committee Membership

Vernon Bishop is the new Section Chairman and Norman Alpert is the new Treasurer. The Section voted by mail ballot for Section Secretary and new Nominating Committee member. Douglas M. Griggs was elected Secretary and Harris Granger was elected to the Nominating Committee, serving with Hermes A. Kontos (1989) and Carl F. Rothe (1988). James Downey replaced Allen Cowley as primary PAC member, and Harris Granger was named to the second position by the Steering Committee.

Loring Rowell, 1988, and Vernon Bishop, 1989, continue to serve as SAC

Give a Gift of *NIPS*

News in Physiological Sciences is the only international journal designed to keep physiologists up to date about developments in physiology worldwide. Help a scientist in a developing country by giving him or her a gift of *NIPS*.

For individual gift subscriptions write to *News in Physiological Sciences*, c/o Williams & Wilkins, P.O. Box 1496, Baltimore, MD 21203, or call free [(1-800) 638-6423] from anywhere in the United States, except Alaska and Hawaii. From Maryland, call 5428-4105 collect. *NIPS* is \$50 (US) worldwide and distributed by Williams & Wilkins.

members as our Section moves to comply with the three-year term requested by Council (amendments to Society Bylaws, Article V, Section 6, 1987).

James Covell replaces Joseph Janicki as Chairman of the Cardiac Mechanics Subsection.

A. P. Shepherd replaces Neil Granger as Chairman of the Splanchnic Circulation Subsection.

Treasurer's Report

Submitted by Vernon Bishop.

Section Membership

As of April, 1987, of those regular APS members who responded to an APS questionnaire regarding Section membership, 719 listed the Cardiovascular Section as their primary affiliation. Of these, 266 are Fellows, and this is about 6% of the regular membership.

Awards

Fellowship. In addition to regular membership in this Section, which is open to any APS member, the Cardiovascular Section elects Fellows. Fellows must be regular members of the APS and must have published meritorious research in cardiovascular physiology. The total number is not to exceed 5% of the total regular membership. Nominations for new Fellows must be made by at least two existing Fellows, with supporting letters sent to Steering Committee members. Nominations are voted on by the Steering Committee. In 1986, the following members were elected to Fellowship: Robert Carpenter, Burl Hamrell, J. R. Haywood, John Johnson, Ulla Kopp, Jeanie McMillin-Wood, Colin Rose, David Skorton, Robert Tomanek, Stephen Vatner, and Wiltz Wagner.

The **Lampport Award** is presented annually to an outstanding young investigator (under age 36 years) showing outstanding promise in his or her field of cardiovascular research. The Awardee is selected by the Wiggers Awardee of the previous year. Dr. Kiichi Sagawa selected Dr. William Little, Department of Medicine, Bowman Gray School of Medicine, Wake Forest University, as the 1987 Lampport Awardee. Dr. Little received a Certificate of Award and a

check for \$200 from the Cardiovascular Section.

The **Carl J. Wiggers Award** honors a founder of our section and is presented annually to one who has over the years made outstanding and lasting contributions to cardiovascular physiology. The 1987 Awardee was Aubrey E. Taylor, Professor and Chairman, Department of Physiology, University of South Alabama Medical School, Mobile, Alabama. Dr. Taylor received the traditional bronze plaque for the Wiggers Award and presented a lecture entitled "Transvascular Fluid Exchange; the Landis Hypothesis Reexamined."

Programming

Under the able leadership of Jim Downey and Allen Cowley, the Cardiovascular Section sponsored four symposia at the 1986 Fall Meetings of the American Physiological Society in New Orleans.

The Cardiovascular Section cosponsored the theme Neurohumoral Regulation of Water and Electrolyte Balance. Included in that theme were four symposia, listed below.

Neuropeptides, Angiotensin and Vasopressin, Ian Phillips;

Neural and Humoral Control of Kidney Functions, Arthur Guyton;

Neural Humoral Regulation of Electrolytes and Water Balance at the Microcirculation, Aubrey Taylor; and

Neural Humoral Mechanisms of Thirst and Salt Appetite, Allen Epstein.

The following symposia were sponsored or cosponsored by the Cardiovascular Section at the 1987 Annual FASEB Meetings in Washington, DC.

Autonomic Control of the Peripheral Circulation in Humans, L. B. Rowell;

The Capillary Functions: Historical Perspectives, Aubrey Taylor;

Role of Oxygen Free Radicals in Myocardial Ischemia and Infarction, Robert Kloner; and

Cardiovascular Responses to Chronic Portal Hypertension, Neil Granger.

At the Annual Meeting, the membership was informed about programming prob-

lems and what must be done to correct them. The growing importance, in fact, primary importance, of successful programming as a vital task of each Section was conveyed to the membership. The message was to do it right and to do it well. There are now well-established rules and forms for "doing it right." The efforts of our hard-working PAC representatives deserve special respect and thanks from the Cardiovascular Section. It is a difficult job.

Section Advisory Committee

The Cardiovascular Section continues to participate vigorously in the reorganization of the Sections.

In April 1986, at FASEB in St. Louis, a four-person committee was formed to develop Guidelines for Section governance. Committee members were R. B. Reeves (Chairman), L. P. Sullivan, N. W. Weisbrodt, and L. B. Rowell (Cardiovascular Section). Our report, drafted by R. B. Reeves, was submitted to APS on June 19, 1986.

On August 22, 1986, an extraordinary meeting of the SAC took place in New Orleans. Jim Downey represented the Cardiovascular Section because other Steering Committee members were unable to attend. Views of the Cardiovascular Section were presented to Council by Dr. Downey.

In November 1986, the SAC Subcommittee of Reeves, Sullivan, Weisbrodt, and Rowell received from APS Council a draft document entitled "Section Standards," which precipitated a strong negative reaction from the Subcommittee and subsequently from the Steering Committee members of the Cardiovascular and Respiratory Sections.

The document was discussed at length at the SAC meeting in Washington, DC at the Hilton Hotel, on Saturday, March 28, 1987. At this meeting, attended by Bishop, Alpert, and Rowell, the SAC drastically revised Council's draft of "Section Standards" in an effort to eliminate what seemed like unnecessary and bureaucratic busy work. We (the Cardiovascular Section) continued to argue that if our Section (or any Section) is administered in a way that makes us a functional and successful organ of APS, then some minimum set of standards can be applied to such Sections to keep things working well. We voiced our reluctance to make changes that we feel will damage our Section. The main issue to be resolved is finding a way to keep a Steering Committee member on SAC for three years (an obligation we have accepted) without obliging this Committee member to serve a possible total of five years on the Steering Committee with three of them as Chairman. To retain the spirit of the new Bylaws, our plan is to

elect an SAC member from one of our former Steering Committee members (ideally someone who had served several years ago) and this experienced individual would then serve a three-year term on the SAC. We will retain the sequence of office, namely, Secretary one year, Treasurer one year, and Chairman one year, because this has served us so well since we began as the Cardiovascular Group under C. J. Wiggers. Another special meeting of the SAC was held in Bethesda, MD, on May 14, 1987. Bishop and Rowell were unable to attend, but fortunately the Cardiovascular Section was well represented by Norman Alpert and James Downey.

Other Matters

Our most serious problem during 1986-1987 was the late mailings from APS, sometimes months late (other Sections were damaged by this as well). This raised havoc with the administration of Section affairs. It caused disruption in the planning of every major event on our annual calendar. Any repetition of these unfortunate mishaps would do more damage to the Sections than anything I can imagine at this point.

L. Rowell, Chairman

Cell Research Award

Purpose. The Cell and General Physiology Section of the American Physiological Society will offer an award to one undergraduate student (\$200) and one postdoctoral student (\$300) after three years of obtaining an M.D. or Ph.D. degree. This award will be made based on whose research, as represented by an abstract submitted to the Spring FASEB meeting in the field of cell physiology, is judged to be an outstanding contribution.

Selection Procedure. Recipients will be selected from those scientists who submit abstracts by February 1, 1988, to the Program Chairman of the APS-Cell: Dr. Lazaro Mandel, Dept. of Physiology, Duke University Medical Center, Box 3709, Durham, NC 27710.

Qualifications of Recipients. 1) A recipient must be first author on an abstract submitted for the FASEB meeting; 2) a recipient must be performing research in the field of cell physiology; 3) a recipient must be a graduate or must be within three years of receiving his/her degree; and 4) a recipient must submit with their abstract a letter from the Department Chairman confirming their eligibility.

Receipt of Award. The recipients will be notified before the FASEB meetings and will be invited to be guests of APS-Cell at the annual banquet/lecture at which time each will receive the award.

Gastrointestinal

The Smith Kline & French Gift

The GI Section has received a generous gift from Smith Kline & French Laboratories to recognize meritorious research in the gastrointestinal field and to support the activities of the Section. These moneys will be used to award prizes to two young investigators who are in predoctoral and postdoctoral training programs and to an established senior investigator. The awards will be presented at the annual GI banquet held at the FASEB Meetings in Las Vegas. The GI Section is grateful for the support of Smith Kline & French Laboratories.

The Smith Kline & French Young Investigator Awards for Gastrointestinal Research

Predocctoral students and postdoctoral fellows who are concentrating their research efforts in the gastrointestinal tract are encouraged to apply for the Smith Kline & French Young Investigator Awards for Gastrointestinal Research. Eligibility requirements are indicated on the attached announcement. Please support this program by nominating your students and postdoctoral fellows.

Call for GI Symposia and Theme Suggestions for 1989 FASEB Meetings

Jack Wood, the new GI representative to the APS Program Committee, advises that it is time to send suggestions for symposia to be proposed for the 1989 FASEB Meetings. Suggestions are welcomed from any member of the GI Section. Younger members are especially encouraged to send proposals. All proposals for symposia must be defended in competition with the other Sections of APS in a spring meeting of the Program Advisory Committee. Consequently, symposia with general interest beyond GI that can be supported by a coalition of sections have improved prospects for approval. Proposals for broader themes for the 1989 FASEB Meeting will also be welcomed. Those who send proposals should indicate their willingness to be the organizer of the theme or symposium. Correspondence related to symposia, themes, or other aspects of programs for APS-sponsored meetings should be mailed to J. D. Wood, Ph.D., Department of Physiology, 4196 Graves Hall, 333 West 10th Ave, The Ohio State University, Columbus, OH 43210. These should be mailed no later than January 15, 1988.

Two symposia sponsored by the GI Section will be presented at the 1988 FASEB Meeting in Las Vegas. The first is "Physiology and Pathophysiology of Reactive Oxygen Metabolites in the digestive system," which will be organized by Dr. Neil Gran-

(Continued on p. 283)

PUBLIC AFFAIRS

Scientific and Educational Communities Stood Up to be Heard—And They Were Heard

For the first time, perhaps, the scientific and educational communities have stood up and forcefully stated their concerns to a federal agency. The result of such action has been a reconsideration by the agency of its proposed regulations for laboratory animal care and use.

The Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) is considering revising its proposed regulations for implementing the 1985 amendments to the Animal Welfare Act. The Service is responsible for the enforcement of the Act.

Following publication of the proposed regulations last March, APHIS received more than 8,000 letters during the 90-day period for public comment. Approximately two-thirds of the letters were critical comments from the scientific and educational communities.

The comments, described as detailed and substantive, caused APHIS to reexamine its initial rule proposals and to consider:

- revising and republishing the proposed regulations;
- including in the revision standards for the exercise of dogs and the psychological well-being of nonhuman primates, the two amendments that were not included initially in the proposed regulations;
- regional hearings on the proposed regulations;
- reviewing the proposed regulations by the Federal Interagency Research Animal Council to assure that the rules are in agreement with the US Public Health Service regulations for the care and use of laboratory animals; and
- declaring the proposed regulations to be a major rule change.

It has been stated that APHIS hopes to have any revision of the proposed rules published by January 1988. However, the outside betting is that the publication of any revision will not be before April and possibly not before June. When the Congress enacted the amendments in December 1985, it stipulated that the regulations were to be in effect within 12 months.

Aside from revising the proposed regulations, the most significant aspect of the considerations by APHIS is the possible determination that the proposed regulations do represent a major rule change. Such a determination would require the

agency to seek additional data as to what affects the regulations would have on the industry, including economic impact, thus involving the Office of Management and Budget in the promulgation of the rules.

A proposed regulation is considered to be a major rule change when it is likely to result in one or more of the following:

- an annual effect on the economy of \$100 million or more;
- a major increase in costs or prices for consumers, individual industries, governmental agencies, or geographic regions; or
- significant adverse effect on competition, employment, investment, productivity, innovation, or on the ability of US-based enterprises to compete with foreign-based enterprises in domestic or export markets.

APS and other scientific and educational societies pushed both APHIS and the Secretary of Agriculture to declare the proposed regulations as a major rule change inasmuch as implementation would cost research and educational institutions nearly \$1 billion and approximately \$144 million annually to maintain compliance with the rules.

APS also pushed for a review by the interagency committee because many of the proposed APHIS rules conflicted with the public health service requirements. Other changes in the proposed regulation sought by APS dealt with the usurping of institutional prerogatives and provisions that exceeded the legislative intent of the Congress. (See *The Physiologist*, no. 4, 1987.)

American Physiological Society Statements on Animal Usage

The Use of Animals is Necessary for the Proper Teaching of Students of the Biomedical Sciences

The American Physiological Society believes the use of animals is important in the education of students in the biomedical sciences. The use of animals gives the student a direct understanding of how living systems work, an understanding that cannot be gained by reading a textbook, watching a video, or using a computer. To achieve the best biomedical education, students must have a complete learning experience including the use of laboratory animals.

October 1987

Animal Research is the Most Humane Response to Human Suffering from Disease

Depriving sick human beings of the benefits of animal research is inhumane and reprehensible. The American Physiological Society advocates the use of animals for research and teaching as the most humane response to the need to relieve mankind from the suffering caused by disease. The use of animals is necessary if researchers are to combat illness, which affects both human beings and animals. The correct training of physicians and medical scientists also requires the use of animals for laboratory teaching. Textbooks, isolated cells, computer models, and other representations of the intact living organism can provide only a partial understanding of life processes for both the medical researchers and the student. Efforts to deny the human race the best possible curative power of modern sciences must be repulsed.

October 1987

Pound Animals

Unclaimed pound animals (random-source dogs and cats) have proved to be the most useful animals for the purposes of research and teaching. Medical advances benefiting both humans and animals were possible because of the availability of unclaimed pound animals for use in research. The American Physiological Society strongly believes that denial of the availability of random-source animals would be a catastrophic setback, and the Society strongly endorses the continued use of unclaimed pound animals for basic and clinical research and teaching.

April 1987

Federal authorities for the first time are pursuing the animal rights activists who stole 27 cats and 7 miniature pigs from the US Department of Agriculture research facility at Beltsville, MD. The theft of a dog in December 1982 and another dog in January 1983 from the National Naval Medical Research Center in Bethesda, MD, was not purposed by federal authorities.

Both the Federal Bureau of Investigation and the Department of Agriculture's inspector general are conducting investigations of the break-in at the animal parasitology institute. The intruders cut through a chain-link fence and smashed several padlocks to gain entry to the facility. Of the cats stolen, 11 were reported to be infected with toxoplasmosis.

A group called the "Band of Mercy" claimed responsibility for the break-in and theft of the animals.

Of the 22 break-ins and thefts of animals by animal rights activists since 1979, 7 have taken place in Maryland. The Band of Mercy also claimed responsibility in 1982 for breaking into a laboratory at the University of Maryland's College Park campus and taking 48 rabbits.

The Animal Liberation Front has claimed responsibility for the thefts of both dogs from the naval center and six rats from a laboratory at The John Hopkins University. True Friends claim credit for stealing 4 chimpanzees from a Rockville research facility and People for the Ethical Treatment of Animals were responsible for the seizure of 17 monkeys from a Silver Spring laboratory.

William M. Samuels

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.

OPINION

Are Animal Activists Humane?

Although antivivisectionists have been a part of society for over a century, it is only recently that animal activists have been with us. Is there a difference between these two? If so, need we, as experimental biologist, be concerned?

I believe we have ample cause for concern and unless we begin to support our profession in a conscientious and active manner there soon will be much less of our profession to support.

Ever since animal experimentation began, a concern has been expressed that biologists are cruel to their charges. An extreme view by some is that all animal experimentation is inhumane and that no good purpose is served by such experiments. Dr. Michael W. Fox, scientific director for The Humane Society of the United States (HSUS), has stated that "Animals are frequently used as models for various human ailments. However, since the causes of human diseases are primarily mental, social, and environmental, the use of animals as appropriate models must be severely questioned."

Those who first expressed this view were abolitionists and appropriately called themselves antivivisectionists. Their goal: to ban all animal experimentation.

In spite of the fact that antivivisectionists have had modest success in some countries, it is generally recognized in the United States that banning animal experimentation would destroy medical progress, a progress few are willing to abandon. Antivivisection is not a cause to which the United States population rallies, thus the introduction of the euphemism "animal activist" and its partner "animal rightist." Although the names have changed, the face of the organizations have not, as Patricia Forkan noted in the spring 1982 issue of the *Humane Society News*: "Eliminating animals in biomedical research and testing has been a goal of the HSUS since its founding 28 years ago."

In the United States there are approximately 400 antivivisection organizations: some quite small, some large, and most well financed. In this category, I include such diverse groups as The Humane Society of the United States and People for the Ethical Treatment of Animals (PETA). The budget of these two groups alone runs into the millions of dollars annually. When added to all other animal activist groups, the total runs into the hundreds of millions of dollars each year.

It is important to understand that the shared goal of most of these societies is to prohibit all research using animals. In other words, these societies are antivivisectionists in spite of the reluctance of most organizations to use that term. Their approach was perhaps described best by Dr. John McArdle, who said, when he was the HSUS director for laboratory animal welfare, "Never appear to be opposed to animal research; claim that your concern is only about the source of the animals used."

Such views seldom are expressed openly. Rather, they are masked by general statements implying that the groups are only interested in humane treatment of animals or that only pound animals (unclaimed cats and dogs) not be used for experiments. To this end their efforts have been directed at closing pounds to animal researchers. The goal is to achieve by the year 2000 a total ban on the use of unclaimed pound animals for research.

Eleven states now prohibit pounds from releasing or selling their animals for research. Massachusetts even prohibits the use of any pound animals, thus requiring all cats and dogs used for research or educational purposes to be purpose bred.

Can any medical school afford \$500 per dog for teaching purposes? Can investigators afford such costs? Such costs are prohibitive, raising expenditures 10-40 times, depending on the size and age of the animal required.

I urge investigators currently using cats or dogs to reestimate their yearly budget, figuring \$500 per animal rather than the figure used in the original budget. The new figure will be staggering.

In spite of the fact that these laws have been passed in the name of humane treatment, they in no way address that issue. These laws do not reduce animal deaths, but rather increase them. Each year, 13,000,000 unwanted cats and dogs are killed by animal shelters, while 250,000 are used in research. Should a pound closing law be passed on the national level, 13,500,000 animals would die as a result of the need for 250,000 purpose-bred dogs and cats.

As physiologists, we have not yet come to grips with the import and the power of the animal rights movement. The movement's leaders are deadly serious people with a hidden agenda: abolish animal research.

The public is bombarded with half truths and untruths regarding our profession: an old tactic long identified with extremist groups. It may be of interest to note that when Sir Victor Horsley of University College, London, was running for a seat to represent his College in Parliament, he was viciously attacked by antivivisectionists. His election committee was obliged to write in *The London Times* of December 8, 1910, "They (antivivisectionists) have issued a circular to the electors saying that he has performed over 3,000 experiments on animals, but they expressly omit any reference to the anesthetics employed, thereby imputing cruelty to him." Sir Horsley lost 2,579 to 1,857. Today, the tactics are similar. Photos of animals are presented to imply terrible cruelty. Reference to anesthetics are still omitted.

But why concern? It is because of the hidden agenda. If pound laws are repealed, the next step will be to limit animal experimentation in some other manner, perhaps to prohibit use of primates or dogs or cats. If successful, efforts will move on to other limitations. Despite the animal rightists' claims, this issue is not about humane treatment; it is about animal use. Pound laws have nothing to do with humanness.

Unfortunately, laws are passed not because the majority of the electorate favors them but because a vocal group is heard. Every poll has shown that less than 10% of the United States population is in favor of severely restricting animal research, but legislators hear resoundingly from this mi-

nority. At local, state, and national levels, they receive a barrage of antivivisectionist letters. This issue has generated more letters to the Congress than any other issue. Yet, the response of the scientific community has been silence. We seem to believe a series of myths:

"Pound laws don't affect me, so why get excited?"

"Our national societies will take care of the issue."

"No one believes the antivivisectionists anyway."

Such responses are wrong. Dead wrong. Regulations that make research prohibitively costly are an assault on all research. Not only does it stop much needed work, it drains the research budgets of granting agencies, thus making it more difficult for all to obtain funds.

The American Physiological Society and others do testify before Congress; however, they cannot testify at state and local levels. But even at a national level, it is imperative for researchers to write or phone their congressional representative. Why should your representatives in the Congress support your view if she or he receives no word from you? Their thinking is "If investigators don't care enough to spend 10 minutes to write me, why should I believe they care about the issue?"

Finally, it is incorrect to assume no one believes the horror tales told. The same inaccurate charges have been leveled against the scientific community for decades. Little rebuttal has appeared, so that even those who support animal research believe we are inhumane. The public is

not aware of the regulations by which we must abide.

Scientists must become active before restrictive laws are passed. Once passed, they are very difficult to repeal. It means we must speak to lay groups when possible and to the media when the opportunity arises. My experiences have shown they are interested and fair. We must write, not only to our representatives but to our newspapers, when the issue is raised. We must also become active members of those organizations that devote themselves to informing the public on the nature of animal research. They exist in many states—California Biomedical Research Association, Massachusetts Society for Medical Research, Michigan Society for Medical Research,—and nationally—Foundation for Biomedical Research and National Association for Biomedical Research.

I firmly believe the scientific community must tithe itself in time and money to protect the institutions that we serve. When biomedical research is slowed unnecessarily, human suffering is increased. Disease will not be conquered by political change, only by progress in knowledge.

Ingrid Newkirk, national director of PETA, claims that "a rat is a pig, is a dog, is a boy." A boy is not equivalent to a rat, and deception is not compatible with care and concern for human life.

I submit that the answer to the question posed in the title is "No. Animal activists are not humane."

Richard L. Malvin
University of Michigan

News From Senior Physiologists

Letters to Roy O. Greep:

Donald Whedon writes, "So wonderful of you to keep remembering my July 4 birthday. This year I was in San Francisco, and by observation from the Top of the Mark I can report that they observed it there with the proper fireworks display I have come to expect wherever I go!" Last June at his fiftieth reunion at Hobart College he was awarded one of three alumni citations for career accomplishments as well as for "unusual activities including arranging Hobart's first intercollegiate golf match." He is on the Calcium Science Working Group planning studies for the planned NASA Space Station in 1997 and is also still managing the research programs for the Shriners Hospitals.

S. Howard Bartley reports that although he does not have much chance for laboratory research, he remains busy with scientific writing. Distinguished Research Professor in the Department of Psychology at Memphis State University since 1974, he is continuing to apply what he has learned in biology laboratories to build a "scientific psychology." "What I am trying to do is state some problems which I'd be happy to see my colleagues take seriously enough to get together in groups and discuss." He is proud to have a group of 40 graduate students who have shown him many warm expressions of regard. He writes, "I call this group my Gems . . . To me they are like a family."

NIH Regional Workshops on Implementation of the PHS Policy on Humane Care and Use of Laboratory Animals

The National Institutes of Health (NIH) Office for Protection from Research Risks is continuing to sponsor a series of workshops in implementing the Public Health Service Policy on the Humane Care and Use of Laboratory Animals. Located in Albuquerque, New Mexico, the workshops are open to institutional administrators, members of animal care and use committees, laboratory animal veterinarians, investigators, and other institutional staff who have responsibility for high-quality management of sound institutional animal care and use programs. *Information:* Rynda Gibbs, University of New Mexico School of Medicine Continuing Medical Education, 815 Vassar N.E., Albuquerque, NM 87131. Phone: (505) 277-3942. Other workshops will be announced in future issues of the NIH Guide for Grants and Contracts. *Information:* Roberta Garfinkle, Executive Assistant for Animal Welfare Education, National Institutes of Health, Office of Protection from Research Risks, Bldg 31, Rm 4B09, Bethesda, MD 20892.

Second Century Founders

Thomas H. Adair
W. Ross Adey
Edward F. Adolph
Willard M. Allen
Paul D. Altland
Murray D. Altose
Rajen S. Anand
N. R. Anthonisen
Henry S. Badeer
Silvio Baez
Praphulla K. Bajpai
Carleton H. Baker
Bruno Balke
A. Clifford Barger
Bayer AG/Miles
Leslie L. Bennett
Carl J. Benzelt
Robert W. Berliner
Robert M. Berne
Anwar B. Bikhazi
Oscar H. L. Bing
Edward H. Blaine
David F. Bohr
Judith S. Bond
Robert F. Bond
Stuart Bondurant
John H. Boucher
Robert A. Brace
Steven L. Britton
John R. Brobeck
David Brodie
Alfred W. Brody
John M. Brookhart
Chandler McC. Brooks
David P. Brooks
Arthur M. Brown
Manfred Brust
Nancy Buckley
Thodore H. Bullock
Howard B. Burchell
Leo K. Bustad
Michel Cabanac
Stephen M. Cain
Leon Cander
David Cardus
Colin G. Caro
H. Mead Cavert
Paolo Cerretelli
K. K. Chen
Leon Chesley
S. T. Chiang
Shu Chien
Shyan-Yih Chou
John A. Clements
Stephen R. Cohen
Hazel Coleridge
John Coleridge
Ruth E. Conklin
Andre F. Courmand
David L. Crandall
Julio C. Cruz
Brian Curtis
Horace W. Davenport
Hallowell Davis
Domenic A. De Bias
Pierre Dejours
Lewis Dextet
Bruce Dill

James G. Dobson, Jr.
Peter Dodek
Robert W. Doty
Willa H. Drummond
Michael J. Dunn
James E. Eckenhoff
Richard W. Eckstein
Ludwig W. Eichna
Gilbert M. Eisner
Robert J. Fallat
Saul J. Farber
Eric O. Feigl
Frederick P. Ferguson
Benjamin G. Ferris, Jr.
Giles F. Filley
Alfred P. Fishman
G. Edgar Folk, Jr.
George D. Ford
Robert D. Foreman
Robert E. Forster
Martin Frank
William Freas
Melvin J. Fregly
Charles A. Fuller
Robert H. Furman
A. Pharo Gagge
Morton Galdston
Carl Gans
Kenneth D. Gardner, Jr.
John F. Gaugl
Elizabeth Carlsen Gerst
Daniel L. Gilbert
Kenneth L. Goetz
Anna Goldfeder
Robert M. Goldring
Jean R. Gontier
David B. Gordon
D. Neil Granger
Brydon J. B. Grant
Harold D. Green
James W. Green
David G. Greene
Paul H. Guth
Francis J. Haddy
Charles A. Hales
Clara Eddy Hamilton
Lyle H. Hamilton
Chester W. Hampel
Esther Hardenbergh
Alan R. Hargens
Patrick D. Harris
Jayne Thompson Hart
Katherine B. Hartman
Richard J. Havel
George A. Hedge
Ruth M. Henderson
Joseph F. Hoffman
Frederic G. Hoppin, Jr.
T. Hoshiko
Ernst G. Huf
Michael H. Humphreys
Richard W. Hyde
Eleanor L. Ison-Franklin
Howard N. Jacobson
Louis B. Jaques
J. Raymond Johnson
Paul C. Johnson
Frederic T. Jung

Jiro Jerry Kaneko
C. Y. Kao
Frederick W. Kasch
Adrian I. Katz
Susan R. Kayar
Geoffrey L. Keighley
Ralph H. Kellogg
Mushaq Ahmad Khan
Rolf Kinne
F. M. Knapp
Ernst Knobil
Leon K. Knoebel
Franklyn Knox
Philip M. Kober
Raymond C. Koehler
Kenneth G. Kohlstaedt
Samuel N. Kolmen
Diana L. Kunze
Phyllis Kutsky
Eugene M. Landis
Ivan M. Lang
Henry D. Lauson
James E. Lawler
John K. Leach
L. Don Lehmkuhl
Jacob Lemann, Jr.
S. Leonard
Michael G. Levitzky
Matthew N. Levy
Benjamin Libet
Ira J. Lichton
Melvyn Lieberman
Meyer D. Lifschitz
W. Gregory Lotz
Ulrich C. Luft
Roy H. Maffly
Virendra B. Mahesh
Elizabeth Painter Marcus
Norman B. Marshall
Alexander Mauro
Jane D. McCarrell
Ernest P. McCutcheon
Donald E. McMillan
Robert B. Mellins
George R. Meneely
Patricia J. Metting
Ulrich F. Michael
Florence K. Millar
David Minard
Vu Dinh Minh
Howard E. Morgan
Peter R. Morrison
Nicholas A. Mortillaro
E. Eric Muirhead
Gunnar Nicolaysen
Robert M. Nerem
Nancy Lee Noble
Eleanore A. Ohr
Dennis D. O'Keefe
George A. Ordway
Arthur B. Otis
L. C. Ou
Charles R. Park
William J. Pearce
Louis J. Pecora
J. C. Penhos
Kenneth E. Penrod
Eliot A. Phillipson

Richard N. Pierson, Jr.
Irwin J. Pincus
Ernest A. Pinson
Bertram Pitt
Chi-Sang Poon
Robert J. Porcelli
Robert L. Post
E. James Potchen
Frank L. Powell, Jr.
Hershel Raff
Hermann Rahn
J. Usha Raj
Nathan Rakiety
Carlos Enrique Rapela
Paul H. Ratz
Walter Redisch
Emerson A. Reed
James B. Rhodes
Erick L. Ritman
Jane C. Roberts
James S. Robertson
Sol Roy Rosenthal
James N. Ross, Jr.
Gerald I. Roth
A. Yvonne Russell
L. T. Rutledge
Kiichi Sagawa
Williams M. Samuels
G. Sant'Ambrogio
Francis J. Saunders
Wilbur H. Sawyer
John J. Sayen
James A. Schafer
Harold P. Schedl
F. O. Schmitt
William W. Scott
Gordon W. Searle
Ewald E. Selkurt
John W. Severinghaus
Daniel C. Shannon
John T. Sharp
David P. Simpson
Arthur H. Smith
Curtis A. Smith
Falconer Smith
Gerard P. Smith
James J. Smith
Thomas W. Smith
Jonas Sode
Joseph E. Sokal
R. John Solaro

Sidney Solomon
Ralph R. Sonnenschein
Harvey V. Sparks, Jr.
Nicholas Sperelakis
Isaac Starr
Norman C. Staub
N. L. Stephens
John L. Stephenson
Daniel J. Stone
Douglas G. Stuart
Kenneth Sugioka
Lawrence P. Sullivan
Kenneth G. Swan
George A. Tanner
Aubrey E. Taylor
Michael O. Thorner
Klaus Thureau
Robert E. Thurber
Daniel C. Tosteson
Janett Trubatsch
Karl J. Ullrich
Max E. Valentinuzzi
Glen R. Van Loon
Herman Villarreal
Margaret M. Von Dreele
Karlman Wasserman
Enoch P. Wei
E. G. Weir
A. Kurt Weiss
Robert M. Weiss
Bernice M. Wenzel
Stanford Wessler
John B. West
Ira Wexler
W. J. Whalen
G. Donald Whedon
John I. White
Herman S. Wigodsky
Walter S. Wilde
William D. Willis
J. Henry Wills
Charles A. Winter
Andrew L. Wit
R. Stewart Wolf, Jr.
Lester F. Wolterink
Clinton N. Woolsey
Billy K. Yeh
Michael R. Yelich
Douglas P. Zipes
Benjamin W. Zweifach

Moving?

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

PEOPLE AND PLACES

Ernest M. Wright, D.Sc., professor, Department of Physiology, University of California, Los Angeles, has been appointed chairman of the department succeeding **Wilfried Mommaerts**, who has retired.

APS member **Joyce M. Verrett**, Ph.D., professor of biology at Dillard University, New Orleans, has been appointed dean of the College of Arts and Sciences at Governors State University, Chicago.

David Robertshaw, D.V.M., professor and chairman, Department of Physiology and Biophysics, has moved to the Cornell University College of Veterinary Medicine, Ithaca, as chairman, Department of Physiology. A member since 1976, Robertshaw has been very active in the Society's Comparative Physiology Section.

John B. West, M.D., Ph.D., received an honorary D.Sc. degree from the University of Barcelona, Spain. West was President of the Society in 1984.

Having spent two years in Allan W. Cowley's laboratory at the Medical College of Wisconsin, **Emil Monos**, M.D., D.M. Sc., has returned to Semmelweis Medical University, Budapest, Hungary. Monos was a re-

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.

cipient of a John F. Perkins, Jr. Memorial Fellowship Award.

Michael Karlstad, Ph.D., New England Deaconess Hospital, Harvard Medical School, has moved to the University of Tennessee Medical Center at Knoxville.

APS member, **Rong T. Yen**, Ph.D., has accepted an appointment as professor of Mechanical Engineering at Memphis State University. Yen was in the Department of Bioengineering at the University of California, San Diego.

POSITIONS AVAILABLE

Research Position. Major Philadelphia teaching hospital seeking M.D. or Ph.D. (intestinal motility interests preferred). For information contact Anthony J. Di-Marino, Jr., M.D., Presbyterian-University of Pennsylvania Hospital, 39th and Market Streets, Philadelphia, PA 19104.

Research Associate Awards. NASA is offering several Research Associate Awards for scientists to work in laboratories capable of providing scientific advice and facilities relevant to space biology. The awards vary from \$18,000 to \$22,000 based on experience. They are for a 12-month period with the possibility of renewal. *Proposals are due February 1.* The funding will begin anytime from June 1 to October 1. Eligible are postdoctoral US citizens. For information and application forms contact Dr. X. J. Musacchia, Chairman, NASA Award Committee, Graduate Programs and Research, University of Louisville, Louisville, KY 40292; or Dr. Thora W. Halstead, Research Associates Program, Life Sciences Division, NASA Headquarters, Washington, DC 20546.

ANNOUNCEMENTS

Applications Sought for Senior and Postdoctoral Research Associateships

The National Research Council announces the 1988 Resident, Cooperative, and Postdoctoral Research Associateship Programs for research in the sciences and engineering. The programs provide Ph.D. scientists and engineers of unusual promise and ability with opportunities to perform research on problems largely of their own choosing yet compatible with the research interests of the supporting laboratory. Annual stipends for recent Ph.D.s for the 1988 program year will vary from \$27,150 to \$35,000, depending on the sponsoring laboratory, and will be appropriately higher for senior Associates. Reimbursement is provided for allowable relocation costs and for limited professional travel during tenure. The host laboratory provides the Associate with programmatic assistance, including facilities, support services, necessary equipment, and travel necessary for the conduct of the approved research program. Applications to the National Research Council must be postmarked no later than January 15, 1988 (December 15 for NASA), and April 15 and August 15, 1988. Initial awards will be announced in March and April (July and November for the two later competitions) followed by awards to alternates later. *Information:* Associ-

ateship Programs, Office of Scientific and Engineering Personnel, GF1 Room 424-D2, National Research Council, 2101 Constitution Avenue, N.W., Washington, DC 20418. Phone: (202) 334-2760.

Mechanisms to Support Citizens in International Study

Scientific advances are being made in many international laboratories whose environments have much to offer US investigators at all levels of development. Opportunities for Americans to study abroad have always been supported by the National Institutes of Health (NIH) and Alcohol, Drug Abuse and Mental Health Administration (ADAMHA) in those universities and laboratories where a period of time spent in a well-defined research program would advance an individual's expertise in a new area of science or enlarge the capacity to be more productive through the acquisition of state-of-the-art techniques.

The Fogarty International Center is the Public Health Service (PHS) focus for providing opportunities for study abroad. However, all of the institutes of which the NIH and ADAMHA are composed make international research and research training available through judicious use of several ongoing mechanisms.

Fogarty International Center for Advanced Study in the Health Sciences. Programs for US Scientists

Senior International Fellowships. These fellowships offer opportunities to US biomedical, behavioral, or health scientists to conduct research in a foreign institution. Fellowships are awarded for a period of 3 to 12 months and provide stipend, travel, foreign living allowance, and host institutional allowance.

Foreign-Supported Fellowships. These fellowships are supported by specific foreign countries. They provide opportunities for scientists to conduct collaborative research in the country that provides funding for a maximum period of 1 year. Participating countries are Finland, France (CNRS and INSERM), Federal Republic of Germany, Ireland, Israel, Norway, Sweden, Switzerland, and Taiwan.

Special International Postdoctoral Research Program in Acquired Immunodeficiency Syndrome (AIDS). The objectives of the special institutional research fellowship program are 1) to support collaborative research between US and foreign scientists who wish to enhance their knowledge and skills in the epidemiology, diagnosis, prevention, and treatment of AIDS and 2) to stimulate scientists from nations affected by AIDS to cooperate and share research knowledge in combating this global problem. Awards

(Continued on p. 283)

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 pre-paid 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

(Continued from p. 282)

will be made to US institutions having comprehensive programs in AIDS research. The program director will have the authority to appoint US and foreign scientists at all career levels to work in institutions abroad and in grantee institutions, respectively. Appointments will be for a minimum of 3 months to a maximum of 24 months. The award provides for stipend, travel, and host institutional allowance.

Health Scientists Exchanges. This program supports short-term (2–12 weeks) and long-term (3–6 months) exchange visits between the US and Bulgaria, Austria, Hungary, Poland, Ro-

mania, Yugoslavia, or the Soviet Union. The purpose of this program is to conduct collaborative biomedical research of mutual benefit to the US and the participating country. Priority is given to visits designed to strengthen or expand ongoing collaborative relationships or to explore prospects for long-term cooperation. The financial provisions include round-trip travel and in-country costs. **Information:** International Coordination and Liaison Branch, Fogarty International Center, National Institutes of Health, Bethesda, MD 20892.

National Research Council to Administer Ford Foundation Postdoctoral Fellowships for Minorities

The National Research Council plans to award approximately 35 Ford Foundation Postdoctoral Fellowships for Minorities in a program designed to provide opportunities for continued education and experience in research for American Indians and Alaskan Natives (Eskimo or Aleut), Black Americans, Mexican Americans/Chicanos, Native Pacific Islanders (Micronesians and Polynesians), and Puerto Ricans. Fellows will be selected from among scientists, engineers, and scholars in the humanities who show greatest promise of future achievement in academic research and scholarship in higher education.

In this national competition sponsored by The Ford Foundation, citizens of the US may apply for a fellowship award of one-year duration.

Information: Fellowship Office, National Research Council, 2101 Constitution Avenue, Washington, D.C. 20418.

New PHS Indirect Costs Policies Effective October 1

New indirect costs policies that will bring PHS more in line with NSF and other federal agencies took effect with the start of the federal fiscal year. Indirect costs on PHS grants will be calculated and reimbursed based on the most current rate available at the time of award. Supplemental funding to reflect final or new institutional indirect cost rate changes during the award cycle will no longer be paid. The total amount awarded (direct plus indirect costs) will constitute a ceiling on the amount payable to the grantee for that grant budget period. Each contribution grant budget period in subsequent years will be adjusted to reflect the most current rate available at the time of that budget period.

These revised policies and procedures are now in effect and will eventually appear in the *NIH Guide to Grants and Contracts* and a revised PHS Grants Administration Manual, Part 609. The display of direct and indirect costs for reviewers is contained in the new PHS grants application form 398 that also takes effect October 1.

GASTROINTESTINAL

(Continued from p. 277)

ger. Dr. Helen Cooke will organize the second one entitled "Neural Control of the Intestinal Epithelium."

Dr. Leonard Johnson and James Jamieson in conjunction with an organizing committee including Drs. Marian Neutra, Susan Henning, and Lenard Lichtenberger are to be congratulated for their efforts in organizing an excellent FASEB Summer Research Conference, Gastrointestinal Tract II: Adaptation and Growth at Copper Mountain, Colorado, July 5–10, 1987.

Another FASEB Summer Conference, Gastrointestinal Tract III: Regulation of Organ and Cellular Functions, is being proposed for the summer of 1989. The organizers include Chairman, Dr. Jack Wood; Cochairman, Dr. Gilbert Castro; and Organizing Committee, Drs. David Alpers, John Bienenstock, and James Jamieson.

Membership

Approximately 195 members of APS have indicated a primary affiliation with the GI Section. There are an additional 100 who have indicated a secondary interest and 60 with a tertiary interest in gastrointestinal physiology. Members of the GI Section are encouraged to recruit colleagues with an interest in the gastrointestinal tract to join the Section. Membership in the GI Section can be requested by writing to Membership Services, 9650 Rockville Pike, Bethesda, MD 20814.

H. J. Cooke, Chairman

BOOKS RECEIVED

Comparative Physiology of Environmental Adaptations (Vol 3). *Adaptations to Climatic Changes*. P. Pevet (Editor). Basel: Karger, 1987, 187 pp., illus., index, \$118.75.

Neuromethods: 6 Peptides. Alan A. Boulton, Glen B. Baker, and Quentin G. Pittman (Editors). Clifton, NJ: Humana, 1987, 489 pp., illus., index, \$69.50.

Neuropsychology of Alcoholism: Implications for Diagnosis and Treatment. Oscar A. Parsons, Nelson Butters, and Peter E. Nathan (Editors). New York: Guilford, 1987, 414 pp., illus., index, \$00.00.

Drug Discovery and Development. Michael Williams and Jeffrey B. Malick (Editors). Clifton, NJ: Humana, 1987, 447 pp., illus., index, \$69.50.

Potassium Transport: Physiology and Pathophysiology (Vol 28). *Current Topics in Membranes and Transport*. Gerhard Giebisch (Editor). Orlando, FL: Academic, 1987, 494 pp., illus., index, \$89.00.

Membrane Structure and Function (Vol 29). *Current Topics in Membranes and Transport*. Richard D. Klausner, Christoph Kempf, and Jos van Renswoude (Editors). Orlando, FL: Academic, 1987, 310 pp., illus., index, \$85.00.

Motor Control and Learning: A Behavioral Emphasis (2nd ed.). Richard A. Schmidt. Champaign, IL: Human Kinetics, 578 pp., illus., index, \$35.00.

The Retina: An Approachable Part of the Brain. John E. Dowling. Cambridge, MA: Harvard Univ. Press, 1987, 282 pp., illus., index, \$37.50.

The Toxicity of Methyl Mercury. Christine U. Eccles and Zoltan Annau (Editors). Baltimore, MD: Johns Hopkins Univ. Press, 1987, 259 pp., illus., index, \$39.50.

Five Kingdoms: An Illustrated Guide to the Phyla of Life on Earth (2nd ed.). Lynn Margulis and Karlene V. Schwartz. New York: Freeman, 1987, 376 pp., illus., index, \$24.95.

Proposed Amendments to the Society Bylaws

The following amendments to the Bylaws approved by Council will be offered for vote at the Society Business Meeting, Wednesday, May 4, 1988.

ARTICLE III. *Membership*

SECTION 9. *Nominations for Membership.* Two regular members of the Society must join in proposing a person for regular membership, corresponding membership, honorary membership, associate membership or student membership in writing and on forms provided by the Executive Director. In the nomination of corresponding members, a corresponding or honorary member of the Society may substitute for one of the regular members in proposing a person for corresponding membership.

a. The Membership Committee shall investigate their the qualifications of regular and corresponding members and recommend nominations to Council. Council shall nominate members for election at the Spring and Fall Business Meetings of the Society. A list of nominees shall be posted for consideration by the members attending the meeting two days prior to the Business Meeting at which election occurs.

b. Nominations for associate and student membership shall be reviewed by the Executive Director, and if the nominees meet the criteria established by Council, they will be accepted immediately and so notified. The Executive Director will inform Council of the names of new associate and student members.

SECTION 10. *Election of Members.* Election of regular members, corresponding members, and honorary members, associate members, and student members shall be by secret ballot at the Spring and Fall Business Meetings of the Society. A two-thirds majority vote of the members present and voting shall be necessary for election.

ARTICLE V. *Standing Committees*

SECTION 1. *Publications Committee.* A Publications Committee composed of five Regular members of the Society ap-

pointed by Council shall be responsible for the management of all of the publications of the Society. The term of each member of the Publications Committee shall be three years; a member may not serve more than two consecutive terms. The Council shall designate the Chairman of the Committee who shall be an ex officio member of Council, without vote. On the advice of the Publications Committee and consent of Council, the Executive Director is shall be empowered to appoint and compensate the Publications Manager who shall assist in carrying out the functions of the Publications Committee under the supervision of the Executive Director. The President, Executive Director, and the Publications Manager shall be ex officio members of the Publications Committee without vote. The Committee shall have the power to appoint editorial boards for the Society's publications. The Committee shall present an annual report on publications and policies to the Council for approval and present an annual budget coordinated through the Executive Director to the Finance Committee for its approval and recommendation to Council.

SECTION 2. *Finance Committee.* A Finance Committee, composed of three Regular members of the Society appointed by Council, shall receive the total coordinated budget proposals annually from the Executive Director and shall determine the annual budgets, reserve funds and investments of the Society, subject to approval of the Council. The term of each member of the Finance Committee shall be three years; a member may not serve more than two consecutive terms. The Council shall designate the Chairman of the Committee who shall be an ex officio member of the Council, without vote. On the advice of the Finance Committee and consent of Council, the Executive Director is shall be empowered to appoint and compensate a Business Manager who shall assist in carrying out the functions of the Finance Committee under the supervision of the Executive Director. The President-Elect, the Executive Director, the Chairman of the Publications Committee, and the Business Manager shall be ex officio members of the Finance Committee, without vote.

APS Sustaining Associate Members

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

* Second Century Corporate Founders



Abbott Laboratories
American Medical Association
Beckman Instruments, Inc.
Berlex Laboratories, Inc.
Boehringer Ingelheim
Burroughs Wellcome Company
Ciba-Geigy Corporation
Coulbourn Instruments, Inc.
Dagan Corporation
DuPont Critical Care, Inc.
E. I. du Pont de Nemours & Company
Glaxo, Inc.
Gould, Inc.
Grass Foundation
Harvard Apparatus

Hoechst-Roussel Pharmaceuticals, Inc.
* Hoffmann-La Roche, Inc.
Jandel Scientific
Janssen Pharmaceutica
Lederle Laboratories
Lilly Research Laboratories
Marion Laboratories, Inc.
McNeil Pharmaceutical
* Merck & Co., Inc.
Miles Institute for Preclinical Pharmacology
NARCO Bio-Systems
Norwich Eaton Pharmaceuticals, Inc.
Ortho Pharmaceutical Corporation
Pennwalt Pharmaceuticals

Pfizer, Inc.
Pharmacia, Inc.
Pillsbury Corporation
A. H. Robins Company
* Sandoz, Inc.
* Schering Corporation
G. D. Searle and Company
Smith Kline & French Laboratories
* Squibb Corporation
Sterling Drug, Inc.
Stuart Pharmaceuticals
* The Upjohn Company
Warner-Lambert/ParkeDavis
Waverly Press, Inc.
Wyeth Laboratories