

EDITORIAL

Reach Out and Touch Someone

Once again, the forthcoming IUPS Congress in Helsinki provides an opportunity for physiologists to strengthen old ties and build new collaborations with associates in other countries. Such collaborations are an essential element in the continued vitality of science in laboratories throughout the world.

In October 1986, I urged APS members to "Lend a Helping Hand" to scientists in developing countries to help strengthen their research programs. While many of you heeded the call, much still remains to be done. The XXXI IUPS Congress is another opportunity to provide assistance as scientists from both developed and underdeveloped countries meet to exchange scientific information.

Not only have physiologists lent a helping hand since the last Congress, but the Society has done the same. At the direction of Council, the APS has donated books and journals to our colleagues in developing countries.

Excess book stock, arising from the transfer of our book program to Oxford, was donated to Project HOPE for distribution to developing countries (see letter, page 169). Additional copies were donated for distribution by the Third World Academy of Sciences located in Trieste.

Similarly 50 subscriptions to each of the Society's research journals were donated to the Third World Academy of Sciences and the American Association for the Advancement of Science for distribution to libraries in developing countries. These programs are designed to strengthen the research infrastructure of institutions in developing countries to assist them in

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Organization Committed to Direct Action Supporting Animal Research Formed at Berkeley

Charles S. Nicoll

Department of Physiology-Anatomy, University of California, Berkeley

The University of California at Berkeley has been under attack by animal rights activists (ARAs) for many years-probably longer than any other institution in the country. There are several reasons for this situation. First, Berkeley has a long standing history as a center of activism, and there are numerous ARA groups in the San Francisco area. Second, until recently the animal quarters on our campus were antiquated and not in keeping with modern standards. In addition, the organization and supervision of the animal care personnel were suboptimal. Because the university planned to construct new animal holding facilities (which the local ARAs opposed vehemently), the administration was reluctant to spend scarce funds to upgrade the old quarters in a period of severe budgetary restraint. As a result, the university was cited for numerous deficiencies by the USDA. The local ARAs portraved these deficiencies in the physical plant and the supervision of animal care personnel as cases of severe animal abuse and neglect. We foolishly assumed that if we simply ignored these misguided people, they would eventually go away. However, we finally realized that such a happy event would not occur.

In the fall of 1987, the ARAs began increasing their attacks on some of our esteemed colleagues, particularly in the departments of Psychology and Optometry. Their campaigns to discredit, malign, and vilify world-renowned researchers convinced many of us that we could no longer remain silent. Early in 1988 we obtained information on the plans of ARA groups for their "Lab Animal Liberation Week" during April. They had scheduled activities at various universities and research facilities in our area; we were targeted for their "direct action" on April 21.

At our university, Sproul Plaza is designated as a "free speech" area that can be reserved by any registered campus organization for demonstrations of various kinds. This is the plaza from which the renowned Free Speech Movement of the 1960s generated many of their demonstrations and other activities. We knew that the ARAs planned to reserve the plaza for their day of direct action, and one of our colleagues suggested that we form our own organization and reserve it ahead of them. We formed a group called the Students and Staff for Biomedical Research (SSBR) and reserved the plaza. At this time it was uncertain whether we would actually organ-(Continued on p. 173)



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dealing with health problems endemic to their region.

Opportunities to develop collaborations with our colleagues in South America and the Soviet Union have also increased since the last IUPS Congress. As a result of the participation of the ALACF in the 1987 Fall Meeting in San Diego, Aubrey Taylor and Harvey Sparks were invited to participate in the ALACF meeting in Buenos Aires and to visit other Latin American countries. As reported by Dr. Sparks in October, investigators in South America would like the opportunity to visit with colleagues in the United States. They urged APS to work to develop sister departmental linkages and to set up a clearinghouse that would identify potential sites for training of Latin American scientists. Past experience indicates that Latin American departments can be strengthened through such collaborations.

To assist the Society in its effort to match scientists and departments, I would like to urge you to turn to page 168 and complete the "Clearinghouse Information Form" and return it as soon as possible. With your assistance, the APS can serve as a matchmaker for an extremely important venture.

The visit of Dr. Franklyn Knox and myself to the Soviet Union has provided an additional opportunity for the development of fruitful collaborations. During our visit, numerous investigators expressed a desire to meet and interact with colleagues in the United States. The desire for interactions has already resulted in the preliminary linkage of the UCLA Brain Research Institute and the Institute of Higher

Publications Committee: *Chairman*, Paul C. Johnson; *Members*, Francois Abboud, John S. Cook, Melvin J. Fregly, and Stephen H. White. *Publications Manager*, Brenda B. Rauner; *Editorial Staff*, Laura North and Lorraine Tucker.

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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.

Headquarters phone: (301) 530-7164. TELEFAX: (301) 571-1844.

Nervous Activity and Neurophysiology in Moscow.

For individual physiologists, the opportunity to work with Soviet scientists began on November 1st as a result of the bilateral exchange agreement between the APS and Pavlov's All-Union Physiological Society. Members of APS wishing to invite a Soviet physiologist to their institution will now be eligible for assistance from the Society. Similarly, APS members will be able to visit physiologists in the U.S.S.R. as a result of invitations issued by Pavlov's All-Union Physiological Society.

The opportunities to provide assistance to our colleagues in developing countries are plentiful as a result of recent APS initiatives. Whether through the donation of books and journals or through direct interactions between physiologists, it is apparent that we are moving to reduce the barriers to productive interactions. Not only do we strengthen research institutions in developing countries through such efforts, but we also enhance our own research programs.

"Reach out and touch someone" by completing the form on page 168. Let's make it happen and work to strengthen the institutions in developing countries.

Martin Frank

Positions Available

There is a \$25 charge per issue for each position listed. A check or money order payable to the American Physiological Society must accompany the copy. Purchase orders will not be accepted unless accompanied by payment. Ads not prepaid will not be printed. Copy must be typed double-spaced and limited to 150 words. All copy is subject to the editorial policy of The Physiologist. EOAAE indicates Equal Opportunity/Affirmative Action Employer and appears only where given on original copy. Copy deadline: copy must reach the APS office before the 15th of the month, 2 months preceding the month of issue (e.g., before December 15 for the February 1987 issue). Mail copy to APS, 9650 Rockville Pike, Bethesda, MD 20814.



Recent Changes in NIH Peer Review System

Anthony Demsey

Division of Extramural Activities and Review Branch, NIDDK, NIH

The peer review system of the National Institutes of Health has been considered by many, for better or worse, to be immutable. However, recent internal studies have led to a number of experiments with the system, and these in turn have led to a number of changes in the way study sections do business. Furthermore, the experimentation with the system continues, and one can expect to see more changes in the future.

A major problem that has precipitated much of the desire for change has been "priority score creep." That is, over the years, priority scores (which go from 100 for the *best* approved applications to 500 for the *worst* approved applications) have been constantly improving. Thus, for example, the average score for successful (i.e., funded) applications has dropped from 188 to 148 over the past decade, and the median score of approved applications has gone from 238 to 193.

Some simply attribute this shift to the belief that, in general, applications are just getting better, and certainly they are. But most feel that this is not the *whole* answer. It has been suggested that study section members have to some degree been inflating the scores they give to applications in an attempt to give "their applications" a better chance for funding.

Regardless of the reasons, priority score creep has presented the applicants and NIH with a number of problems. As far as the applicant is concerned, he/she now has the very unsettling knowledge that only outstanding scores will receive funding. Also, because increasing numbers of applications are receiving essentially similar scores, it is becoming increasingly common to miss being funded by only a single priority score point. Consequently, applications that receive excellent priority scores are often the subjects of very emotional and detailed rebuttal letters in attempts by the applicants to gain a bit more of a "competitive edge" for funding.

Priority score creep presents problems to the NIH that are just as unsettling as those presented to the applicant. For example, having to make funding decisions among applications of essentially the same apparent quality on the basis of only one or two priority score points is of serious concern to Advisory Councils and Institute staff. This decision is further complicated when different study sections are behaving differently: an application that receives a 140 priority score in one study section may be equivalent to an application that receives a 160 priority score in another. How does one compare scores from study section to study section?

In response to these concerns, several Institutes at the NIH began using a percentiling system to modify the priority scores given by each study section. The percentile represents the relative position or rank of each priority score (along a 100.0 percentile band) among the scores assigned by the particular study section. If applications of each study section are assigned a numerical rank in ascending order of priority score, then the percentile equals 100/Ntimes the numerical rank, where N is the number of applications approved by the study section. The percentile is the same as the cumulative percent distribution of the scores for each study section and indicates the percent of applications with scores equal to or better than that particular application. For example, a percentile rank of 25.0 indicates that 25 percent of the applications approved by that study

section received equal or better scores. (Note that this is a reversal of the usual percentile interpretation in order to correspond to the NIH priority score rating system in which *lower* scores indicate better applications.)

Those NIH Institutes using percentiles to assist in making funding decisions might then set a percentile cut-off of, for example, the 30th percentile, meaning that, from study section to study section, all applications up to the 30th percentile would be considered for funding, regardless of the actual priority score numbers. Therefore, an application receiving a 140 priority score from one study section and an application receiving a 160 priority score from another study section would have an equal chance of being funded if they were both within the 30th percentile for their study sections.

A major decision was made recently by the Director of NIH that, beginning in FY89, *all* Institutes at the NIH would employ the percentiling system when making funding decisions. In practice this means that it is immaterial *what* scores study sec-

TABLE 1. Adjectival Descriptors

This application is

- (1.0) of the highest quality-really superb, wish I'd written it. Bravo!
- (1.1) really, really, outstanding.
- (1.2) a genuinely outstanding application, but not really, really, outstanding.
- (1.3) an outstanding application.
- (1.4) of very high quality. I liked it a great deal.
- (1.5) of very high quality. I liked it alot.
- (1.6) of very high quality. I liked it.
- (1.7) of high quality.
- (1.8) above above average; almost, but not quite of high quality.
- (1.9) detectably above above average.
- (2.0) above average in quality. Definitely so.
- (2.1) just barely misses being definitely above average.
- (2.2) truly above average, but not really *above* average, if you know what I mean.
- (2.3) just slightly above average, but definitely not much more than that.
- (2.4) a wee bit above average.
- (2.5) average. Dead center average. So-so as hell.
- (2.6) almost, but not quite, average.
- (2.7) a little bit below average.
- (2.8) more than just a little bit below average.
- (2.9) not really as good as average, but not quite *really* below average.
- (3.0) below average. Precisely, exactly, and unequivocally below average.
 - (3.5) substantially below average.
 - (4.0) way below average.
 - (4.5) pretty close to wretched.
 - (5.0) terrible, but with a hint of redeeming social or scientific merit.

Developed by Walter R. Gibbons during a stint on the Physiology Study Section, October 31, 1981.

tions give to applications they review so long as each study section remains internally consistent in its scoring behavior. Consequently, in conjunction with the mandate for universal use of percentiles, a number of operating procedures for study sections have undergone revision.

The most important concept that has been communicated to study section members is that since the raw priority scores they assign to applications are of little importance in making funding decisions, it would be helpful to "spread out" the scores, that is, make real distinctions in the quality among applications by using the full range (100 to 500) of priority scores. To assist in this endeavor, new and uniform adjectival descriptors are being applied to various, relatively broad regions of the scoring scale. For example, applications judged "outstanding" should receive scores from 100 to 150; applications that are "excellent" are between 150 and 200; etc. Study section members score applications in tenths (e.g., 1.5 = 150), and these are averaged and multiplied by 100 to give the customary three-digit priority score. Reviewers have been allowed to score to any tenth (e.g., 1.4, 1.5, 1.6). A recommendation that they begin scoring only in halves (1.0, 1.5, 2.0, etc.) has not been implemented because a study has shown no noticeable effect in outcome using halfdigit scoring.

The results after only one round of reviews (i.e., the October 1988 Council round) are significant. If the scores of all qualified study sections for this round are taken together and percentiled (this is known as the "all-DRG curve"), the 30th and 50th percentiles equate to priority scores of 186 and 239 respectively, as compared to 155 and 193 one round earlier. The important message for the applicant to understand is that a 180 priority score *this* round may be funded, while a 160 priority score *last* round may not have been.

In addition to priority score creep, another problem recently addressed is that of the increasing workload on NIH staff: the numbers of applications are increasing at a much faster rate than staff are being added. In addition, there is more and more demand for "accelerated review" of applications. Measures being considered to address these pressures include use of electronic mail/computerization, triage of applications, and shortened summary statements. The last two are the most controversial.

Triage is being used now to a limited degree by some Institutes in reviewing responses to Requests for Applications (RFAs) but promises to become more commonly used in the future. Triage is a process of screening out "noncompetitive" (not necessarily disapprovable) applications so that those applications would not require full peer review. This decision is generally made by a subset of the reviewers meeting prior to the meeting of the full initial review group, and an abbreviated "summary sheet" is sent to the applicant detailing why his/her application received less than full review. This is controversial because most applicants believe that submission of an application "entitles" them to a comprehensive review by their peers. and that this review is to be tutorial in the

sense of providing applicants with specific recommendations to improve their research projects.

While there are divergent positions on these two points, both outside and within the NIH, the legal and technical consensus of opinion is that the applicant is neither entitled to a review (unless the application will be funded, in which case review and approval are legislatively mandated) nor is he/she entitled to a tutorial (the study section members are consultants to the NIH, not to the applicant).

Obviously, the concept of a shortened summary statement is also controversial if one holds to the tutorial nature of peer review. Nevertheless, the NIH is experimenting in a number of study sections with "structured review." That is, study section members are asked to fill out a multipage "questionnaire" for each application they review, which asks for specific and relatively brief comments about major strengths and weaknesses, and for checka-box types of ratings (e.g., fair, good, outstanding) for a number of review criteria. The consequences of this type of review would hopefully be less work for the reviewers as well as less work for the NIH staff in preparing the summary statements, which should be much shorter and less detailed than before. Results of this experiment are due this winter.

The experimentation and changes just described demonstrate that the NIH does not consider the peer review system immutable. However, as change occurs, the overriding concern is that the changes do not compromise the quality of peer review.

Proposed Amendment to the Bylaws

Upon the advice of the Membership Committee, the Council recommends an amendment to the bylaws designed to extend the associate membership category to individuals residing outside the Americas. The bylaw amendment, which follows, will be voted on by the membership at the Spring Business Meeting scheduled for Wednesday, March 22, 1989, in New Orleans, Louisiana.

ARTICLE III. Membership.

Section 6. Associate Corresponding Members. Persons who are engaged in research in physiology or related fields and/or teaching physiology shall be eligible for proposal for associate corresponding membership in the Society provided they reside outside the Americas. Associate corresponding members may later be proposed for corresponding membership.

Section 67.

Section 7 8.

Section 8 9.

Section 9 <u>10</u>. *Nominations for Membership*. Two regular members of the Society must join in proposing a person for regular, corresponding, associate corresponding, honorary, associate or student membership....

Section 10 11.

Section 11 12.

APS Opposes Legislation Granting Standing to Animal Activists

Testimony of the American Physiological Society on House Resolution 1770, an Amendment to the Animal Welfare Act

Mr. Chairman and Members of the Subcommittee:

My name is Aubrey Taylor and I am chairman of the Department of Physiology at the University of South Alabama School of Medicine where I am actively involved in medical education and cardiovascular research. Today, however, I am here as president of the American Physiological Society, which is the nation's senior medical sciences society and whose membership of 6,600 includes Nobel laureates and members of the National Academy of Sciences.

The American Physiological Society opposes House Resolution 1770, which, if enacted, would amend the Animal Welfare Act to allow any citizen to file a civil suit against the U.S. Department of Agriculture for any alleged failure to enforce the Animal Welfare Act. The Society's testimony in opposition to H.R. 1770 is endorsed by 17 national associations and societies of the medical sciences. The names of the 17 are appended to this statement.

The Society's opposition is based on the grounds that enactment of this amendment will without doubt lead to a general disruption of research involving laboratory animals and clinical education programs requiring the use of animal models.

Animal research has made possible major scientific advances that have led to the treatment, cure, and prevention of disease and trauma afflicting both humans and animals. It is estimated that more than onethird of the people in the world born since 1950 are alive today because of modern research, most of which was done with the use of animal models. And a greater number of pets and farm animals are alive today because of that same research.

The sole purpose of H.R. 1770 is to legislate what the courts have refused to do for nearly a decade: the granting of judicial standing to the advocates of animal rights. Since 1981 the courts have contin-



Left to right: Rep. Barney Frank (D-MA), chairman of subcommittee; Rep. Howard Coble (R-NC); committee staff person; Aubrey Taylor.

ually denied antivivisectionist organizations and individual animal activists the right to file civil suits on behalf of animals. Moreover, the U.S. Supreme Court in April 1987 upheld the decisions of the lower courts that these organzations and individuals lack standing, which is the recognition granted by the courts to private citizens or organizations as plaintiffs with legally protectable and tangible interests at stake in litigation.

In its decision to deny standing the U.S. Court of Appeals said that allowing animal advocates to bring suit "... might open the use of animals in biomedical research to the hazards and vicissitudes of courtroom litigation. It may draw judges into the supervision and regulation of laboratory research. It might unleash a spate of private lawsuits that would impede advances made by medical science in the alleviation of human suffering."

The Society agrees with the reasoning of the appeals court and believes that the same reasoning applies to H.R. 1770 despite the implied caveat that the proposed amendment does not authorize suits against universities, research facilities, or any other alleged violator of the Animal Welfare Act. The truth of the matter is that universities and research facilities would be involved in any litigation because any legal action charging a lack of enforcement of the Animal Welfare Act can only be based on allegations of noncompliance by the regulated facility.

A suit against the U.S. Department of Agriculture is in reality a suit against the regulated facility, thus forcing the facility to invest time and money in its defense of allegations of noncompliance. This is in addition to the Department's expenditures of its already scarce resources for its defense of allegations of failing to enforce provisions of the Animal Welfare Act.

Moreover, such suits would be counterproductive in assuring the public and the Congress that animal welfare standards are being met because there would be fewer inspections of animal facilities inasmuch as the inspectors of the Animal and Plant Health Inspection Service would be tied down by the judicial process.

Among the questions raised by H.R. 1770 are

• Does the amendment create a conflict with the separation of powers policy in that it would give the courts the power to conduct executive branch functions?

• How does a court decide whether an inspector did his or her duty when such duties are largely discretionary and frequently are based on professional judgments?

The Society believes that it is a function of the executive branch to assure the public that federal agencies are doing their jobs and that it is a role of Congressional appropriation committees to review each agency annually as to job performance and to determine whether more or fewer funds and personnel are needed.

The agency at issue here is the Department of Agriculture's Animal and Plant Health Inspection Service (APHIS), which is charged with the enforcement of the Animal Welfare Act. What must be noted is that the Administration has tried annually to reduce APHIS' functions by requesting a reduction of funds, but each year the

Presented by Aubrey E. Taylor, Ph.D., before the U.S. House of Representatives Judiciary Committee's Subcommittee on Administrative Law and Governmental Relations, September 16, 1988.

scientific community and the antivivisectionists have joined together in support of APHIS and to ask for increased funding for its enforcement program.

Furthermore, APHIS' record for enforcement, by and large, is good considering it has a budget of only \$6 million to conduct annual inspections of more than 8,000 facilities. It is a matter of common accord among both the scientists and the antivivisectionists that a budget of at least \$10 million would expedite greatly APHIS' ability to fulfill the charge mandated by the Congress.

A stated intent of the Congress is to assure the public that animals are treated humanely. The Animal Welfare Act provides such assurances because it includes safeguards at both the national and local of evaluation in assuring the proper usage and handling of laboratory animals.

Of concern to animal research institutions is what effect the amendment, should it become law, will have on the institutional animal care and use committees inasmuch as the language in H.R. 1770 states "... any person or persons charged with the duty by statute or regulation to enforce the provisions of the Act ... " are liable for civil action. Since the local committees are required by statute and, therefore, required to enforce provisions of the Act, these committees would be involved in any litigation alleging noncompliance. Thus, the intent of the Congress to provide local monitoring of animal research facilities will be greatly weakened because many gualified individuals-from both the



Aubrey Taylor testifies before Judiciary Committee of U.S. House of Representatives.

levels. At the national level the Act sets the standards for animal welfare and APHIS provides external inspections to verify the animal facility's compliance with federal regulations and to define what may be needed to upgrade the facility.

Safeguards at the local level were established in 1985 when the 99th Congress amended the Act to require all animal research facilities to have an institutional animal care and use committee. These local committees, which also include public members, are charged with conducting at least two inspections a year of the institution's animal facilities, approve all projects involving the use of animals, and monitor the institution's use of animals.

All matters concerning animal usage are evaluated by the local committee on a regular basis and no investigator can use an animal in a research program unless the research has been approved by the committee. Moreover, no federal grant is reviewed without prior approval of this committee concerning animal usage, and, as a matter of fact, the federal grant review committee also serves as yet another line institution and the public—will decline to serve on a local committee to avoid a possibility of being involved in litigation.

It is the considered opinion of the American Physiological Society that the enactment of H.R. 1770 would soon erode the many strides made by the Congress to assure the public that laboratory animals are treated and cared for humanely. The work of both the institution's researchers and the APHIS inspectors also will be lost their time unsurped by litigation—and important animal research will be halted.

The grating to antivivisectionist organizations and animal activists the right to file civil suits on the behalf of animals will without doubt lead to an increased number of break-ins of research facilities by covert antivivisectionists searching for documents and evidence in which to base charges of failure to enforce the Animal Welfare Act. It should be noted that since the establishment of institutional animal care and use committees, charges of laboratory animal mistreatment have been proven, by and large, to be unfounded after investigation by federal authorities. Lastly, the Society believes there is no justification to enact a law that adds to an overburdened court system since both national and local safeguards are in place and are working effectively. Civil suits asking a judge and/or jury to consider and rule upon discretionary judgments made by qualified individuals and scientists are not justified and will increase significantly the judicial caseload.

House Resolution 1770 is one of several efforts before the Congress in the last eight years aimed at restricting the use of laboratory animals for purposes of research and clinical education. Should Congress grant private citizens the privilege to file civil suits on behalf of animals, then the opinion of the U.S. Court of Appeals may be most prophetic in that "It [standing] may draw judges into the supervision and regulation of laboratory research. It might unleash a spate of private lawsuits that would impede advances made by medical science in the alleviation of human suffering."

Mr. Chairman, I thank you for allowing the American Physiological Society this opportunity to share its views with you and your colleagues and I will be pleased to answer any questions you or the members of the committee may have at this time.

The following national associations and societies in the medical sciences have endorsed the testimony of the American Physiological Society concerning H.R. 1770, an amendment to the Animal Welfare Act.

American Association of Immunologists American Heart Association American Institute of Nutrition American Pediatric Society American Psychological Association American Society for Cell Biology American Society for Microbiology American Society for Pharmacology

and Experimental Therapeutics American Society of Animal Science Association of American Medical Colleges Association of Chairmen of Departments

of Physiology Association of Medical Schools

Pediatric Chairmen Association of Professors of Medicine Federation of American Societies

for Experimental Biology

Federation of Behavioral, Psychological, and Cognitive Sciences

Society for Neuroscience Society for Pediatric Research

APS/FASEB 1989 Spring Meeting Symposia Preview New Orleans, LA March 19–23, 1989

Myocardial Function in Shock and Sepsis

Chair: F. L. Abel and H. R. Adams. *Speakers*: F. L. Abel, R. D. Goldfarb, M. L. Hess, M. S. Liu, S. B. Jones, and H. R. Adams.

This symposium will focus on the function of the heart in shock, both septic and endotoxin shock. This area has become relatively well defined in the past 10 years after much early work that suggested that this type of shock was associated a direct myocardial depression by means of circulating substances or other undefined mechanisms. Although still somewhat controversial, most workers agree that there is a direct depression of the myocardium, probably because of a reduction in coronary blood flow. The exact mechanisms involved are not completely understood; this symposium will focus on alterations in the sarcoplasmic reticulum, alteration in phospholipase and phosphorylation in the myocardial membrane and the role of beta-adrenergic receptors and adenylate cyclase. Specific attention will be given to the necessary methods of evaluating function to see the depression during states of altered afterload, heart rate and preload.

Identification, Regulation, and Molecular Biology of Epithelial NaCl Transporting Proteins

Chairs: M. Donowitz and G. W. G. Sharp. Speakers: M. Donowitz, G. W. G. Sharp, D. J. Benos, H. F. Lodish, P. Aronson, and J. Pouyssegur.

The purpose of the symposium is to present what is known about epithelial Na and Cl absorbing proteins as far as their regulation, identification, and molecular biology. Common structures, regulation, and molecular biologic definitions may demonstrate that there are some similarities as well as differences in the proteins used to transport these ions in epithelia. Most information is known about regulation, next about identification, and least about molecular biology, and it is hoped that this symposium will help this field truly charge into the molecular biologic ear.

G Proteins and Ionic Transport

Chair: A. M. Brown. *Speakers:* A. M. Brown, L. Limbird, T. K. Harden, H. Hamm, and F. Belardetti.

There have been great advances made recently in our knowledge of how guanine nucleotide binding, or G proteins, regulate ionic transport during signal transduction. This symposium gives a broad contemporary presentation of the subject by experts with the leading research programs in the field. Heidi Hamm will describe her recent work on receptor–G protein sites of interaction. Lee Limbird will provide an overview, including G protein coupling to adenylyl cyclase, and will discuss her work on alphaadrenoceptors and Na⁺/H⁺ transport and the possible coupling by G proteins. Arthur M. Brown will deal with ionic channels, and, between him and Limbird, the two modes of membrane ionic transport carriers and channels will be discussed. Ken Harden will discuss receptor coupling to phospholipases and the cellular second messengers involved in this pathway, and Francesco Belardetti will deal with coupling via phospholipase A2 and the arachidonic acid pathway.

Congestive Heart Failure: Molecular Mechanisms and the Rationale for Inotropic Intervention

Chair: N. Alpert. Speakers: To be Announced.

The presence of congestive heart failure significantly increases the probability of death. Although major advances have been made in addressing the curable etiology, correcting amenable risk factors or treating the symptoms, once congestive heart failure develops, a substantial number of patients do not respond to the interventions. This suggests that the fundamental nature of the myocardial problem is incompletely understood.

In congestive heart failure the cardiac output is inadequate to meet the metabolic needs of the peripheral tissues. The depression may result from alterations in ejection or filling. In this day-long symposium, two aspects of the problem are addressed: 1) the fundamental nature of the problem resulting in depressed performance and 2) the targets for inotropic intervention.

The symposium is designed to address the important questions of the causes of congestive heart failure and potential ways for improving the performance of the failing heart.

The Cardiac Gap Junction Channel: From Protein to Pathologies

Chair: J. M. Burt. *Speakers:* J. M. Burt, E. C. Bayer, D. C. Spray, R. Weingart, J. Jalife, and L. Leinwand.

Conduction of the electrical impulse from cell to cell in the heart occurs via the gap junction. The structure, gating behavior, and regulation of the individual channels that compose the gap junction and the impact of abnormalities in these properties of the channel at the level of the intact heart are the subjects of this symposium. The primary sequence of the protein and its possible conformation within the membrane will be discussed and comparisons to other gap junction proteins made. Sensitivity of channel gating to the membrane lipid environment will be explored and results discussed in terms of ischmeia and arrhymogenicity. Regulation of channel gating by second-messenger pathways and receptor coupling to these pathways will be discussed. Propagation from cell to cell within the ventricles is characterized and its dependence on altered gating behavior examined. The role of gap junctions in generation of arrhythmias and other pathologies of the heart will be discussed.

The participants will share, in the context of the symposium and in informal meetings before and after the symposium, their latest data and discuss in global terms possible directions for future research. The mixture of basic and clinically trained scientists, and scientists with broadly diverse approaches to the same set of questions, which the participants represent, should create an exceptional environment for discussion. The participants will benefit by widening their horizons with respect to their understanding of cardiac function and the importance of gap junction channel function to cardiac function.

Regulation of Renal Cellular Function and Signal Transduction

Chairs: W. S. Spielman and D. Ausiello. *Speakers:* W. S. Spielman, D. Ausiello, K. A. Hruska, T. Dousa, and W. L. Smith.

This symposium deals with signal transduction pathways in renal cells. Topics include interactions among receptors, second messengers, and protein phosphorylation as the relate to endocrine, paracrine, and autocrine effectors of renal cellular transport function.

Integrative Factors in Gut Function

Chair: S. K. Sarna. *Speakers*: S. K. Sarna, S. F. Phillips, H. Cooke, N. W. Read, D. N. Granger, P. R. Kvietys, and K. H. Soergel.

Gastrointestinal physiologists have somewhat artificially isolated themselves into groups dealing with intestinal motility, transport, and blood flow. However, the gut requires all these for its normal function. Furthermore, all three major functions are closely interrelated. For example, adequate absorption of nutrients, electrolytes, and water could not occur if there is a motility disorder because there may be too much or too little exposure of the contents to the mucosa. Efficient propulsion could not occur if the gut wall is not adequately lubricated or if the viscosity of the luminal contents is too high or too low. Likewise desired changes in secretion or absorption may not be accomplished without a corresponding change in blood flow to the gut or a part of it. Not only that but each one of the

major gut functions may act to compensate another function in case of a disorder. For example, in the presence of excessive secretion in a pathologic state, the motor activity may attempt to slow down intestinal transit to allow more time for absorption. On the other hand, in the presence of undesirable substances in the lumen, increased secretion and giant migrating contractions may both coordinate to effectively and quickly get rid of it. Because of a lack of understanding and interaction between subdisciplines in gastrointestinal physiology, these questions have not been investigated so far. However, we all know for a fact that in several types of diarrhea intestinal transport, blood flow and motility play a major role.

Keeping this in mind, the symposium will have a multidisciplinary participation. The objectives will be 1) to acquaint the investigators in other sections with basic concepts of each discipline; 2) to provide an in-depth understanding of the primary control mechanisms of each function; and 3) to unify the concepts of each section by considering a diseased state such as diarrhea.

The Proximal Tubule Interaction With the Renin-Angiotensin System

Chair: L. G. Navar. Speakers: L. G. Navar, R. Blantz, K. D. Mitchell, M. C. Cogan, J. R. Douglas, and J. R. Ingelfinger.

This symposium focuses on the interactions of the renin-angiotensin system with the proximal tubule. Topics range from effects of both extra- and intrarenally formed angiotensin on proximal tubule reabsorption and on the Na/H exchanger to intracellular actions and the molecular biology of proximal tubule renin-angiotensin system.

Receptor Mechanisms in the Development of Respiratory Control

Chair: J. P. Farber. *Speakers*: J. P. Farber, J. T. Fisher, O. P. Mathew, D. F. Donnelly, E. M. Mulligan, and M. A. Hanson.

Respiratory output depends in part on chemoreceptor and mechanoreceptor feedback to the respiratory areas of the brainstem. In recent vears research has revealed that the newborn mammal often generates substantially different rates and patterns of action potentials during chemoreceptor and mechanoreceptor stimulation when compared with adults; such results suggest that transduction properties of receptors can differ substantially between young and adult animals. In addition, influences of such receptors on nervous system functions are often changed during development. This symposium will bring together investigators who will discuss important recent data from newborn and developing mammals concerning 1) stimulusresponse relationships for mechanoreceptors of the lungs and upper airway; 2) termination of fibers from upper airway receptors in the medulla; and 3) the responses of carotid body chemoreceptors to hypoxia and other stimuli.

This session will provide a forum to discuss how changes in afferent imformation might contribute to maturation of respiratory reflexes and responses. Since relatively few receptor systems have been analyzed longitudinally during development, this session will interest individuals who are concerned with processes of maturation in the nervous system.

Bronchial Circulation in Lung Edema

Chair: J. Butler. *Speakers*: J. Butler, A. Taylor, J. Hogg, S. Lakshminarayanan, N. Charan, J. Widdicombe, and N. Staub.

Pulmonary edema is an important clinical problem that continues to fascinate physiologists in the pulmonary, cardiovascular, electrolyte, and fluid exchange disciplines; it also has relevance to exercise and high altitude physiology. Much has been learned about the role of the pulmonary circulation in lung edema. However, the role of the bronchial circulation in forming inflammatory edema and in reabsorbing it has only recently been appreciated. There are now many groups interested in studying the bronchial circulation, and this symposium will allow them to discuss the techniques that have been developed for the very difficult measurements of flow and edema in the lungs and give an opportunity for other groups to appreciate recent advances in lung and airway vascular fluid fluxes.

People and Ideas in Endocrinology

Chair: S. M. McCann. *Speakers:* S. M. McCann, G. F. Erickson, J. Tepperman, H. Rasmussen, J. Roth, and A. J. de Bold.

The idea for this symposium grew out of the recently published book *People and Ideas in Endocrinology*, which has traced the development of ideas and important areas of progress in a number of areas of endocrinology. The present symposium is not all inclusive because of the limitations of time but will examine the development of the ideas and concepts in endocrinology in the following areas:

1. The Saga of the Hypothalamic Releasing and Inhibiting Hormones

2. Endocrine Function of the Ovary

3. A View of the History of Biology From an Islet of Langerhans

4. Mechanism of Hormone Action

5. Development of Our Ideas of Hormone Receptors

6. Atrial Natriuretic Factor: A Hormone From the Heart

The area of endocrinology has been one of the most dramatically developing areas in all of physiology, and it is hopeful that this symposium will show the development of the main concepts in the field.

This symposium should be of considerable interest to drug companies in view of the fact that considerable practical application has been made of many of these hormones. For example, the atrial natriuretic peptides that are covered in the final talk by Dr. de Bold have encouraged much work in the industrial sector and the expenditure of massive amounts of funds. There has been practical spin-off in the area of the releasing hormones, the most important example of which would be LHRH, which is probably the treatment of choice for metastatic protatic cancer and also can be utilized to enhance and inhibit fertility. There are many important examples with other hormones. Obviously, this symposium has wide basic, clinical, and practical significance.

Recent Advances in the Physiology of Vascular Endothelium

Chair: S. C. Silverstein. *Speakers:* S. C. Silverstein, J. Harlan, J. Pober, D. Stern, J. Schnitzer, and P. van Houette.

Vascular endothelium can be viewed as a linear organ system positioned at the interface between the blood and the tissues. The endothelial cells that comprise this organ regulate and participate in a number of physiologically important pathways. Recent studies show that these cells play a central role in controlling leucocyte traffic, in the assembly and lysis of blood clots, in the transport of albumin and other blood proteins into the extravascular compartment, and in the control of vascular tone and permeability to water and ions. Endothelial cells also function as antigen-presenting cells and as targets for cytokines and for mediators of immunopathology. Participants in this symposium have made important contributions to our understanding of endothelial cell function and describe the current state of knowledge in each of these rapidly advancing areas.

Regulation of Synthesis of Membrane Transporters

Chair: A. A. McDonough. *Speakers:* A. A. McDonough, G. Mandel, L. Y. Jan, M. Hediger, and K. Geering.

The APS has, at recent meetings, made efforts to inform and instruct their members about recent techniques in molecular biology through workshops and lectures. This symposium, which illustrates the application of such techniques, will examine the regulation of various membrane transporters at the molecular level. Included are talks concerning Na⁺-K⁺-ATPase assembly and regulation, expression and regulation of two ion channels, and regulation of the sodium/glucose cotransporter. These membrane transporters are of central importance to the housekeeping or specialized functions of epithelial tissues such as kidney and intestine, as well as excitable tissues such as nerve and muscle. The synthesis and regulation of these transporters undoubtedly share common elements. By bringing together investigators from diverse backgrounds to present their work, these common elements may emerge and will be recognized to be of general importance to membrane transporter regulation.

Human Colonic Fermentation of Dietary Carbohydrate: Physiological, Nutritional, and Clinical Implications

Chair: C. L. Kien. Speakers: C. L. Kien, J. H. Cummings, M. D. Levitt, J. A. Perman, and R. D. Murray.

Colonic bacterial fermentation of carbohydrate is relevant to the following areas of human physiology and nutrition: energy balance and lactose utilization by the premature infant; lactose intolerance; relationship of fiber intake to the risk of coronary heart disease and colon cancer; the effects of complex carbohydrate and/or fiber enriched diets to glucose tolerance, hypertriglyceridemia, and hypercholesterolemia; nutrition of the colon epithelia; and transport of electrolytes and water in the colon. This symposium will bring together, as speakers and audience participants, scientists interested in fermentation from a variety of perspectives. It is hoped that the interactions resulting from this symposium will enhance research activity in this field. The symposium will address the following: dietary carbohydrate utilization and fermentation in the colon and its relationship to health and energy balance; breath hydrogen testing and lactose intolerance; lactose assimilation in the premature infant; and effects of fermentation products on colon function.

Endothelial Barrier Function

Chair: A. B. Malik. Speakers: A. B. Malik, F.-R. Curry, J. A. Cooper, G. E. Palade, P. N. Belloni, and J. L. Madara.

This symposium will deal with newer aspects of endothelial barrier function. Specific issues to be addressed will include the mechanisms of albumin transport across the endothelium, i.e., the contribution of receptor mediated albumin transport. Data relating to receptors on the endothelium that may be involved in albumin transport will be discussed. Other presentations will deal with mode of transport of water across the endothelium; in particular, the contribution of "fiber matrix" in transendothelial water transport and the regulation of endothelial hydraulic conductivity by the interaction of albumin with endothelial components will be discussed. The regulation of zonula occluden structure and permeability may be integrated to epithelial transport processes and may be regulated by intracellular messengers and alterations in cytoskeletal elements. The concept of paracellular transport across the epithelial barrier will also be discussed in light of these new data.

Functions of the Purine Nucleotide Cycle in Skeletal Muscle

Chair: R. L. Terjung. Speakers: To Be Announced.

This symposium will consider the functions of the purine nucleotide cycle in skeletal muscle. This will include a development of the basic sequence of reactions, applicability of the enzyme control features determined in vitro to the functions of the purine nucleotide cycle reactions in contracting muscle in vivo. Evaluation of AMP deamination during contractions in normal individuals and patients with AMP deaminase deficiency, differences between skeletal muscle fiber types, and the influence of adaptations in aerobic capacity on the process of AMP deamination will be presented. Critical evaluation of the evidence, obtained primarily with the use of metabolic inhibitors, assessing the function of the sequential reactions of the purine nucleotide cycle in active muscle will be considered. The molecular bases for AMP deaminase deficiency in humans will be developed.

Function and Modulation of Glutamate Receptors

Chair: E. Costa and D. Choi. *Speakers:* E. Costa, D. Choi, M. L. Mayer, S. Vicini, and D. Lodge.

Excitatory amino acids operate various types of receptors in the CNS. In some receptors signal transduction is operated by the opening of highconductance cationic channels; in others the opening of low-conductance cationic channels transduces the signal. Still in other glutamate receptors the signal transduction occurs via the activation of phosphatidyl inositol turnover, which determines a cascade of events including activation and translocation of protein kinase C and the expression of nearly induceable genes. Both metabolotropic and inotropic receptors are regulated allosterically by positive and negative modulators. The physiological role of these mechanisms and their pharmacological implications will be discussed. Brain ischemias cause edema and prolonged unregulated release of glutamate, which may be responsible for delaved neurotoxicity including neuronal death. It will be discussed as current knowledge can help devise therapeutic mechanisms to limit postischemic neuronal damage.

Genetic Determination of Ingestive Behavior

Chair: D. A. Denton. Speakers: D. A. Denton, A. Epstein, D. J. Ramsay, P. Rozin, J. Schulkin, and G. de Caro.

Survival of an organism is directly determined by the capacity to select and ingest nutritious substances and to reject materials that are poisonous. The former process involves choice of food appropriate to the metabolic constitution of the species. As well as this, animals have an elaborate organization of introreceptors and brain sensors that detect deviation from constancy of the milieu interieur and generate hunger, thirst, or specific appetite for a particular substance (e.g., sodium), of which the creature is depleted. Collateral mechanisms contrive that intake is quantitatively appropriate in the face of the need that generated the appetite.

These vegetative systems controlling ingestion, like those of sex and maternal behavior and temperature regulation, are subserved by complex genetically programmed neural circuitry in the hypothalamus. Major elements of the behavior are innate, and there is also facilitated propensity to learn.

The symposium will reflect some of the great advances in this field in the past 5-10 years and, no doubt some of the large gaps in present knowledge will also emerge.

Sexual Dimorphism in Regulation of Blood Pressure and Water and Electrolyte Homeostasis

Chair: L. Share. *Speakers*: L. Share, W. E. Stumpf, J. T. Crofton, M. D. Lindheimer, D. Ganten, P. W. Ramwell, and C. Baylis.

Although there are important sex-related differences in cardiovascular function and water and electrolyte homeostasis, e.g., the incidence and severity of many forms of hypertension, the cardiovascular responses to some vasoactive agents, osmoregulation, and the disposition of a salt load, this subject has not received widespread attention. Recent developments make this symposium timely for the stimulation of research in this area. The following topics will be discussed: 1) the significance for cardiovascular and body fluid regulation of estrogen and androgen receptors in blood vessels, heart, and centers of the brain involved in cardiovascular and body fluid regulation, 2) sex-related differences in control of secretion of vasopressin and its actions, 3) osmotic regulation in pregnancy, 4) implications of sex-related differences in the peripheral and brain renin-angiotensin systems for cardiovascular regulation and hypertension, 5) sex-related differences in renal hemodynamics in health and disease, and 6) sex-related differences in EDRF activity.

Physiological Mechanisms of Hypertonic Resuscitation

Chairs: G. C. Kramer and C. E. Wade. *Speakers:* G. C. Kramer, C. E. Wade, R. J. Mullins, M. Rocha e Silva, Jr., G. L. Navar, and T. E. Pisarri.

Hypovolemia with associated circulatory shock remains a common life-threatening complication in critically ill patients. Recent research from several laboratories has shown that very small volumes of hypertonic saline/hyperoncotic colloid formulations rapidly normalize cardiovascular function in hemorrhaged animals and humans. The remarkable effectiveness of these regimens appears to result not only from osmotically induced fluid movements but also from other direct and reflex effects of hyperosmolality. There is substantial evidence that in addition to rapid vascular volume expansion the infusion of hypertonic saline increases cardiac contractility and promotes a brisk diuresis/natriuresis. More controversial is the importance of hypertonic-induced hormonal changes, redistribution of cardiac output, stimulation of pulmonary osmoreceptors, and reflex-induced changes in venous capacitance. This symposium brings together cardiovascular, renal, neural, and endocrine physiologists to present different views on the dominant physiological mechanisms of hypertonic saline resuscitation.

Cellular and Molecular Aspects of Growth and Contractile Activity in Vascular Smooth Muscle

Chair: R. C. Webb. *Speakers*: R. C. Webb, N. E. Owen, K. G. Owens, B. C. Berk, M. S. Sturek, C. Rembold, J. D. Johnson, and D. F. Bohr.

The purpose of this symposium is to provide a forum for interaction between two subspecialties in the area of vascular smooth muscle physiology. The two subspecialties to be featured are 1) growth regulation and 2) contractile mechanisms. Further, the symposium will bring together young investigators in the United States who are placing their research energies into understanding these two subfields at a cellular and/or molecular level. Each participant tends to be an expert in one or the other subspecialty, yet because each process is part of an integrated cellular system it is essential that the investigator be informed about current research on the other component. Another rationale for this symposium is that the pathophysiology of vascular smooth muscle in hypertension, atherosclerosis, and several other disease states involves both a growth response and a change in contractile function in the blood vessel wall. Thus this symposium will provide an examination of current knowledge about basic cellular and molecular events that underlie the biology of vascular smooth muscle. This topic has general appeal since smooth muscle physiology overlaps research areas related to respiration, reproduction, and gastrointestinal physiology.

Membrane Mechanisms of Ischemic Brain Damage

Chair: E. M. Nemoto. *Speakers*: E. M. Nemoto, D. F. Wilson, N. G. Bazan, G. Y. Sun, L. Horrocks, P. Kochanek, M. Ginsberg, and M. Spatz.

Rapid liberation and accumulation of free fatty acids (FFA) during brain ischemia of up to one hour duration has led to the hypothesis that it reflects the evolution ischemic brain damage. The liberation and accumulation of FFA during cerebral ischemic insults poses at least threefold threat to neuronal recovery: 1) components severely compromise membrane function; 2) FFA such as 20:4 and 18:3 with detergent-like effects on cell membranes may directly disrupt or inhibit membrane function; and 3) arachidonic acid (20:4) serves as a precursor for prostaglandins and leukotrienes, potent hormones that may adversely affect neuronal recovery. Elucidation of the mechanisms and sources of FFA liberation during ischemia and other cerebral insults could provide important insights into the membrane defects leading to membrane dysfunction as well as means of preventing or repairing such defects. Subcellular differentiation of the mechanisms and sources of FFA liberation and membrane degradation could explain why synaptic transmission appears more vulnerable to ischemic damage than mitochondrial oxidative phosphorylation. Thus the ultimate goal of this symposium is to obtain a consensus of opinion on from where and how these FFA are being liberated, the secondary detrimental consequences of their liberation, and how these changes in the membrane might be reflected in membrane function.

Biologic Responses to Prolonged Increase in Circulating Atrial Natriuretic Factor

Chair: N. C. Trippodo. *Speakers*: N. C. Trippodo, J. P. Granger, J. E. Hall, S. E. Kaufman, J. P. Koepke, and B. A. Scoggins.

The atrial natriuretic factor (ANF), a peptide hormone secreted by the heart, has a number of actions when administered for the short term that appear to be aimed at lowering cardiac filling pressure. These hormonal, renal, and circulatory actions, if persistent, could have profound influences on the long-term regulation of body fluids and arterial pressure. Possible important physiologic actions of ANF mediated through modulation of long-term regulatory systems can only determined through experiments based on the continuing effects of ANF. It is likely that several different approaches will eventually be required to ascertain a complete understanding of the long-term physiologic actions of ANF, including experiments designed to blunt the release of the hormone, "immunoneutralize" endogenous ANF, or inhibit the actions of the circulating peptide. The studies in this symposium were aimed at determining the biologic actions of prolonged elevations of circulating ANF. This was accomplished by infusing the synthetic peptide, by slowing the metabolic clearance of ANF or by prolonged stimulation of endogenous release of ANF.

The Influence of Temperature on Muscle and Locomotory Performance

Chairs: L. C. Rome and A. F. Bennett. *Speakers:* L. C. Rome, A. F. Bennett, J. C. Montgomery, R. Woledge, E. D. Stevens, R. L. Marsh, and J. A. Faulkner.

Temperature is an environmental variable that has a great influence on physiological function. Over the past 10 years there has been considerable work done on the influence of temperature on muscle mechanics, muscle energetics, locomotory energetics, locomotory performance, and nervous function. Important generalizations are coming out of the work and this symposium represents the first opportunity to discuss these generalizations and for scientists from different disciplines to share their perspectives.

This meeting will also be coordinated with a smaller symposium to be held at the International Union of Physiological Sciences meeting in Helsinki. To insure intellectual links between the symposia, the manuscripts from both will be published together in the *American Journal of Physiology*.

Debate: ANP Plays a Significant Role in Body Fluid Homeostatis

Moderator: G. F. DiBona. Pro: E. H. Blaine; Con: K. L. Goetz.

Atrial natriuretic peptide (ANP) produces a diuresis and natriuresis when appropriately administered to animal and human subjects. The secretion and plasma concentration of ANP appears to be regulated by the level of atrial pressure when this is manipulated by alterations in dietary sodium intake and intravascular (cardiopulmonary) blood volume. These findings have given rise to the hypothesis that ANP plays a significant role in body fluid homeostasis by mediating the appropriate renal excretory response to a change in body fluid volume. The evidence concerning this hypothesis has been conflicting. In this session, a debate format will be used to critically analyze the published evidence for and against the hypothesis. In addition, there will be short presentations concerning more recent observations supporting or refuting the hypothesis. There will be an opportunity for questions from the audience. It is hoped that this format will provide a timely and critical assessment of the hypothesis.

Debate: Is Nitric Oxide EDRF?

Moderator: H. Kontos.

Debate: Is Myocardial Hypoxia Necessary for Coronary Blood Flow Regulation?

Moderator: R. Olsson.

Debate: The Morass of Terminology in Gastrointestinal Motility and Electrical Activity

Moderator: R. W. Summers. Participants: N. W. Weisbrodt, K. M. Sanders, and S. K. Sarna.

Terminology is often a highly complex and difficult problem in biology. In the field of gastrointestinal motility, nomenclature has evolved in an erratic and highly individual fashion. Scientific writers describe their observations from unique perspectives based on organ, species, recording technique differences or scientific disciplines. Failure to address this situation causes confusion and misunderstanding for the neophyte and the experienced investigator. On the other hand, terminology cannot be legislated; it evolves out of consensus and common usage, changes in technology, and enhanced understanding of basic mechanisms.

This point/counterpoint discussion will not be a true debate but after an introduction of the problem, three speakers will discuss their individual points of view on how the problem of terminology might be addressed.

Debate: Accommodation of Increased Pulmonary Blood Flow: Recruitment Versus Distension

Moderator: A. E. Taylor. Recruitment: S. Permutt; Distension: J. B. West.

For many years, pulmonary physiologists have been aware that when either pulmonary arterial (P_{pa}) or venous (P_{pv}) pressures are elevated, pulmonary vascular resistance decreases. This finding is seen clearly in Zone III blood flow conditions in the upright lung $(P_{pa} > P_{pv} >$ P_{pa1}) because the pressure gradient between P_{pa} and Ppv is constant, but flow increases. S. Permutt will present convincing arguments that blood vessel recruitment causes increased blood flow while J. West will present equally convincing arguments that blood vessel distension increases blood flow. Meanwhile, A. Taylor will try to referee this evenly matched contest. After each discussant has an initial but lengthy turn, they will then be given an additional short time in which to rebut the other's opinion. This portion of the debate is designed for audience participation since this is where the gloves come off and cheers and cat calls from the audience are allowed! Finally, the audience will be asked to join in the fray with their opinions and nasty questions. So, roll up your sleeves and join in the barroom brawl that is likely to be precipitated by Drs. West's and Permutt's lively debate, and Dr. Taylor, who will hide under a nearby table, will try and orchestrate this event in the finest tradition of a John Wayne movie filmed in old New Orleans.

Tutorial: Using the Microcomputer in the Classroom

Faculty: H. Modell and S. Robinson.

The thrust of most computer-based educational efforts is aimed at interaction between one to three studients and one computer or terminal. In practical terms, however, broad application of these approaches must wait until a critical mass of computers with appropriate software is available for classrooms at all educational levels. The computer, in conjunction with large screen video output, can also serve, however, as a valuable tool in providing an active learning experience to students in a group setting. In these applications, multiple machines are not necessary. This session will explore the potential of using one computer as a presentation and feedback device to promote an active learning environment in the classroom or lecture hall.

Fractal Description of Bio-Medical Systems (BMES)

Chair: J. E. McNamee. *Speakers*: J. E. McNamee, J. B. Bassingthwaighte, B. Onaral, A. Goldberger, and B. J. West.

Mathematics provides precise and concise descriptions of physical systems. Living systems

can also be described with mathematical rigor. Biological systems, however, often defy the descriptive power of mathematics. Irregular and quasi-periodic events are poorly characterized by traditional mathematical expressions. Fractal geometry is a new branch of mathematics that describes the result of repeated division or the process of self-similar replications. Like fractal shapes, biological systems are composed of bits and pieces whose form is repeated many times on several different scales. These forms can be the branching pattern of blood vessels or the temporal pattern of a membrane potential. Examples of natural phenomena that clearly exhibit fractal properties include the surfaces of subcellular organelles, the electrocardiogram, and the distribution of blood flow in microvascular beds.

This symposium gathers experts who have applied fractal mathematics to the interface between physical and biological systems. Their goal is to obtain a new understanding of the structure, function, and disfunction of living systems. The aims of the symposium are to illustrate the application of fractal mathematics and geometry to living systems. to demonstrate common properties shared by diverse biomedical systems, and to gain new insights into their organization and workings.

Modern Analysis of Complex Systems (BMES)

Chair: R. Sclabassi. *Speakers*: To Be Announced. Approximation of nonlinear behavior of physiological systems using linear techniques may introduce misleading generalizations and creates the need to recharacterize behavior at every different operating point. Recent developments in analysis of nonlinear systems not only provide a compact description of integrative behavior but also present more insight into fundamental physiological mechanisms. The purpose of this symposium is to review these newer methodologies and explore their applications to a variety of physiological problems.

Cellular and Molecular Bases for the Influence of Nutrition on Aging and Longevity (SEBM)

Chairs: R. A. Good and B. C. Johnson. *Speakers:* R. A. Good, B. C. Johnson, R. L. Walford, R. Weindruch, G. Fernandes, N. K. Day, E. J. Masoro, and D. Kritchevsky.

On the 50th anniversary of Clive McCay's discovery that decreased food intake prolongs life-span of rats, a symposium will be held under the joint auspices of the Society for Experimental Biology and Medicine and the American Physiological Society. This symposium will explore the cellular and molecular bases for the influence of nutrition on aging and longevity. Speakers will include investigators who are leading inquiry into physiological, biochemical, molecular biological, and cell biological basis of this extraordinary dietary influence. Presentations will focus on the influence of nutrition on life-span and span of health, on the enzymatic

and cellular concomitants of undernutrition without malnutrition, evidence for selective gene action in mice subjected to undernutrition without malnutrition, the virologic and molecular concomitants of prevention of breast cancer by undernutrition without malnutrition, crucial nutritional components involved in prolongation of life and health by diet, and the roles of diet and exercise in preventing experimental cancers.

Modified Hemoglobins as Blood Substitutes (BMES)

Chair: A. G. Greenburg and H. W. Kim. Speakers: A. G. Greenburg, H. W. Kim, L. Sehgal, Y. Nose, M. Feola, C. A. Hunt, R. Valeri, T. M. S. Chang, and C. Hsia.

Interest in developing hemoglobin (Hb) as an oxygen-carrying resuscitation fluid (blood substitute) has recently been rekindled because of concerns about availability and safety of donated blood for transfusion. Although Hb is the ideal oxygen carrier, previous attempts to develop unmodified Hb as a blood substitute have not been successful because of problems including inefficient oxygen offloading characteristics, short intravascular retention time, and undesirable effects on the kidneys and vascular system. In recent years, however, significant advances have been made toward solutions of these problems through intramolecular and/or intermolecular modification of Hb molecules. The purpose of this symposium is to assess new developments in the field and to discuss advantages and remaining problems of these methods. This symposium should provide audience with general knowledge on blood substitutes, some key methods of hemoglobin modification, in vitro and in vivo (animal and/or clinical) characteristics of so-prepared Hb, and their current status toward practical use.

THEMATIC SYMPOSIA

Central Nervous Mechanisms of Host Defense Responses

Chairs: C. M. Blatteis and C. A. Dinarello. *Speakers:* C. M. Blatteis, C. A. Dinarello, L. B. Lachman, D. Saphier, J. T. Stitt, H. Shibata, M. J. Kluger, J. M. Krueger, E. W. Bernton, J. M. Lipton, and J. J. Oppenheim.

The study of the interactions between the nervous and immune systems is now one of the most rapidly developing areas in physiological and immunological research. The recent demonstration that a negative feedback loop may exist from macrophage via the central nervous and neuroendocrine systems to macrophage for the production by peripheral macrophages of the monokine interleukin 1 establishes clearly that the two systems are linked in host defense against infectious pathogens. In this way and several others, the brain plays an important role in modulating and integrating an array of host defense mechanisms, previously thought to be processes unrelated to the CNS. Other cytokines, such as the interferons and tumor necrosis factor, may be similarly involved, although their roles in this context have not vet been as fully studied. However, all have been shown also to be produced in the brain. A series of questions have, therefore, arisen; e.g., are the cytokines that induce host defense responses centrally those that are elaborated in the brain or those that are secreted peripherally? But, if produced in the brain, where and how are they released? And if they enter from the circulation, how do they cross the blood-brain barrier? Where and how in the brain do they induce their various effector actions? What is the functional organization of the neuronal circuitry involved? The purpose of this symposium is to address these questions in an interdisciplinary manner. Thus the most current work in this field will be presented by both physiologists and immunologists. Such an integrated approach should not only provide a comprehensive overview of this field but also point to future, cooperative research from the perspectives of both disciplines.

Factors Determining VO_{2max} in Humans

Chair: P. Cerretelli. *Speakers*: P. Cerretelli, P. E. di Prampero, J. T. Reeves, J. Piiper, H. Hoppeler, G. Ferretti, and P. Dejours.

 VO_{2max} is usually considered to be limited by circulating factors. However, from a recent analytical approach VO_{2max} appears to be determined by a more complicated system described as a series of resistances along the O_2 pathway from the lungs to the muscles. These resistances are basically maximal hemoglobin flow, maximal muscle blood flow, muscle mitochrondrial mass and morphometry, and muscle oxidative enzyme activity. In this symposium, the theory of VO_{2max} control as well as each of the contributing factors will be discussed. Changes in the control of VO_{2max} induced by adaptation to various stresses, such as chronic hypoxia or exercise training, will also be presented.

The Uptake, Synthesis and Physiological Function of Organic Osmolytes in Biological Systems

Chair: T. J. Bradley. *Speakers:* T. J. Bradley, G. Somero, A. Hanson, S. Bishop, D. Manahan, S. Wright, and L. Goldstein.

A very broad taxonomic array of organisms (including bacteria, algae, higher plants, marine invertebrates, insects, and vertebrates) modulate the osmotic concentration of the intracellular or extracellular compartment through the use of organic osmolytes. Very few compounds can accumulate to high concentrations in the blood or cytoplasm without adversely affecting protein and membrane structure. As a result, despite the taxonomic breadth of organisms employing this mechanism, the compounds used and the mechanisms of synthesis and accumulation are highly conserved. The speakers will address the unique biochemical characteristics of the compounds used for osmotic regulation, mechanisms of uptake from the external environment and metabolic pathways for osmolyte synthesis both in plants and animals. Osmotic regulation at the cellular and organismal level will be discussed for two systems where the role of organic osmolytes has only recently been elucidated: aquatic insects and vertebrate kidney. By bringing together workers in diverse fields working on similar problems, this symposium is certain to provide a useful review of physiological mechanisms as well as novel experimental and conceptual insights for both the participants and the audience.

Adaptation to Asphyxia: Lessons From Diving Animals

Chairs: R. Elsner and S. K. Hong. Speakers: R. Elsner, S. K. Hong, D. Leith, M. Castellini, G. Kooyman, W. Zapol, and P. Hochachka.

Animals vary in their ability to tolerate asphyxia, the progressive development of cellular hypoxia, hypercapnia and acidosis resulting from the cessation of respiratory gas exchange. Among aquatic species, some are well adapted to asphyxia associated with apnea of their diving behavior. The related mechanisms are not unique to diving animals, rather they are extensions of similar reactions noted in terrestrial species. Our understanding of asphyxia has grown in large part from research on aquatic vertebrates and by comparing the responses of these natural specialists with those of other animals. Both natural history and laboratory studies contribute to this knowledge. The divers have been shown to rely ultimately on oxygen conservation and enhanced anaerobic reserves resulting in a strategic retreat into a hypometabolic state. Respiratory and cardiovascular systems are the primary targets for the required adaptations. Regulation of the processes in divers is fundamentally similar to that of their terrestrial counterparts. The product of these studies yields improved understanding of the biology of aquatic animals. Furthermore, because of the potential for severe asphyxial pathology, new medical insights can be gained through these studies.

Speakers: J. S. Brody, C. Bauer, R. W. Winslow, R. S. Fitzgerald, J. B. West, E. R. Weibel, J. M. McCord, D. F. Wilson, D. P. Jones, J. W. Fisher, J. Caro, C. Lacombe, R. Levi-Montalcini, J. V. Weil, N. S. Cherniack, N. H. Edelman, H. W. Farber, P. Cerretelli, and P. W. Hochachka.

Mechanisms of response and adaptation to hypoxia is the theme of this symposium. The mechanisms and manifestations of adaptations appear to be diverse depending on the cell types. However, it is expected that a common link exists between all the oxygen-sensitive responses. Accordingly, several oxygen-sensitive tissues are included for presentation and discussion. In selecting the topics emphasis has been placed on both morphology and mechanisms of cellular and subcellular responses. The oxygen sensor types include erythropoietic tissue, carotid body, and vascular tissue and the metabolic type particularly include skeletal muscle. The consensus that the metaoblic effects of oxygen initiate and control the responses may emerge at the symposium.

The symposium will provide a common forum where the experts from diverse fields and disciplines will be able to interact and offer the audience the opportunity to absorb and integrate the current state of the knowledge. The interdisciplinary interaction is expected to generate new ideas and open up new areas of research.

Frontiers in Environmental Physiology Lectures

Chair: E. R. Nadel.

The Theory of Adaptation

Speaker: C. L. Prosser.

Acclimation to Salt Stress: Neuroendocrine Adjustments Assessed in Birds With Salt Glands

Speaker: E. Simon.

Gravitational Physiology in the 1990s

Speaker: H. Bjurstedt.

Response and Adaptation to Hypoxia—Organ to Organelle

Organizer: S. Lahiri.

Session I: Oxygen Biology Chair: J. S. Brody.

Session II: Erythropoietic Response *Chair:* C. Bauer and R. W. Winslow.

Session III: Peripheral Chemoreceptors *Chair*: R. S. Fitzgerald.

Session IV: Metabolic Adaptation *Chair:* J. B. West.



Papers of Wallace Osgood Fenn

The History of Medicine Section of the Edward G. Miner Library has recently completed processing the papers of **Wallace Osgood Fenn**, Ph.D. (1893–1971), Chairman of the Department of Physiology at the University of Rochester School of Medicine & Dentistry from 1924 until 1959. A physiologist of international stature, Dr. Fenn made pioneer contributions to the fields of muscle metabolism, electrolyte physiology, and the physiology of respiration. The Fenn papers include extensive series of correspondence, reports, manuscripts, and lecture notes, as well as laboratory notebooks chronicling Fenn's research activities from 1915 to 1971. An inventory of the collection is available from Christopher Hoolihan, History of Medicine Section, Edward G. Miner Library, 601 Elmwood Ave., Rochester, NY 14642.

Special Pre-Meeting Workshop: "The Law and Animal Care Committees"

Litigation involving state sunshine laws and the impact upon institutional animal care committee policies for research will be explored on Sunday, March 19, 2:00 P.M. at the New Orleans Hilton Hotel.

This special pre-meeting program will feature a panel of winners and losers in litigation promoted by animal activists to make animal care committee records and meetings open and public.

A panel discussion will include an overview of what has happened and is happening in various states, discussions by the courts, and animal care committee members and researchers who are affected by courts decisions requiring that meetings and/or records be open to the public.

The program is for those attending the FASEB meeting and is sponsored by The American Physiological Society. Registration fee is \$35.00.

To register or for more information contact Mr. Bill Samuels, APS, 9650 Rockville Pike, Bethesda, MD 20814. Physiology in Perspective Walter B. Cannon Memorial Lecture Wednesday, March 22, 1989



Ernest M. Wright

"Intestinal Glucose Transport: From Molecules to Man"

Ernest M. Wright, Professor Department of Physiology UCLA School of Medicine Los Angeles, California

4:45 р.м. New Orleans Hilton

APS Business Meeting

Aubrey E. Taylor, President 5:45 P.M.

Return to American Physiological Society 9650 Rockville Pike Bethesda, MD 20814 Attn: Mr. Bill Samuels

_____ I am interested in attending the Workshop on "The Law and Animal Care Committees"

_____ Please send additional information

_____ My check is enclosed.

NAME

ADDRESS

PHONE NO. _

APS and Section Awards

Society Student Awards

The annual Caroline tum Suden Professional Opportunity Award (provides \$500, complimentary registration for the meeting, and a waiver of placement service fees) will be granted to as many as six male or female graduate students or postdoctoral fellows who presented a contributed paper at the meeting. To be considered for the award, the candidate must be the first author of an abstract submitted to APS. An accompanying letter, signed by the sponsor of the abstract, must contain 1) certification that the author is a student or postdoctoral fellow and 2) the approximate date the nominee will be available for employment. Awardees will be notified by the Selection Committee prior to January 31, 1989 and will be presented with their awards during the APS Business Meeting.

The Procter & Gamble Professional Opportunity Award (provides \$500 and complimentary registration for the meeting) will be granted to at least 17 predoctoral students who present a contributed paper at the meeting. To be considered, the candidate must be the first author of an abstract submitted to APS and within 12–18 months of completing his/her Ph.D. degree. All recipients must be U.S. Citizens or hold a Permanent Resident visa. An accompanying letter, signed by the sponsor of the abstract, must contain 1) certification that the author is a predoctoral student and 2) the approximate date of degree completion. Awardees will be notified prior to February 15, 1989. Selection of the awardees will be made by the Sections of the APS. When submitting your abstract for consideration, please indicate (by appropriate number) which section should consider your abstract as indicated in the list below:

- 1. Cardiovascular
- 2. Cell and General
- 3. Comparative
- 4. Endocrinology & Metabolism
- 5. Environmental, Thermal & Exercise
- 6. Gastrointestinal

- 7. Nervous System
- 8. Neural Control
- & Autonomic Regulation 9. Renal
- 10. Respiratory
- 11. Teaching
- 12. Water & Electrolyte Homeostatis

NIDDK Travel Fellowships for Minority Physiologists are open to advanced undergraduate, predoctoral, and postdoctoral scientists who have obtained their undergraduate education in Minority Biomedical Research Programs (MBRS) and MARC eligible institutions, as well as students in the APS Porter Development Program. Applications may also be submitted by minority faculty members at the above institutions. Funds will provide transportation, meals, and lodging. The specific intent of this award is to increase participation of the pre- and postdoctoral minority students in the physiological sciences. Applicants need not be members of the APS but should be a U.S. Citizen or hold a Permanent Resident Visa. 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 underrepresented minority (Black, Hispanic, or American Indian) with which the applicant identifies himself/ herself; 6) an estimate of required travel and per diem expenses. Awardees will be notified prior to January 31, 1989.

Section Student Awards

The Cardiovascular Section presents three annual awards—Fellowship, the Lamport Award, and the Carl J. Wiggers Award. Nominations for Fellowship Awards must be made by at least two existing fellows with supporting letters sent to the steering committee for vote. The total number of fellows cannot exceed 5% of the APS regular members who have published meritorious research in cardiovascular physiology. The Lamport Award is presented to a young investigator under the age of 36 showing outstanding promise in his/her field of cardiovascular research. The recipient, who receives a certificate and a \$200 check, is selected by the Wiggers awardee of the previous year. The Carl J. Wiggers Award honors a founder of the section who has made outstanding and lasting contributions to cardiovascular research.

The Cell and General Physiology Section 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 to the student whose research in the field of cell physiology is judged to be an outstanding contribution. 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 his/her abstract a letter from the Department Chairman confirming his/her eligibility. Recipients will be selected from those candidates who submit abstracts to Program Chairman of the APS Cell Section, Dr. Lazaro Mandel, Department of Physiology, Duke University Medical Center, Box 3709, Durham, NC 27710.

The Comparative Physiology Section Scholander Award is presented annually to recognize an outstanding young investigator presenting a paper as first author in a comparative physiology slide session at the Spring FASEB Meeting. Candidates must be graduate students or postdoctoral fellows, not more than five years beyond their highest degrees. The recipient receives a cash award of \$100 and a certificate from the American Physiological Society.

The Young Investigator Award of the Environmental, Thermal and Exercise Physiology Section is for the recognition of excellence in research by a graduate student. Candidates must be first author on a paper presented at a previous APS Fall Meeting or the Spring Meeting at which the award is presented. Honoring Harwood S. Beling, an award of \$150 is presented at the Temperature Regulation Dinner.

The Gastrointestinal Physiology Section Student Prize (\$300) is designed to challenge and reward students and postdoctoral fellows who are concentrating their research efforts in gastrointestinal research. Two awards will be made at the APS Spring (FASEB) Meeting in 1989. One will be given for work done while enrolled as a student for a doctoral degree. A second award will be given for work performed during the first through the third postdoctoral years. In order to be considered, the applicant must be first author on an abstract submitted for the FASEB Meeting. A copy of this abstract, accompanied by a letter from the applicant's advisor, indicating whether the applicant is a graduate student or a postdoctoral fellow, should be sent to Dr. Joseph Fondacaro, Department of Pharmacology, Smith, Kline and French Labs, L520 P.O. Box 1539, King of Prussia, PA 19406, by December 15, 1988.

The Van Harreveld Memorial Award of the Nervous System Section is to honor the best APS student presentation at the Spring FASEB Meeting. The first annual cash award will be presented at the 1989 FASEB Spring Meeting at a section meeting, dinner, or reception.

The Renal Physiology Section Award for Excellence in Renal Research is to promote and develop excellence in research related to molecular, cellular, and organ mechanisms expressed by the kidneys. Annual awards are presented to a graduate and a postdoctoral students with judging based on abstract submission (25%) and meeting presentation (75%). Papers are evaluated by three judges in renal hemodynamics, epithelial transport, and metabolism. A certificate and prize of \$200 are presented to the recipients at the annual renal dinner.

APS NEWS

Committee Report

APS Confers Honorary Memberships on Three Renowned Scientists

Three renowned physiologists—one from Japan and two from Europe—have been tendered honorary membership in the American Physiological Society.

The memberships were granted to Setsuro Ebashi, M.D., director general and professor of the National Institute for Physiological Sciences, Myodaiji, Okazaki, Japan; Erwin Ncher, Ph.D., director of the membrane biophysics department at the Max-Planck-Institut fur biophysikalsche Chemie, Gottingen, West Germany; and Ewald Rudolf Weibel, M.D., professor of anatomy at the University of Berne, Switzerland.

Honorary membership is granted to distinguished scientists who have contributed to the advances of physiology and do not live in the United States.

Ebashi's work has been in the area of muscle physiology, for which he has been recognized by the presentation of several



Setsuro Ebashi

Erwin Neher

books. 49



major awards including the Imperial Prize

the patch-clamp technique, which for the

first time allowed the recording of single

transmitter activated channels in biological

membranes. He also originated the first

description of single Na- and Ca-activated

channels. Neher's present interest is how

the channels are connected to cellular

functions and how they contribute to the

control of-and are themselves controlled

training in respiratory physiology, cell bi-

ology, and electron microscopy, has con-

centrated his research on the question of

whether structure and function are quan-

titatively related. He has published more

than 250 papers and is the author of 3

Weibel, whose background includes

Neher assisted in the development of

from Japan Academy.

by-intracellular calcium.

Ewald R. Weibel

Comparative Physiologists Honor C. Ladd Prosser

I recently had the pleasure to represent our Society at the Second International Congress of Comparative Physiology and Biochemistry at Baton Rouge, Louisiana. This was a very well attended meeting (over 500 registrants) and Drs. Dietz and Stickle organized a very exciting and informative meeting.

A highlight of that meeting was a presentation following the cajun food buffet (which was delicious—gumbo, jambalaya, etc.) by Dr. C. Ladd Prosser on his 81st birthday. What a treat to hear our 42nd president discuss "Comparative Physiology and Biochemistry: The Challenge of the Future." Dr. Prosser felt that many comparative physiologists were being left out of the mainstream of grant funding and national funding priorities and discussed his thoughts on improving the image and interests of comparative physiology on local and national scales. It is important for you to recall that Dr. Prosser, while in his APS leadership, developed and obtained funding for a college teacher summer research fellowship and also proposed that our Society become sectionalized into a different governing system. The first effort was an attempt to acquaint college leadership with our research and to develop a broader recruiting base for attracting future physiologists, while the latter was an attempt to prevent loss of our members to societies that were spawned by our membership's interest. The summer research program is now being revitalized and after my initial motion at Anaheim to sectionalize our Society and after several years of trial and tribulations two of Dr. Prosser's ideas will soon be firmly entrenched in our Society.

A. E. Taylor, President

LIAISON WITH INDUSTRY

At the May 1988 Spring Meeting, Las Vegas, Nevada, the Liaison With Industry Committee considered the following.

1. Minorities in Physiology. LWIC members confirmed their objective to design a program for minority high school students to stimulate their interest in physiological sciences. The strategy is to create a program that would encourage the private sector and academe to provide local minority high school students with a laboratory experience that hopefully will lead to a career in physiology.

The committee reviewed a draft questionnaire that will be used to identify extant programs in industry for minority high school students. The committee approved the questionnaire in principal but requested that it be shortened by removing redundant sections.

Upon completion, the questionnaire will be mailed to industrial organizations that employ physiologists. An attempt will be made to identify specific individuals, within each respondent company, who will be responsible for interacting with the LWIC on behalf of his/her employer.

2. Industrial Representatives. A need was expressed for identifying a specific individual within each industrial organization who would serve as a communication facilitator between the LWIC and his/her employer. Facilitators, obviously, would provide an amplification system in support of APS/LWIC communications and efforts. A request was made to obtain a list of APS members employed in industry to implement the "facilitator" process.

3. Industrial Physiology Section. A recommendation was presented for forming an APS section for Industrial Physiology with primary emphasis on developmental research. One objective of forming such a committee would be to have formal representation on the Program Advisory Committee. Following considerable discussion, it was decided to solicit input from Industrial Physiologists to determine interest/need for a formal section.

4. Second Century Corporate Founders. Martin Frank reported the current status of the Second Century Corporate Founders Program Endowment Fund.

> N. B. Marshall Chairman

APS Reaching Out to Developing Countries

University of the Philippines

Dear Dr. Sparks:

I read with interest your article in The Physiologist about your sabbatical year in Zimbabwe. I have just been appointed chairman in our department and one of our problems is the lack of training opportunities available to local physiologists. The University of the Philippines College of Medicine is considered the premier medical school in the Philippines, but even here, the physiology department has not made any stride in research because of lack of funds, equipment, and training. There are only a few trained physiologists and many members of the faculty are clinicians. Our equipments have been acquired in the '60s and as you can image, we cannot get spare parts anymore since many are discontinued models. I can tell you more woes of our department but reading your article certainly encouraged me to write you as you may be more sympathetic to our plight since you had first-hand experience in a third world country.

There are three areas where you can be of help to us.

- 1. Training program in your country. Many of our faculty members have no recent exposure to advances in physiological techniques which could be utilized either in our teaching or research. Sometimes we are able to get grants from the school but the problem is to find the suitable place to send our staff members. If we can establish linkages with physiology departments which are willing to accept fellows for training, this would be ideal.
- 2. *Visiting professorship*. A similar program like what you did in Zimbabwe could be of help not only to us but to other

medical schools in the Philippines. Here, you can help us recruit similarly minded physiologists who would like to work with us in the Philippines.

3. *Procurement of equipment.* New equipment cost is prohibitive for us but essential if we are to set up a research laboratory. What do you do with old ones when they are replaced? Can they possibly be donated to other institutions if they are still functional?

I would like to hear from you any ideas you may have on these points. I hope that I can interest you or any of your colleagues in the American Physiological Society to share with us your expertise in Physiology possibly in a collaborative project.

Very truly yours, Cecilia V. Tomas, M.D. Chairman

American Physiological Society

Physiology in Developing Countries Clearinghouse Information Form

Name
Address
I am interested in
—— Hosting a scientist from a developing country
—— Hosting a graduate student from a developing country
Working in a developing country
Sending books, journals and/or teaching materials to a developing country
Initiating a "sister department" relationship with a department in a developing country
Other
Expertise: Research Teaching
Would you be able to partially support a visitor?
Do you speak a foreign language? What language?
Have you previously worked in a developing country?
If so, where?
Does your department currently have a "Sister Department" relationship with a department in a developing country?

If so, please attach a description.

Please relate to us any other experience which may be of use to us in setting up a clearinghouse.

Thank you for your assistance!

Project HOPE

Dear Dr. Frank:

I would like to express our thanks and appreciation to you and the American Physiological Society for your generous contribution of textbooks to Project HOPE.

We are grateful indeed for this expression of your interest and support of our work.

Sincerely, Jan Downing Gift-in-Kind Coordinator

Third World Academy of Sciences

Dear Dr. Frank,

Thank you for your kind letter and the generous offer of 25 subscriptions to your journals for distribution to libraries in developing countries.

We are extremely grateful to you for all your efforts. Kindly send the journals directly by surface mail to our address in Trieste. If you contact a shipping company, they would take care of the packing as well as the transportation of the material.

As to the question of payment of transportation costs, the Third World Academy of Sciences will be happy to refund the amount involved upon receipt of an official invoice.

Please note that we will provide you with a list of the libraries chosen to receive your publications in due course.

I am happy to extend an invitation to you or a representative from the American Physiological Society to attend our Workshop scheduled for October on the "Increasing Flow of Scientific Literature to Third World Institutions" and hope you will be able to participate.

With kind regards and many thanks for your collaboration.

Yours sincerely, H. R. Dalafi

Moving?

If you change your address or telephone number, please notify the APS office (301-530-7171) as soon as possible. 1989 FASEB Annual Meeting APS Fall Meeting

FASEB Annual Meeting APS Fall Meeting 1991 FASEB Annual Meeting APS Fall Meeting 1992 FASEB Annual Meeting

1993 FASEB Annual Meeting

Future Meetings

March 19-23, New Orleans, LA October 15-18, Rochester, MN

April 1–5, Washington, DC October 7–10, Orlando, FL

April 14–18, Atlanta, GA September 29–October 3, San Antonio, TX

April 5-9, Anaheim, CA

March 28-April 1, New Orleans, LA

News From Senior Physiologists

Letters to Roy O. Greep:

Harold M. Kaplan, at 80 years of age, is the oldest member of the teaching faculty at Southern Illinois University School of Medicine where he is a visiting professor in the department of physiology and the medical preparatory program for minorities. He also is coauthor of a book on discovery and invention that is to be published in 1989 by the University Press of America.

Hallowell Davis reports that his health is better than it was a year ago and that he goes to the Central Institute for the Deaf once or twice each week to do some historically oriented writing about projects with which he has been associated. He and Nancy travel to New England for long summer vacations and to Florida for a week each February.

"I read *The Physiologist* carefully," he said, "but have given up on technical reports. I am concerned about the weakening of the unifying image of physiology as a basic discipline. The old principles are still valid and vital and must not be lost in our enthusiasm for the 'new biology'."

W. T. Liberson, who said he hopes to reassure scientists who are told that their academic contributions will have to be terminated at age 70, reports that four years ago, at age 80, he joined Dr. Julia Terzis, a microsurgeon, in her work for patients with severe neuropathies and the following three discoveries that resulted from this collaboration are among the most exciting.

1. "We found the possibility in patients with avulsive brachial plexus injuries, if not to regain full mechanical potential in distal muscles, at least to restore the electrogenesis in some of them sufficient to power simple braces. This may allow these patients to exert their voluntary control, just as we fell in full control of power steering and brakes.

2. "Fully functioning regenerated nerves remain unexcitable by brief electrical stimuli. This new notion will modify some present electrodiagnostic and electrotherapeutic procedures.

3. "Peripheral nerves implanted in the spinal cord in the vicinity of the ventral horns can be regenerated directly by motoneurons, bypassing ventral roots. Thus, after several months, electrical stimulation of the brain resulted in contractions of corresponding regenerating muscles as shown by EMG (so far in rats only). I believe that spinal cord injury patients, using functional electrical stimulation, will also benefit from these studies."

J. U. Schlegel writes that he and his wife thoroughly enjoy the beauty and climate on Lake Chapala in Mexico and that he stays busy reading, writing, and working with his computers.

Letter to John R. Brobeck:

Grover C. Pitts said he finds retirement stimulating with not one boring day so far. He and his wife spend time with their hobbies of wildflower gardening and birding and he is catching up in his postponed reading of classical literature. He also has continued some professional writing. Since retiring two years ago he and his wife have visited Japan, Italy, Mexico, Arizona, southern France, and Paris.

Second Century Founders

Thomas H. Adair W. Ross Adev² Willard M. Allen² Paul D. Altland² Murray D. Altose Rajen S. Anand N. R. Anthonisen Henry S. Badeer Silvio Baez Praphulla K. Bajpai Carleton H. Baker Bruno Balke² A. Clifford Barger Bayer AG/Miles Leslie L. Bennett² Carl I. Bentzel 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 Brodie² Alfred W. Brody John M. Brookhart Chandler McC. Brooks David P. Brooks Arthur M. Brown D. Les Brown Manfred Brust Nancy Buckley Theodore H. Bullock Howard B. Burchell Leo K. Bustad Michel Cabanac Stephen M. Cain² James Campbell 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 David L. Crandall Julio C. Cruz Brian Curtis Horace W. Davenport² George Davis Hallowell Davis Domenic A. De Bias Pierre Dejours Lewis Dexter

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 Benjamin G. Ferris, Jr.² Giles F. Fillev Alfred P. Fishman G. Edgar Folk, Jr. George D. Ford Robert D. Foreman Robert E. Forster Martin Frank William Freas Jeffrev Fredberg A. Stone Freedberg Melvin J. Fregly Charles A. Fuller Robert H. Furman A. Pharo Gagge Morton Galdston Carl Gans² Kenneth D. Gardner, Jr. John F. Gaugl Elizabeth Carlsen Gerst Daniel L. Gilbert Kenneth L. Goetz Anna Goldfeder Roberta M. Goldring Jean R. Gontier David B. Gordon D. Neil Granger Brydon J. B. Grant E. Rhoda Grant Harold D. Green James W. Green David G. Greene² Paul H. Guth Francis J. Haddy Zareh Hadidan 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. Hartman² Charles C. Hassett Richard I. Havel George A. Hedge Ruth M. Henderson Nathan Hiatt Henry R. Hirsch Joseph F. Hoffman Frederic G. Hoppin, Jr. T. Hoshiko Ernst G. Huf²

Michael H. Humphrevs Richard W. Hvde Shulchi Ichikawa Yukisato Ishida 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 F. Kao Frederick W. Kasch Adrian I. Katz Susan R. Kavar Ralph H. Kellogg Mushtaq Ahmad Khan Rolf Kinne F. M. Knapp Ernst Knobil Leon K. Knoebel Franklyn Knox Philip M. Kober Raymond C. Koehler Kenneth G. Kohlstaedt² Kiyomi Koizumi Samuel N. Kolmen Diana L. Kunze Phyllis Kutsky Eugene M. Landis Ivan M. Lang Henry D. Lauson² James E. Lawler John K. Leach Allan M. Lefer L. Don Lehmkuhl Jacob Lemann, Jr. S. Leonard Michael G. Levitzky Matthew N. Levy Benjamin Libet Ira J. Lichton² Melvyn Lieberman Meyer D. Lifschitz Robert B. Livingston James E. Lock W. Gregory Lotz Ulrich C. Luft Peter R. Lynch Roy H. Maffly Virendra B. Mahesh Elizabeth Painter Marcus Norman B. Marshall Alexander Mauro Ernest P. McCutcheon Donald E. McMillan Robert B. Mellins Patricia I. Metting Ulrich F. Michael Florence K. Millar David Minard Vu Dinh Minh Howard E. Morgan Peter R. Morrison Nicholas A. Mortillaro E. Eric Muirhead

John F. Mullane Gunnar Nicolaysen Robert M. Nerem Nancy Lee Noble Eleanore A. Ohr Dennis D. O'Keefe George A. Ordway Arthur B. Otis L. C. Ou Irvine H. Page Charles R. Park William J. Pearce Louis J. Pecora J. C. Penhos² Kenneth E. Penrod Eliot A. Phillipson Richard N. Pierson, Jr. Irwin J. Pincus Ernest A. Pinson Bertram Pitt Grover C. Pitts Chi-Sang Poon Robert J. Porcelli Robert L. Post E. James Potchen Frank L. Powell, Ir. Hershel Raff Hermann Rahn I. Usha Raj Nathan Rakieten Henry J. Ralston Carlos Enrique Rapela Paul H. Ratz Phillip Leon Rayford Walter Redisch Emerson A. Reed Eugene Renkin James B. Rhodes Erick L. Ritman Jane C. Roberts James S. Robertson Sol Roy Rosenthal James N. Ross, Jr. Gerald I. Roth Gabor M. Rubanvi A. Yvonne Russell L. T. Rutledge Kiichi Sagawa William M. Samuels² G. Sant'Ambrogio Francis J. Saunders Wilbur H. Sawyer John J. Sayen James A. Schafer Harold P. Schedl Paul R. Schloerb 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 I. Stone Douglas G. Stuart Kenneth Sugioka Lawrence P. Sullivan Kenneth G. Swan George A. Tanner Aubrey E. Taylor George W. Thorn Michael O. Thorner Klaus Thurau 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 Silvio Weidmann 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. Ir. Lester F. Wolterink Clinton N. Woolsey Billy K. Yeh Michael R. Yelich Walter A. Zin Douglas P. Zipes Benjamin W. Zweifach

Note: Number indicates the number of years of continuous giving to the Second Century Fund.

PUBLIC AFFAIRS

National Academy of Sciences Lab Animal Study Offers Recommendations; APS Member Writes Minority Report

A three-year study by a National Academy of Sciences select committee concludes that animal research is essential to human health care and that the need for laboratory animals will continue in the foreseeable future.

However, the study's 10 recommendations—ranging from the use of unclaimed pound animals to the appropriate roles for the federal government in funding and regulating research—divided the 15-member committee to the point where one member, Christine Stevens, refused to sign the report. Another committee member, APS Past President Arthur C. Guyton, submitted a minority report disputing the committee's attitude toward alternatives to animal research and citing animal care regulations for the high cost of research. The full text of Guyton's report is on page 172.

The recommendations include that

• All persons responsible for the use and care of animals adhere to the principle that animals are to be treated humanely.

• No additional laws or regulations (excepting the regulations required by the Improved Standards for Laboratory Animals Act of 1985) affecting the use of animals be promulgated until a careful accounting of the effects of the present body of laws, regulations, and guidelines has been made and there is evidence of the need for new regulation.

• A mechanism be established for an ongoing review of the regulatory framework of federal agencies concerned with animal experimentation and that scientists who must abide by this framework be prominently involved in its assessment. The committee cited a need to review the Guide for the Care and Use of Laboratory Animals to determine whether revisions are necessary due to changing conditions and new information.

• Federal agency standards for animal care and use be congruent.

• Sufficient federal funds be appropriated for the inspection requirements of the Animal Welfare Act and for the maintenance and improvement of animal facilities so that research can be conducted in compliance with government policies, regulations, and laws.

• Federal regulatory agencies validate nonanimal tests that would reduce the

to tection in the use of consumer products.
 Research investigators consider alternative methods before using animals in

native methods before using animals in experimental procedures and that databases and knowledge bases be further developed and made available for use in the design of research protocols.

number of vertebrates used as long as such

tests do not compromise the public's pro-

• Pound animals should be made available for research.

In addition to Guyton, who is chairman of the Department of Physiology and Biophysics at the University of Mississippi Medical Center, another APS member on the committee was Carl W. Gottschalk, Kenan Professor of Medicine and Physiology at the University of North Carolina.

Other committee members in addition to Stevens, who is president of the Animal Welfare Institute, Washington, DC, were chairman Norman Hackerman, Rice University; Kurt Benirschke, University of California Medical Center, San Diego; Michael E. DeBakey, Baylor College of Medicine; Edward L. Ginzton, Varian Associates, Palo Alto, CA; William Hubbard, The Upjohn Company; John Kaplan, Stanford University; Harold Morowitz, Yale University; Carl Pfaffman, The Rockefeller University; Dominick P. Purpura, Albert Einstein College of Medicine; Lewis Thomas, Memorial Sloan-Kettering Cancer Center; and James McKendree Wall, The Christian Century magazine, Chicago.

A copy of the 102-page report is available from the National Academy Press, 2101 Constitution Avenue NW, Washington, DC 20418. Single-copy cost is \$11.95. Discount for multiple-copies orders begins with five copies.

APS Testifies Before House Committee in Opposition to Standing Bill

In the closing hours of the 100th Congress antivivisectionist organizations pushed for the enactment of bills that would give animal advocates standing in federal courts and would reduce available sources for dealers purchasing unclaimed animals.

The American Physiological Society, representing the scientific community, testified before a House judiciary subcommittee in opposition to granting standing to antivivisections and sent a letter to the House Agriculture Committee citing concerns with the proposal to reduce the source of unclaimed animals. Full text of the testimony and the letter are on page 157.

Both efforts of the antivivisectionists died in committee but undoubtedly will

be resurrected when the 101st Congress is convened in January.

The effort to legislate judicial standing for antivivisectionist organizations and animal activists stems from a rebuff by the federal courts. The antivivisectionists were denied standings by the federal district court when a suit was filed seeking custody of 17 monkeys confiscated from a Maryland research institution. The U.S. Court of Appeals upheld the district court and the U.S. Supreme Court refused to hear the appeal of the appellate court's decision.

Standing is the recognition granted by the courts to private citizens or organizations as plaintiffs with legally protectable and tangible interests at stake in litigation.

William M. Samuels

Comments of Arthur Guyton on NAS Animal Study

This statement is made for two purposes: first, to express severe disappointment that our Committee Report fails to make clear how seriously the Animal Rights Movement and increasing government regulation are impeding essential medical research; and, second, to record at least one dissenting vote against the implication in the "Recommendations" section of the main report that the present regulatory framework will allow a healthy future for medical research.

The success of the Animal Rights Movement in making medical research difficult has been phenomenal in the last 3 years. One-fifth of all States have already passed laws prohibiting release of pound animals for medical research. And multiple animal rights-welfare organizations have announced publicly their priority goal to eliminate by law all release of pound animals for medical research within the next few years. Historically, most large-animal medical research has been performed in dogs and cats obtained from pounds because these are all unwanted animals and because the cost to society in using these animals is almost zero, which contrasts with a cost of many millions of dollars when alternative animals are used.

Also, the Animal Rights Movement has been surprisingly effective in getting the Federal Government to establish very restrictive regulations on medical research. Some of the most blatant of these are 1) the necessity to obtain prior approval before performing each type of animal experiment, a requirement that often delays essential research as much as two months; 2) a requirement that all major survival surgery on rabbits or larger animals be performed in a surgical operating room suite costing an average of a quarter million dollars and directed by a high-salaried veterinarian, even though the veterinarian usually is not a trained surgeon. In the past, this type of surgery has been done exceedingly successfully in the investigator's own laboratory at no extra cost; 3) very arbitrary regulations for specific cage sizes, and even these have been changed on multiple occasions, costing hundreds of millions of dollars throughout the United States. These are only examples of a litany of such regulations.

The net effect has been an extreme increase in the cost of animals used in research as well as cost of lost time and effort by the investigator. Including the expense of meeting federal regulations, the cost of dogs and cats used in research, together with the cost of their care, now averages more than \$1,000 per animal in some institutions, and *this does not count the cost of the research itself*. Historically, when animals were readily available on a day's notice from local animal pounds, the cost of dogs and cats was very little.

Role of Veterinarian Professonalism in Imposing New Difficulties for Medical Research. Veterinarian scientists have made and are making major contributions to medical research. However, in the last three years, there has been a proliferation of new government regulations requiring vastly expanded and costly roles for veterinarians as regulators of virtually all animal-based biomedical research. This presumably has come about because those government agencies that make the regulations (for example, the Inspection Agency of the Department of Agriculture) are staffed to a great extent by professional veterinarians, and they naturally believe that others cannot have the expertise to work properly with animals. Yet, we all know that medical professionalism, with doctors regulating doctors, and legal professionalism, with lawyers regulating lawyers, always under the pretense of high principles, make medical and legal services extremely expensive to the public. In a similar manner, this new proliferation of animal-control regulations requires a very costly layer of veterinarian regulators who do not actually participate in the research itself. The vast and superb medical research accomplishment of the past has been achieved without this new bureaucracy. Is it truly needed now? And if so, is it not also needed for the pounds and animal rights-welfare shelters which house and kill 50 times as many dogs and cats each year as does medical research?

Misplaced Faith in "Alternatives" to Animal Research. The Committee Report contains an entire chapter on Alternative Methods in Biomedical and Behavioral Research. Unfortunately, the prominence of this chapter gives false hope that animalbased medical research can be done with substitutes for animals. Unless we substitute human beings as the research subjects, this is very rarely true. Therefore, it is seriously wrong for the Committee Report to give such false expectation. The Animal Rights Movement has already made a strong effort in Congress to divert as much as one-fifth to one-half of all health-related research money to studies using only animal "alternatives," and our report will likely be used to support further such efforts.

Desperate Need for Help in Combating the Initiatives of the Animal Rights Movement and of Regulatory Bureaucracies. It is clear that the Animal Rights Movement, with the help of new and expanding federal, state, and local laws, is rapidly making much animal research cost ineffective as well as extremely wasteful of the research scientist's time. Many of the regulations appear not to have been thought through, such as the requirement for a quarter of a million dollar operating room suite to perform operations on rabbits.

The new federal regulations are similar to those established in Europe several decades ago; large-animal research is now close to annihilation in Europe. As a result, the Europeans have made very little contribution in certain types of medical research, for example in cardiovascular surgery, except when the research could be done on human beings themselves.

Therefore, the medical research community desperately needs strong help in combating both the Animal Rights Movement and the growing regulatory bureaucracies. Our committee has failed to produce a document that will be helpful for this purpose. This is understandable because the committee itself includes many members who have never worked in animal research and particularly includes two Presidents of national animal "welfare" organizations.

Considering the rapidly expanding restrictive and time-wasting regulatory environment, I cannot in all good conscience recommend to young researchers that they pursue careers in those types of medical research that require the use of animals. How will it be possible to make many new advances in medicine?

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.

Executive Director Writes About Concerns With Pet Theft Act

September 22, 1988

Rep. George Brown, Jr. 2256 Rayburn House Office Building Washington, D.C. 20515

Dear Mr. Brown:

The American Physiological Society is pleased with the efforts by the Congress in addressing the scientific community's concerns with the Pet Theft Act (S. 2353). This bill is a major improvement over the shortsighted Pet Protection Act (H.R. 778 and S. 1457), which does not protect pets despite the title. Moreover, the changes made in the Senate-approved version have further improved and strengthened the original bill's intent of protecting pets from theft by a few unscrupulous animal dealers.

There are two other considerations, however, that the Society believes should be addressed before any action is taken by the House on this legislation: (1.) The holding period for unclaimed animals should be in accordance with prevailing state and local custom, and (2.) the available sources for Class B dealers to obtain unclaimed cats and dogs should be expanded to include auction sales.

The Society believes the proposed sevenday holding period for unclaimed animals to be sold to dealers should be changed to conform with established state law, local ordinance, or pound and shelter policies. In many localities unclaimed animals are euthanized within two or three days because the pound or shelter does not have the space or resources for longer holding periods. Thus, the seven-day requirement could prevent research facilities from receiving unclaimed animals because pounds and shelters, unable to comply with the requirement, would euthanize the animals according to local policy.

As for expanding the source, the current proposal limits the dealers' source for unclaimed animals to public and private pounds and shelters, research institutions, and individuals who raise animals on their own property. Not included are animal auctions and other dealers, frequently the only sources for dealers in areas where pounds and shelters do not make unclaimed animals available.

It is the Society's recommendation that the House Agriculture Committee's Subcommittee on Department Operations, Research, and Foreign Agriculture defer any hurried action on the Pet Theft Act. The bill has come a long way since its introduction last April and it would be a shame not to take the time to include changes that would make it truly pet theft legislation.

The Society appreciates your interest in this matter and looks forward to working with you and your colleagues.

Sincerely, Martin Frank, Ph.D.

cc: House Agriculture Committee

CFAAR

(continued from p. 153)

ize a demonstration or rally. However, attacks on local scientists and on plans for a new animal research facility continued to escalate. These activities galvanized us into action, so we decided to plan a demonstration. We felt that it was time to come out of the laboratory and publicly declare that we are not the callous ogres the ARAs portraved us to be.

As the idea of having a rally was discussed, the upwelling of enthusiasm among members of the biomedical community became infectious. Dozens of volunteers among the graduate students, faculty, and staff worked feverishly to construct placards with various slogans touting the benefits of animal research to both animals and humans. We prepared numerous fliers and a position paper describing our views about the nature of animal research and the need for its continuation. In addition, we obtained pamphlets from the California Biomedical Research Association and the Foundation for Biomedical Research describing maladies that remain to be conquered and how animal research will be needed to achieve these conquests. These brochures, pamphlets, and fliers were distributed at Sproul Plaza during the day of our celebration. We also had petitions and postcards available for signatures that we delivered and mailed, respectively, to legislators regarding funding for our proposed animal facility and other issues.

When the ARAs learned what SSBR had done, they were perturbed, to put it mildly. They considered revising their schedule of activities in the Bay Area; however, this was not possible logistically. Accordingly, they approached us through an intermediary to inquire whether we were really planning to use the plaza and if so, would we be willing to share it with them. Before our celebration took place, we had discussions with the campus police, who expressed concern about the possibility of a violent encounter with the ARAs because of their distress with the turn of events. It was decided, therefore, that it would be advisable to be accommodating to them. Hence, we agreed to turn over the microphone to them after we had finished our celebration, providing that they did not disrupt our activity. As it turned out, they counter-demonstrated us and were somewhat disruptive, but there were no serious difficulties. At the end of our celebration, which a local newspaper estimated more than 400 people attended, we marched off to the psychology building to demonstrate support for the construction of the new animal facility that the ARAs were opposing. The ARAs then assembled and had their own demonstration with about 60 in attendance, again according to the local newspaper.

At the celebration I was the first speaker and emphasized the many health benefits that humans and animals enjoy because of animal research. I asked the audience to consider where we would be if such research had been halted 50 or 100 years ago. Mr. Steve Carroll of the Incurably Ill for Animal Research (iiFAR) spoke next, and he stressed the need for continued animal research if cures for various maladies are to be found. Professor Paul Licht (Zoology) described how animal research is helping to preserve endangered species, and a graduate student in Psychology, Cynthia Langley, recounted how basic behavioral research on animals has helped humans. David Perrin, an undergraduate student in Biochemistry and a member of the

from voluntary contributions from the memberships of various societies. If the membership renewal notices of these groups had a line designated for the voluntary tax-deductible contribution of \$10 or more to such a fund, and if only 10% of the memberships contributed, the fund would be very substantial.

Such funds could be used to support the formation of local CFAAR chapters or equivalents. They could also be used to finance public educational programs, including purchase of space for informational ads in selected magazines. Parenthetically, the ARAs are running ads promoting their philosophy in various environmental and wildlife conservation magazines, and even in widely read newspapers such as the New York Times. Funds could also be used to produce films about research advances in which animals have played an indispensable part. Such films could be distributed to high schools and public television stations. Lobbying and political activities of various kinds could also be supported, and numerous other kinds of educational activities could be undertaken with sufficient financing.

We attribute the success that the ARAs have enjoyed in part to the fact that there is a significant segment of the public that is generally ignorant about how animal research is conducted and the benefits that they enjoy from many decades of animal research. They also do not appreciate that such research must not be hindered if we are to continue to enjoy good health, and they are misinformed about the degree of regulation on animal research and the fact that it is conducted in a responsible and humane manner. These shortcomings are illustrated by the fact that in a recent poll of high school students, a majority had never heard of poliomyelitis and they did not know what the iron lung was. Even though most of them have undoubtedly been immunized against polio, they did not know what they were protected against. Clearly we must redress these serious deficits in the education of our general public if we are to succeed in holding ground and regaining that which has been lost against the well-financed, vigorous and dedicated antivivisectionist groups.

References

- 1. We have since changed our name to the Coalition for Animals and Animal Research (CFAAR, pronounced "see far"). This change resulted from legal action taken against us by an ARA group with the acronym "AFAAR," which alleged that our use of "AFA&AR" constituted unfair competition.
- 2. Denver, R. J., C. S. Nicoll, and S. M. Russell. Direct action for animal research. *Science* 241: 11, 1988.
- 3. Chui, G. Activists beset UC, Stanford labs. *Science* 239: 1229–1232, 1988.

PEOPLE AND PLACES . . .

APS member Sarah A. Nunneley, M.D., will become president of the Aerospace Medical Association in 1990–91. She will be the first female president of this association. In 1975, Nunneley joined the USAF School of Aerospace Medicine, Brooks AFB, where she initiated a program of thermal research and is now senior research scientist and physician-in-charge of thermal physiology. She has been guest referee editor of the *Journal of Applied Physiology* since 1976 and is chairperson of the Career Opportunities in Physiology Committee.

Sherman Bloom, M.D., professor of pathology at George Washington University, has been named Chairman, Department of Pathology, University of Mississippi Medical Center, Jackson.

BOOKS RECEIVED

Comparative Physiology of Environmental Adaptations—Vol. 3: Adaptations to Climatic Changes. P. Pevet. (Editor). Strasbourg, Paris: 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.

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. APS member Wilton H. Bunch, M.D., Ph.D., Dean of Medical Affairs Administration of Hospital, University of Chicago, has accepted a position as Dean of the College of Medicine at the University of South Florida, Tampa.

Norman H. Edelman, M.D., has been appointed Dean of University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School. A member since 1971, Edelman remains professor in the Department of Medicine.

Richard C. Rose, Ph.D., has moved to the University of North Dakota as Chairman, Department of Physiology. Formerly professor of physiology and surgery at Milton S. Hershey Medical Center, Rose has been a member since 1973.

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 Bebavioral 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 University Press, 1987, 282 pp., illus., index, \$37.50.

The Toxicity of Methyl Mercury. Christine U. Eccles and Zoltan Annau (Editors). Baltimore, MD: The Johns Hopkins University 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.

ANNOUNCEMENTS

NIH NEWS

NIH Alumni Association Formed

The newly reorganized Alumni Association of the National Institutes of Health (NIHAA) is most desirous of compiling as complete a list as possible of former staff and associates to be in contact with as many alumni as possible as further plans and items of interest develop.

Accordingly the NIHAA would like to hear from all those who ever were at a NIH facility in

any staff, fellow or executive administrative capacity.

Please send a note giving your name, former NIH affiliation, current position, mailing address and telephone number to Harriet R. Greenwald, Executive Director, NIHAA, 9101 Old Georgetown Road, Bethesda, MD 20814.

NIH Workshops on PHS Policy on Laboratory Animals

The National Institutes of Health, Office for Protection from Research Risks, is continuing to

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.

sponsor a series of workshops in implementing the Public Health Service Policy on the Humane Care and Use of Laboratory Animals. 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.

Date: January 24–25, 1989. Location: San Antonio, TX. *Contact*: Ms. Molly Greene, Institutional Animal Care Program, University of Texas Health Science Center at San Antonio, 7703 Floyd Curl Drive, San Antonio, TX 78284-7822. Phone: (512) 567-3717.

Date: February 9-10, 1989. Location: Salt Lake City, UT. *Contact:* Joan Provost, Conferences and Institutes, University of Utah, Salt Lake City, UT 84112. Phone: (801) 581-5809.

IUPS Physiology Teaching Software Demonstration

A physiology teaching software demonstration will take place at the XXXI International Congress in Helsinki (July 9-14, 1989). Computers will be available on-site to provide participants a hands-on experience with the programs. Authors wishing to display their software are urged to submit abstracts describing the topic, educational goals, and hardware requirements of their programs. The deadline for abstracts is February 15, 1989, and copies of the programs and minimal documentation (operating instructions) must be forwarded to Helsinki by June 1, 1989. Information about the software demonstration: Dr. Joel Michael, Department of Physiology, Rush Medical College, Chicago, IL 60612. Phone: (312) 942-6426. Information about the Congress: The Secretariat, XXXI International Congress of Physiological Sciences, P. O. Box 722, SF-00101 Helsinki, Finland.

- Hoffmann-La Roche, Inc. ICI Pharmaceuticals Group 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.

NRC Seeks Applications for Research Associateships

The National Research Council announces the 1989 Resident, Cooperative, and Postdoctoral Research Associateship Programs for research in the sciences and engineering to be conducted on behalf of 30 federal agencies or research institutions, whose 115 participating research laboratories are located throughout the United States.

Approximately 450 new full-time Associateships will be awarded on a competitive basis.

Applications to the National Research Council must be postmarked no later than January 15, 1989 (December 15 for NASA), April 15 and August 15, 1989. *Information:* Associateship Programs (GR430A-D2), Office of Scientific and Engineering Personnel, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. Phone: (202) 334-2760.

NRC to Administer Fellowships for Minorities

The National Research Council plans to award approximately 25 Ford Foundation Postdoctoral Fellowships for Minorities in a program designed to provide opportunities for continued education and experience in research for Native American Indians and Alaskan Natives (Eskimo or Aleut), Black Americans, Mexican Americans/ Chicanos, Native Pacific Islanders (Micronesian or Polynesian), 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. The deadline for submission of applications is January 13, 1989. Information: Fellowship Office, GR 420A, National Research Council, 2101 Constitution Avenue, Washington, DC 20418.



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- Sterling Drug, Inc. Sutter Instruments Company The Quaker Oats Company
- * The Upjohn Company
- * Warner-Lambert/ParkeDavis Waverly Press, Inc. Wyeth Laboratories

AAMI Annual Meeting

The Association for the Advancement of Medical Instrumentation will hold its 24th Annual Meeting and Exposition on May 13–17, 1988, in St. Louis. *Information:* AAMI, 3330 Washington Blvd, Suite 400, Arlington, VA 22201-4598. Phone: (703) 525-4890 or 1-800-332-2264.

International Meeting on Amino Acid Therapy

"Therapy With Amino Acids and Analogues" is the title of the First International Congress to be held in Vienna, Austria on August 7–12, 1989. Topics include basic chemistry, analytical chemistry, biological chemistry including amino acid transport, comparative sciences-plant and animal physiology, experimental pathology and therapy, metabolic pathways, pharmacology, clinical applications, life sciences and clinical sciences. *Information*: Gert Lubec, Univ. of Vienna, Dpt of Paediatrics, A 1090 Vienna, Währinger Gürtel 18, Austria. Tel. (222) 4800-3232 or (evening hours): (222) 23 40 424 = private.

Conference on Nuclear Analytical Methods

An international conference entitled "Nuclear Analytical Methods in the Life Sciences" will be held at the National Bureau of Standards, Gaithersburg, MD on April 17–21, 1989. The conference is organized by the NBS in cooperation with the International Atomic Energy Agency and is cosponsored by the American Nuclear Society. *Information*: Rolf Zeisler, NBS, Building 235, Room B-125, Gaithersburg, MD 20899.