

THE PHYSIOLOGIST



A Publication of the American Physiological Society

Volume 34, Number 6

December 1991

A Physiologist's Views on the Animal Rights/Liberation Movement

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Many physicians and biomedical researchers still believe that the animal rights/liberation (AR/L) movement does not pose a serious threat to biomedical science in the United States. Indeed, some cell and molecular biologists regard the animal rights/research issue as a tempest in a teapot that will not affect them because they use few or no animals. By using the so-called alternatives to animals, they believe that their work is shielded from negative impact from the animal activists. This belief is self-delusionary.

Animal activists use three forms of persuasion to win converts to their movement. Moral/ethical arguments figure prominently in their literature (1); misrepresentation of the value of research with animals and how it is conducted constitutes the second pillar that supports their philosophy. The third form of persuasion involves a campaign of vandalism, slander, intimidation, and violence that is directed at selected scientists by the terrorist arm of the movement. Although

these criminal activities have not had a significant impact on the over all conduct of research, the programs of the targeted scientists have been disrupted, and they and their families have been subjected to severe emotional trauma. Terrorist attacks on laboratories have, of course, also greatly increased the costs of doing research.

The moral philosophy of the animal liberators does not present a threat to biomedical science because its basic tenet—that animals are morally equivalent to humans—is too bizarre to be embraced by most people. However, the vigorous campaign of disinformation about the conduct and the value of animal research by animal advocates has convinced some influential people (including celebrities and politicians) that research with animals should be curtailed and more closely regulated or eliminated altogether.

The activists are using two interrelated strategies to end all use of animals in biomedical research: they are succeeding in having increasing layers of regulation imposed and in escalating the cost of research. If these trends continue much longer, it will become too cumbersome and costly for most scientists to conduct animal research.

The escalating cost of animal research involves increased security at research facilities and vivariums, modernized and upgraded animal holding facilities, increased veterinary care, and so forth. New regulations have been implemented by the US Department of Agriculture regarding steps that must be taken to ensure the psychological well-being of nonhuman primates and the exercise of dogs in laboratories. Fortunately the requirements fall short of those sought by animal activists, but the standards still involve millions of dollars in expenditures.

Another costly bill is one sponsored by Representative Robert Torricelli (D-NJ), called the "Information Dissemi-

Presented at the APS Conference Banquet, San Antonio, TX, October 2, 1991.

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As A Matter of Opinion

Physiology in the United Kingdom

The Physiological Society requires no geographic or national adjective; in fact, the British are rather touchy about it. I can understand that. In Northern California The City does not take an adjective either; San Francisco is understood.

The Physiological Society began, like so many British institutions, as a dining club. It is the world's oldest organized physiological society, dating officially from 1876, some 11 years before the American Physiological Society was formed (1887). Its chief officers are two Secretaries with staggered six-year terms, a Foreign Secretary, and a Treasurer; these positions are all honorary (volunteer). Policy is decided by a committee of 24 members who meet three times annually. There is one annual general meeting, either at Cambridge or Oxford and a semiannual general meeting for election of new members.

I gleaned these essential facts during my recent sabbatical year in the United Kingdom. I wanted to go further, however, to learn more about how the Society functions and how British physiologists view their discipline. With that goal in mind, I visited nine medical

schools (three in London, two in the Midlands, three in Scotland, and one in Northern Ireland), attended the Oxford meeting of the Society, and was a guest at one of the governing committee's dinner meetings in London. I talked with chairmen, professors, faculty, and graduate students.

There are some 1,200 ordinary (regular) members, who "... are engaged in research connected with physiology or in teaching physiology. ..." There are also 79 foreign, 51 honorary, and 172 retired members. There is an affiliate category for those graduates with less than five years experience after receiving their MDs or PhDs.

Dues averaged about \$75 in 1990. Formerly, a subscription to the *Journal of Physiology* was included with membership and was a great incentive to join. However, hard economics and the changing nature of the journal have forced the Society to institute modest subscription charges for all members except honorary ones. The Society has another journal, *Experimental Physiology*, directed toward applied physiology.

As with the APS, The Physiology Society has accumulated a large operating reserve, mainly from its publications and investments. Operating reserve income is used for new initiatives and for balancing any annual operating losses. Except for the publications and finance sections, The Physiological Society has always been run by volunteers, but in 1990 it set up a combined Publications and Administrative Office in Oxford and hired its first fulltime administrative employees to lift some of the pressure of routine business from the honorary officers.

At one time, membership in the Society was highly prized and difficult to achieve. Physiologists were usually well along in their careers before being admitted. The Society was elitist in every sense of the word. And why not? It had a glorious history with many of the world's greatest physiologists as mem-

The Physiologist

Published bimonthly and
distributed by

The American Physiological Society
9650 Rockville Pike
Bethesda, Maryland 20814-3991
ISSN 0031-9376

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Subscriptions: Distributed to members as part of their membership; nonmembers and institutions, \$25.00 per year in the United States; elsewhere, \$35.00. Single copies and back issues when available, \$5.00 each; single copies and back issues of Fall Abstracts issue when available, \$20.00. In 1991, subscribers to *The Physiologist* will receive it and the abstracts of the Fall Meeting of the American Physiological Society. The American Physiological Society assumes no responsibility for the statements and opinions advanced by contributors to *The Physiologist*.

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

Headquarters phone: 301-530-7164. Fax: 301-571-1814.

bers. Faced with changing times, the Society has loosened its membership requirements, although not nearly as much as the APS has. As in America many scientists doing physiological research have not joined the Society. This is especially true of those in clinical physiology and molecular biology. When I asked about this trend, I learned that the scope of physiology in Britain has narrowed more and more since the end of World War II.

One reason was the outstanding success of neural sciences and muscle biophysics and more recently molecular biology. I recall the joint meeting of the APS and The Physiological Society at Cambridge in 1985. The submitted abstracts were divided among neurophysiology, biophysics, and "other." In 1990 half of the abstracts submitted to Society meetings were on nerve-muscle or central neurophysiology. A glance at the *Journal's* index pages will confirm this specialization. In part that is why much effort is being directed at making *Experimental Physiology* (formerly the *Quarterly Journal of Physiology*) into a popular applied physiology journal. I published a paper in the *Journal of Physiology* in 1964. I would not do so now because few of my contemporaries would read it. Now that I think on it, I'm not sure anyone read it then.

Some of the British attitudes toward physiology need to be emphasized. They do not agonize over the state of physiology or its future, as Americans are wont to do. Chairs in physiology are still filled by physiologists, not immunologists or molecularists. British physiologists are reluctant to "officially" define physiology, although most who ventured opinions said it was directed toward understanding whole-body function, especially in humans.

In general, vertebrate animal research is declining, and few teaching laboratory experiments are done with animals other than humans because of public sentiment, student agitation, occasional threats, and high costs. Physiologists admit they lost the animal research battle long ago because of their aloofness. The animal fanatics and terrorists in Britain are well organized, dating back more than 100 years. Despite Charles Darwin's objec-

tions, his daughter Harriette was an early (1875) proponent of antivivisection laws. H. G. Wells' *Island of Dr. Moreau* (1896) is an ill-disguised diatribe against vivisection.

Scarcely a week goes by without some sleazy antivivisectionist propaganda appearing in one of the London tabloids. Shortly before I arrived in the United Kingdom, there was a car bomb attack on a scientist who did animal experiments. As one of my UK associates admitted, the British are more concerned about animal welfare than about human welfare.

There is a renewed effort to combat the antivivisectionists by the Research Defense Society (or Biomedical Research Education Trust). Its two latest animal research brochures for high school students emphasize the vital contributions made by animal research to human health. The brochures are well designed, colorful, and easy to read.

There's more to the specialization of British physiology than limitations on animal research, however. British physiologists are justly proud of their pioneering contributions to the biophysical theory of the nerve impulse and of muscle contraction. Many students of physiology have followed these paths, thus concentrating interest and training in muscle biophysics and neurophysiology. The accelerating growth of special interest societies, especially clinical ones, has spirited away many scientists whose research is concerned with human and whole-animal physiology.

One unexpected finding was that the graduate students I talked with do not feel any strong identity with physiology as a discipline. When I asked some of them why they were working in a physiology department, they said it was because a professor had some technique or project of interest to them. They would have just as soon have gone to a pharmacology, pathology, clinical, or molecular biology department.

University funding for departments and research funding is even more restrictive than in the United States. The University Funding Council has recommended that basic science departments coalesce into biomedical science de-

partments or schools, the concept being that bigger departments are more efficient. Consolidation has already occurred for many physiology departments. On the day I visited the University of Glasgow, the second largest physiology department in Great Britain, there was a party to celebrate the formation of their new biomedical sciences department (physiology, anatomy, pharmacology).

As for recruiting students into physiology, most department representatives told me they still get sufficient top-quality honors students (undergraduate majors), although most concede that the quality and numbers of PhD-level students have declined. That's a broad generalization, because while some faculty are despondent, others maintain there is no problem. Careers in physiology are centered in the pharmaceutical industry; university faculty positions are decreasing.

Research funding is dreadful. The Medical Research Council pay line is at about the 10% level, I'm told. Were it not for the charities (private trusts), there'd be little research, physiological or otherwise. The Wellcome Trust is the largest, but the British Heart Foundation, the British Lung Foundation, Cystic Fibrosis, Multiple Sclerosis, and numerous others contribute generously. In the United States, 95% of funding comes from the federal government; in the United Kingdom, 75% of the funding is private. Some good physiologists have no research support other than a trickle of drug company support.

Everyone I talked with says the national government, parliament, and the public have little interest in science. Recently, Save British Science, a new organization spearheaded by physiologists, was formed to develop a pro-science constituency within parliament. It is too soon to say how effective it will be, but few physiologists are hopeful.

The Physiological Society averages eight small regional meetings a year. All are equal, but some are more equal than others. The one at either Cambridge or Oxford in July is designated as the annual general meeting. The meeting at University College London

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nation and Research Accountability Act." The bill, which was introduced in the fourth consecutive Congress in 1991, would establish a National Center for Research Accountability consisting of 20 presidential appointees who would review all research proposals involving animals to screen out those that are "essentially duplicative of other research." The latest trimmed-down version of that bill is estimated to have a start-up cost of between \$2 and \$6 billion and an annual cost of about \$38 million, again without additional appropriation. The cost includes the cost of converting the computer system of the National Library of Medicine to one that can store in full-text form all biomedical information available since 1960, as is required by the bill.

The animal liberators will continue to work toward these goals, and, because of their persistence, politicians will continue to make what seem to be minor concessions to the activists. The increasing costs of doing animal research have not been covered in the past by matching funds from Congress, and they will probably not be in the future. Hence the available pool of federal funds for biomedical research is being effectively shrunk as new regulations are imposed. This development will impact negatively on all areas of biomedical research, whether or not that research involves using animals.

Countering the Terrorists

Members of the terrorist arm of the AR/L movement have been able to conduct their acts of vandalism and intimidation with impunity because of the disorganized and relatively powerless state of the animal research community. Although we are now represented by organizations that function at the state and national levels to educate the public and politicians about the importance of using animals in research, and a national lobbying organization has been active for several years [National Association for Biomedical Research (NABR)], these organizations are not capable of countering the terrorists, even when their identity is known. Likewise, grassroots organizations that have flourished, such as the incurably ill For Animal Research (iiFAR), the Coalition For Animals and Animal Research (CFAAR), and Putting People First (PPF), do not have the resources to cope with this threat.

However, the Society for Neuroscience has recently established a Medical Scientists Legal Defense Fund (MSLDF), which is planning to use its resources to cover the legal expenses incurred by a research in Washington, DC who is seeking injunctive relief from harassment by a group of animal extremists. [The American Physiological Society Council voted to join the MSLDF at its September 27, 1991 meeting.] This fund needs to be expanded substantially by generous contributions from all members and organizations in the biomedical community. If each of the more than 30,000 scientists in the FASEB-member organizations were to contribute \$10 a year, the defense fund would soon become

substantial enough to take legal action against the activists at every appropriate opportunity.

The AR/L terrorists have succeeded in gaining a substantial amount of positive publicity for their movement as a result of several well-orchestrated "exposes." It is clear that the infamous Silver Spring monkey media event was staged by Alex Pacheco, cofounder and president of People for the Ethical Treatment of Animals (PETA). PETA also serves as the front for the terrorists who stole videotapes from the University of Pennsylvania and Texas Tech and used them to misrepresent the research being conducted in those respective laboratories.

The Animal Liberation Front (ALF) and its counterparts have committed a number of acts of terrorism, intimidation, and character assassination that were less spectacular and less well publicized but that are nevertheless prosecutable. Members of these groups stole the research animals of a graduate student who was working at the University of California at Irvine and then sued him. Others have lied about the research being conducted by a neurobiologist at the University of California at Santa Barbara and used this disinformation for fund-raising purposes in the *Animals' Voice*, an AR/L magazine. Publicity from these acts has generated hate mail and death threats to the researchers, who are guilty of nothing.

There are several reasons as to why no attempts have been made to prosecute the malefactors who are known to be responsible for some of these acts. The lack of funds to cover legal expenses is one. Of equal importance is the reluctance of the targeted researchers to subject themselves and their families to additional trauma and harassment by allies of the terrorists. Furthermore, if the targeted scientists did pursue criminal prosecution of the terrorists, he/she must be prepared to devote a considerable amount of time and energy (both physical and emotional) to the process. Few researchers can afford the luxury of such a time and energy commitment. Such involvements can only put the committed individual's scientific career in jeopardy. Even though peer reviewers may applaud the individual's courage and commitment at working to prosecute the criminals, such activities will not be helpful in the eyes of review panels when research grants are being considered for renewal.

The Silver Spring Monkey Incident

The persecution of Dr. Edward Taub by Alex Pacheco and PETA and the events that followed from that incident illustrate how unprepared we are to respond to the actions of the terrorists (2, 3). Pacheco had infiltrated Taub's laboratory in Montgomery County, Maryland, as a volunteer worker. While Taub was away on a three-week vacation, Pacheco allowed the condition of the animals and their vivarium to deteriorate. The two animal caretakers were absent during much of this time. Photographs were taken by Pacheco of the animals under staged conditions and given to people with strong antivivisectionist sentiments and great political power. These highly placed animal advocates persuaded the police

to raid the laboratory, in what became a well-orchestrated media circus.

Taub was subsequently cleared of all 117 counts of animal cruelty and neglect, and panels of experts from several scientific societies, including the American Physiological Society, found him to be innocent of wrongdoing and, in fact, the victim of a set-up by PETA. They also found that his research program was important and worthy of continued funding. Nevertheless, Taub's grant was terminated by the NIH, largely a knee-jerk response to adverse publicity—publicity that was kept at a feverish pitch from the beginning by PETA for fund-raising purposes.

Taub received no material support and almost no moral support from the scientific community in his legal battles to clear his name. As a result, he lost eight years from his scientific career and all of his savings. Members of the scientific community presumed that he was guilty as charged or saw him as a source of embarrassment, whether he was guilty or not. Instead of rallying to support him, we turned our backs on him and his problems and hoped they would all go away.

Given this example, is it any wonder that AR/L groups continue to target other scientists with great enthusiasm and vigor or that the targets of the terrorists are reluctant to publicly fight their attackers?

The AR/L terrorists can be defeated in the courts, but it will require a commitment of time, energy, and money. The best illustration that they can be made to pay for their misdeeds is provided by the Bobby Berosini case. Berosini is an entertainer who uses trained orangutans in his Las Vegas act. PETA accused him of abusing his animals and supported their claim with fabricated evidence. Berosini sued them and won a \$4 million settlement.

Legal actions, such as that carried out by Berosini, would serve to further discredit PETA and the whole AR/L movement. Such legal actions will reveal the true nature of the organizations like PETA, will reduce their support base among the public, and will cost them money they would otherwise use to brainwash our children and publicize their lies about animal research. Without adequate financial support from a gullible public, and faced with successful lawsuits, hate groups such as PETA cannot endure.

Moral/Ethical Issues

The central dogma of the AR/L philosophy is that there are no "morally relevant" differences between us and other animals; therefore we cannot justify using them in ways we would not use other humans (4). This conclusion is based on equating certain qualities that we share with nonhuman animals (e.g., curiosity, kinship awareness, intentionality, ability to communicate) or that animal rights philosophers regard as shared qualities (e.g., a sense of the past and the future, beliefs). The fundamentally important shared quality in their view, however, is the ability to feel pain and to suffer. It is further argued that as we and other animals have these common qualities, and as we humans have certain

rights, then animals should have the same rights or at least be given equal consideration (5–7). This argument is unsound because it makes a simple association between the possession of certain qualities and the possession of rights. This association is comparable to arguing that because both humans and animals have sex, and humans have moral codes regulating their sexual activity, then animals should have similar codes.

The Animal Rightists' Double Standard

According to the AR/L philosophy, only humans are immoral for exploiting other species because we do not need to do so (4–7). Animal activists allege that we could use so-called alternatives to animals for biomedical research and that we do not need to consume animals for food, clothing, etc. This belief that only *our* behavior toward other animals should be judged morally and that we are the only natural predator that could abandon a predatory lifestyle acknowledges that we are not just the same as other animals. Indeed, the AR/L test of moral relevance does not consider uniquely human qualities that distinguish us from all other species. These uniquely human capacities are manifestations of our intellect and include the abilities for abstract thought, creativity, imagination, ingenuity, insatiable curiosity, the capacity to reason, and complex linguistic skills. These qualities are highly prized by people in all human societies because they have given us the most valued aspects of our cultures, such as art, literature, music, government, science, and technology. However, there is a more fundamental reason why humans regard these intellectual qualities with such esteem: they constitute our only adaptive advantage, without which we would not exist as a distinct and highly successful species (4).

Morally Relevant Differences

The belief that there are no morally relevant differences between us and animals ignores other significant and uniquely human qualities. We are the only species that has developed moral codes to judge our behavior, especially our behavior toward each other and toward animals. We are the only species that can make moral judgments and enter into moral contracts with other reasoning beings who understand the concept of morality and rights. We are moral agents: animals are not. This difference between us and animals is clearly a morally relevant one.

There are other important qualities that are uniquely human. Ours is the only species that can prevent and cure diseases in ourselves and other animals, and only we show concern about the welfare of other species. Indeed we frequently expend great effort and expense to preserve the habitats of animals and to save some from extinction. There are no animal societies for the prevention of cruelty to humans or animals. We would suggest that our concern for the welfare

of other species is another morally relevant difference between us and other animals.

Animal Activists' Hypocrisy

Animal rights activists claim that they are concerned about animal welfare and all animal suffering, but their literature and actions show that this claim is false. The philosophers of the movement devote an inordinate amount of their writings to animal use in biomedical research and education relative to animal use in other spheres, although only 0.3% of the animals "consumed" annually in the United States are used in research [i.e., about 20 million/year (7)]. By contrast, the killing of cats and dogs in pounds [27 million/year or 0.4% of the annual "consumption" (1)] receives little mention. An editorial in a leading animal rights magazine recently acknowledged that the AR/L movement has been grossly negligent about addressing the problem of pound animal slaughter (8). The animal rights activists object vehemently to the use of animals in ways that lead to knowledge that can help humans but have little concern about the senseless and useless deaths of millions of cats and dogs in pounds. However, they do work tirelessly to block the use of a few of these pound animals in biomedical research.

Animal rightists vigorously protest vivisection in the laboratory (even though virtually all surgical procedures in research are performed with anesthesia in accordance with veterinary standards), but they show little concern about vivisection that is conducted on innocent beings outside of research labs without anesthesia. More than 0.4 million puppies are subjected to tail docking every year in the United States, and almost 2 million infant boys are circumcised (1). Both of these procedures are generally done without anesthesia. Furthermore, more than 60 million piglets and bullocks are castrated and about 7 million lambs have their tails docked every year without anesthesia (9); yet this vivisection gets scant mention in the animal rights literature. For example, in the new edition of his book *Animal Liberation*, Peter Singer devotes 69 pages to decrying the use of animals in research (again, about 20 million used annually, with the vast majority experiencing no pain or discomfort) while assigning 0.6 pages to concern about the vivisection (castration and tail-docking) without anesthesia of almost 70 million domestic animals (5).

A further example of AR/L hypocrisy is provided by their persistent attempts to add amendments to the Animal Welfare Act. Recently, animal activists called for changes in the required standards for cages for laboratory animals. They also demanded measures be taken to ensure the "psychological well-being" of research animals (nonhuman primates). However, they made no request that similar standards be applied to pounds, kennels, veterinary clinics or other facilities where animals are held in cages. The animal research community has opposed such amendments to the AWA because they constitute more expensive encumbrances to be imposed on biomedical research and would do nothing to promote animal welfare.

Threats to Human Survival

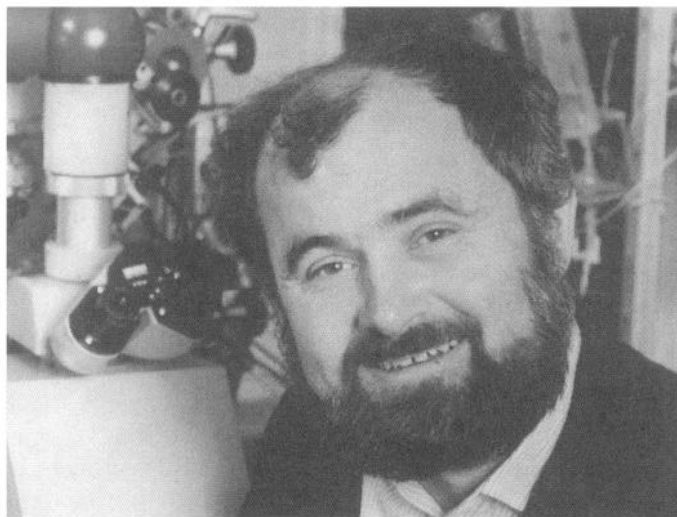
Animal activists maintain that we do not need to do any more animal research. All we need to do is apply the knowledge that is already available or use the alternatives. These opinions show a lack of understanding of medical history and current medical reality. There are four major threats to our well-being and survival as a species: 1) infectious diseases, 2) parasites, 3) insects, and 4) ourselves (overpopulation, environmental pollution, and destruction). The fourth is new, but the other three have always been with us and probably always will be. New infectious or parasitic diseases could arise at any time or old ones could become more virulent and, thus, decimate the human population. Insects can evolve rapidly and develop resistance to insecticides and other means of control, posing threats to our survival in various ways.

If we are to defend ourselves against these threats, we must be free to use our only means of defense: our intellect, which is our sole adaptive advantage, and its instrument, the research laboratory. To understand and cope with new threats to our survival, we must be able to continue to conduct biological research, and much of that effort will require the use of animals. By curtailing our freedom to use animals in biomedical research, the AR/L movement would deny to us the full use of the options that we need to protect ourselves. This attitude illustrates the fundamentally antihuman motivation of the AR/L movement. Another illustration comes from a poll of the participants of the Animal Rights March on Washington, DC last June (10), which found that 75% of them did not approve of the use of animals for research that would benefit humans even if the animals were not harmed by it. A few of the statements of leading figures in the AR/L movement are also enlightening of their motives. For example, Ingrid Newkirk, national director and cofounder of PETA, has stated, "I don't believe that human beings have the 'right to life.' That's a supremacist perversion. A rat is a pig is a dog is a boy." And, "Mankind is the biggest blight on the face of the Earth" (2). Philosopher Tom Regan shows his regard for the acquisition of knowledge by saying, "If [abandoning animal research] means that there are some things we cannot learn, then so be it" (6). Even Peter Singer cannot hide the fact that he is not overcome with concern for his own species. Consider the following statement: "[I]f these children had a pleasant year before being humanely slaughtered, it would seem that the gourmet who wished to dine on roast human child would have as good a defense of his practice as those who claim that they are entitled to eat pork because the pig would not otherwise have existed" (11).

Fortunately, most humans do not concur with these misanthropic sentiments. They would agree that we not only have a need and a right to protect ourselves from harm, but we also have an obligation to use all resources available to prevent or cure diseases and relieve suffering in humans and animals. That is a moral judgment that only the human ani-

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Nobel Prize For Medicine Awarded to APS Honorary Member



An honorary member of the American Physiological Society and his colleague were awarded the Nobel Prize for Medicine for their work in discoveries concerning "the function of single ion channels in cells."

Erwin Neher, director of the membrane physiology department at the Max Planck Institute for Biophysical Chemistry in Gottingen, Germany, and his colleague, Bert Sakmann, a cell physiologist at the institute's Heidelberg laboratory, received the prize for work done in the 1970s and 1980s when they were together in Gottingen.

Neher was elected to honorary membership in APS in 1988. His sponsor, APS President-elect Stanley Schultz, said of Neher's work:

"The patch-clamp technique has made it possible to study the properties of single ion channels—often a single, protein molecule—in biological membranes and has already had an enormous impact on our understanding of the regulation of many channels at the molecular level on the physiological and pathophysiological conditions.

"For example, the elegant studies by Ray Frizzell and Mike Welsh on the regulation of chloride channels in the apical membrane of airway epithelial cells that have shed light on the pathophysiology of cystic fibrosis would not have been possible without this technique.

"This technique is to membrane biophysics what cardiac catheterization is to cardiovascular physiology, radioimmunoassay to endocrinology, or the bubble chamber to elementary particle physics.

"The full impact that this technique will have on our understanding of cell physiology, pathophysiology, and pharmacology will not be appreciated for years to come; we have thus far only witnessed the tip of the iceberg."

The Swedish Karolinska Institute said in its official citation that the two researchers "contributed to the understanding of the cellular mechanisms underlying several diseases, including diabetes and cystic fibrosis.

"In summary," the citation states, "Neher and Sakmann's contributions have meant a revolution for the field of cell biology, for the understanding of different disease mechanisms, and opened the way to develop new and more specific drugs." Their achievements have "radically changed our views on the function of the cell and the content of text books of cell biology."

Nominations for Honorary Membership Requested

The Honorary Membership Committee would like to solicit the names of individuals who might be candidates for Honorary Membership in the American Physiological Society. A nominator should provide a curriculum vitae and a statement about the candidate. Because of the sensitivity involved, information should not be requested from the candidates themselves.

Honorary Members are valuable to the Society by demonstrating that the Society recognizes contributions of colleagues. No specific guidelines are set, but the Committee insists on demonstrated and sustained excellence.

Corresponding Members are eligible for Honorary Mem-

bership. In general, members of the American Physiological Society who live in North America are not considered. However, in unusual situations, a scientist in North America not a member of the American Physiological Society whose primary identification is with another discipline but who has made distinguished contributions to physiology may be considered.

Nominations and supporting documents should be sent to William F. Ganong, M.D., Committee Chairman, Department of Physiology, University of California, San Francisco, CA 94143-0444.

News From Senior Physiologists

Letters to Helen M. Tepperman

"Because I retired from another world about 30 years ago when I became a physiologist, I have no further plans to retire from physiology," writes **Novera Herbert Spector**. "The creaking joints and aching bones here or there unfortunately serve only to goad me into more, perhaps too many, activities."

Before becoming a physiologist, Spector spent 22 years as a machinist, toolmaker, corporate president, consulting mechanical engineer, inventor, instrument designer, and biomedical engineer. He is currently continuing to fulfill his responsibilities as health science administrator in the fundamental neuroscience program at the National Institute of Neurological and Communicative Disorders and Stroke at the National Institutes of Health. He also holds adjunct professorships at the University of Alabama, Birmingham, and Georgetown University medical centers.

"Just over two years ago I retired from regular (albeit part-time) employment," **Peter H. Wright** reports from Bloomington, IN, "but I am still a consultant to Boots Pharmaceuticals, Inc. This keeps me occupied for about two days of each week going through the literature and writing articles for the company."

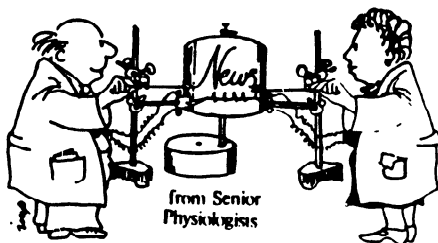
"I am also occupied with projects I have had little time to follow in the past, helping as a volunteer with the VITAL program at the Monroe County Library, recording stories on tape and editing diaries written by my father and myself. All in all, I am kept busy and I am happy with my lot."

Leah M. Staling writes from Hagerstown, MD, that when she retired in 1978 she accepted a volunteer post as a visiting research professor in her physiology department at the University of Maryland, Baltimore, to con-

tinue her research and postdoctoral teaching in neuromotor physiology.

"These endeavors resulted in collaboration on research reports, annual papers, and teaching manuals. Physiology meetings were always enjoyed and I presented my last paper at the IUPS meeting in Vancouver in 1986. Our latest teaching manual was published in 1990.

"Since we had moved 80 miles west from Baltimore when we retired, transportation has become more difficult as my years and the traffic increase. Home interests on our tree farm and local citizen advocacy have replaced much of my professional activity. I find horticulture and aquaculture to be rewarding labors, combined with wildlife conservation and care. I also serve on local boards (community action, area health education) and volunteer with AAUW and the League of Women Voters."



"Thank you and the APS for your good letter on my 93rd birthday," writes **Eugene U. Still**. "I was pleased that quite a number of my students remember me. I think most of my coworkers have passed on. So must it be. I have not been gainfully employed for about 30 years."

"I remember with pleasure many of the APS meetings in the early years, especially the one in Montreal where a humorous thing happened. I was in my last year of study for my doctorate at the University of Chicago and had never met many of the important men in our profession. At a banquet I sat next to Dr. Otto Folin. I introduced myself and his reply to me was: 'Ah, yes. Dr. Still. I know many of your works and admire you greatly.' I did

not have an answer, of course, but it showed to a young physiologist that great people are not only excellent academically, but also personally. Dr. Folin had just published the major work concerning the method of blood analysis by Folin and Wu.

"After I retired I moved to Sarasota, FL, where after a year of loafing I established a private research laboratory, which I continued for about 20 years. In the meantime our children had left the nest, so my wife, Josephine, and I sold some of our property and bought some property in the Cayman Islands an alternated between Grand Cayman and Sarasota. About a year ago I developed a detached retina and, although I had an excellent surgeon, I now have only about 20 percent vision and cannot read or write.

"Last year we celebrated our 50th wedding anniversary and later moved to Owensboro, KY, to be near our youngest son and family. We are very happy with our present mode of life. Our two sons, their wives, and our five grandchildren will all be here for Christmas. I still enjoy my amateur radio work and I have been granted a lifetime license. Long stem roses are my source for exercise and beauty."

Letters to Horace W. Davenport

Dexter M. Easton reports that after seven years at the University of Washington zoology and physiology department and a year as a Fulbright Research Scholar in New Zealand that he moved in 1955 to Florida State University where over the years "I have tried to teach uncounted numbers of pre-med, pre-nursing, and other undergraduates, written two editions of a 'Mechanisms of Body Function' text, and supervised a dozen or so graduate students."

"The amiable milieu of our biological science department, affiliated with a marine station, blessed with congenial interdisciplinary connections, honored by fantastic support groups in

machine and electronic shops, and ornamented by a psychobiology program, has allowed me to indulge my interest in comparative neurophysiology. During the past decade I have turned to mathematical modeling of a special sort, namely Gompertz kinetics, commonly used for human survivorship curves. I find the central assumption, the exponential change rate coefficient, is appropriate for modeling a multitude of other functions that involve large populations of entities of whatever kind.

"Officially, I have been retired since 1982. In that year FSU allowed qualified faculty to retire and then to continue with tenure at halftime employment indefinitely. Now turning 70 I feel in excellent health, encumbered mainly by an apparent chronic bronchitis which is embarrassing for a lifelong non-smoker. Advice to the young? Kant's Categorical Imperative. Live according to good physiological principles and marry well."

"I reached the mandatory age of retirement at the University of Pennsylvania on June 30, 1990," writes **Robert E. Davies**, "but I am still continuing to teach in both physiology and biochemistry courses. I am also teaching a general honors course in the department of astronomy and astrophysics on 'The Search for Extraterrestrial Life in the Universe.' This has led to publications and presentations in the new field of bioastronomy.

"I have given up my laboratory space, but I am still reading the literature. I spent the last three years being chair-elect, chair, and past chair of the faculty senate at Penn, which meant being a member of about 25 committees. Cooperating in the effective running of the university by faculty members is an essential duty, but I am glad it is over.

"I still continue outdoors activities such as scuba diving, whitewater rafting, rock and mountain climbing, and wilderness camping. I videotaped the volcanic activity in the crater of Soufrier, the recently erupting volcano on St. Vincent in the Windward Islands. Life is still very full." ■

Membership Status

(September 1991)

Regular	4,899
Emeritus	771
Honorary	27
Corresponding	301
Associate	739
Associate Corresponding	29
Student	353
Total	7,119

Newly Elected Members

The following were elected to membership in the Society by Council at its 1991 Fall Meeting, San Antonio, TX.

Regular

David H. Alpers
Washington University

Morton F. Arnsdorf
University of Chicago Hospitals

Elikplimi K. Asem
Purdue University

Robert H. Bartlett
University of Michigan

Ann C. Bonham
University of California, Davis

Brian A. Caston
San Francisco VA Medical Center

Vincent A. Chiappinelli
St. Louis University

Doris K. Cope
University of South Alabama

John Cuppoletti
University of Cincinnati

Caron Dean-Bernhoft
Milwaukee VA Medical Center

Eric J. Y. Delpire
Wright State University

Mark E. Dibner-Dunlap
Cleveland VA Medical Center

Claire M. Doerschuk
Indiana University

Shahnaz Duara
University of Miami

Roger P. Farrar
University of Texas, Austin

Michael Fill
University of Texas Medical Branch

Loretta A. Gallenberg
Zablocki VA Medical Center

Dan Garner
UCLA, Harbor

James D. Gifford
University of Cincinnati

Christine A. Gleason
Johns Hopkins Hospital

Andrew S. Greene
Medical College of Wisconsin

Robert D. Harvey
Case Western Reserve University

Benjamin T. Jackson
Providence VA Medical Center

Larry M. Jordan
University of Manitoba

John M. Kennedy
University of Illinois, Chicago

Thomas R. Kleyman
Philadelphia VA Medical Center

William J. Kraemer
Pennsylvania State University

Beverly L. Krilowicz
California State University

Jean-Marc Lavoie
University of Montreal

Kae Y. Lee
Issaacs Gordon Center for Digestive Diseases & Nutrition

Frans H. H. Leenen
University of Ottawa

Yeong-Hau H. Lien
University of Arizona

James R. Ligas
University of Connecticut

J. T. Lightfoot
Florida Atlantic University

Rodger D. Loutzenhiser
Miami VA Medical Center

Ronald M. Lynch
University of Arizona

Gerhard Malnic
University of Sao Paulo

Carlos Martinez del Rio
Princeton University

Kevin K. McCully
College of Pennsylvania

Donald C. McKenzie
University of British Columbia

Todd D. Miller
Mayo Clinic, Rochester

Jeremiah J. Morrissey
Jewish Hosp at Washington University

Stanley J. Nazian
University of South Florida

Srdjan D. Nikolic
Albert Einstein College of Medicine

Martha E. O'Donnell
University of California, Davis

Norman Orentreich
Orentreich Medical Group

Mark S. Orloff
University of California, Los Angeles

Mary F. Otterson
Zablocki VA Medical Center

Vincenzo Panagia
St. Boniface General Hospital

Paul J. Pongonis
University of California, San Diego

Jane F. Reckelhoff
University of Mississippi

Mary Anne Rokitka
SUNY, Buffalo

Bruce K. Rubin
University of Alberta

Leona J. Rubin
University of Missouri

Nancy K. Schreyer
Bristol-Myers Squibb Co.

Sudhir V. Shah
University of Arkansas

David G. Shoemaker
Emory University

Kathy E. Sietsema
UCLA, Harbor

David I. Soybel
Yale University

John A. St. Cyr
University of Colorado

Stephen K. Sullivan
Columbia University

Belay Tesfamariam
Boston University

Donald B. Thomason
University of Tennessee

Nancy C. Tkacs
University of California, San Francisco

Kenneth M. Verburg
Abbott Labs

Ronald G. Victor
University of Texas Southwestern

Thomas C. Westfall
St. Louis University

Corresponding

Christian G. Brilla
University of Missouri, Columbia

Ovidio Bussolati
University of Parma, Italy

Torben Clausen
University of Aarhus, Denmark

Pierre J-L. Escourrou
University of Paris, South

Yoichi Goto
Natl Cardiovascular Center, Japan

Roman L. Haberl
University of Munich

Bjarne M. Iversen
University of Bergen

Myung-Suk Kim
Catholic University, Korea

Eminy H. Lee
Academia Sinica, China

Yasuhiro Nishida
University of Texas, San Antonio

Andrea M. P. Romani
Case Western Reserve University

Yasushi Sakai
Showa University, Japan

Makoto Suzuki
Jikei University, Japan

David A. York
Louisiana State University

Associate

Benjamin O. Anderson
University of Colorado

Stephen T. Ballard
University of South Alabama

Marilyn A. Brandt
University of North Texas

Gary R. Brodowicz
Portland State University

Mary C. Carmichael
University of Arizona

Yongwei Chien
Alton Ochsner Medical Fndn

Lynell C. Collins
Louisville, Kentucky

Jeffrey L. Conklin
University of Iowa Hospitals & Clinics

George M. Dolson
Houston VA Medical Center

Mark A. Douse
University of Toronto

Donna L. Dyess
University of South Alabama

John R. Forder
Johns Hopkins University

Allen Gibbs
University of California, Davis

Rodrigo A. Iturriaga
University of Pennsylvania

Diane E. McClure
University of California, Davis

Scott W. Mittelstadt
Milwaukee VA Medical Center

Stephanie M. Mouton
Vanderbilt University

Karen A. Munger
Vanderbilt University

Kathleen P. O'Hagen
Milwaukee VA Medical Center

Alexander J. Rouch
University of Alabama at Birmingham

Joseph Signorile
University of Miami

Terrence E. Sweeney
University of Arizona

Walter R. Thompson
University of Southern Mississippi

Paul R. Wade
Columbia University

Carol J. Weaver
West Virginia University

Associate Corresponding

Mohammed H. Al-Hassani
Indiana University

Marian E. Brandle
University of Nebraska

Keiji Enzan
Akita University

Jin Seok Jeon
Keimyung University

Young-Hee Kang
Hallym University, Korea

Andreas Lubbe
Freie University, Berlin

Teresa Lyson
University of Texas Southwestern

Ulrich Marti
University of Bern

Emmanuel O. Soyoola
Auburn University

Lih-Min Tsai
Natl Defense Medical Center, China

Hun Yang
Sooncheonhyang University, Korea

Li-Hui Chow
Wayne State University

Daniel J. Conklin
University of Notre Dame

Sean M. Connery
William Beaumont Army Medical
Center

Robert E. Crawford
Auburn University

Jose R. Criado
University of Oklahoma

Timothy A. Cudd
University of Florida

Sandra T. Davidge
University of Cincinnati

Jack C. Debes
University of California, San Diego

Glenn H. Dillon
University of Illinois

Christopher J. Doll
University of British Columbia

Robert M. Douglas
Howard University

Heather A. Drummond
Milwaukee VA Medical Center

LeAnn D. Ermel
University of Texas Southwestern

Lynn M. Everett
Indiana University

Jason G. Fewell
Florida State University

Kim T. Fredricks
Medical College of Wisconsin

Susan P. Gauthier
Temple University

Patricia D. Gillette
University of Louisville

Orlando Gonzalez
University of Puerto Rico

Jose Gonzalez-Alonso
University of Texas, Austin

Michael S. Hedrick
University of British Columbia

James C. Hershey
University of South Carolina

Denise C. Hocking
Albany VA Medical Center

Pauline Hsu
University of Tennessee

Mark J. Hubley
Florida State University

Jeffrey L. Jasperse
University of Arizona

Claudia E. Kasserra
University of British Columbia

Dorothy M. Kearsse
Howard University

John E. Keen
Simon Fraser University

James M. Keily
Emory University

Richard Kinkad
University of British Columbia

DuAnn E. Kremer
Auburn University

Bharath S. Krishnan
University Hospital, Saskatchewan

Mary J. LaDu
University of Illinois

Bobbi Langkamp-Henken
University of Tennessee

Anne-Marie Lauzon
McGill University

Ho T. Lee
New York Medical College

Xuanwen Li
Indiana University

Ying-Jie Li
University of Minnesota

Patricia B. Lieberman
University of Michigan

Li Lu
University of Michigan

Christopher C. Lucas
University of Florida

Hong Y. Luo
Louisville, Kentucky

Jennie C. Mangun
University of Louisville

Kimberly P. Mayfield
University of Michigan

Student

Azeez A. Aileru
Howard University

Francisco H. Andrade
University of Texas

David G. Bernard
Howard University

Ina P. Brown
New York Medical College

Michael A. Burson
Oregon Health Sciences University

Maureen B. Burton
University of Iowa

Kevin C-J. Chang
University of Illinois, Urbana

Jieguang Chen
Indiana University

Beverly S. Monts
Indiana University

John K. Moon
University of Texas, Austin

Patrick C. Nolan
University of Illinois, Champaign

Patrick M. Oates
Howard University

Gibson K. Oriji
Howard University

Yi Pan
Howard University

Ronald S. Platt
University of Calgary, Alberta

Deborah R. Rayfield
Howard University

Thomas C. Resta
University of New Mexico

Edward K. Rodriguez
University of California, San Diego

David K. Saunders
Kansas State University

Lucretia M. Sexcius
Howard University

Hassen T. Sherief
Howard University

Casey A. Shonis
University of Illinois, Urbana

Lamara D. Shrode
Wright State University

Martin R. Siegfried
Thomas Jefferson University

Michele S. Skelton
Auburn University

Edith W. Smith
Auburn University

Michael J. Spinella
Albany Medical College

Janet E. Steele
Miami University

James C. Stein
St. Louis University

Deborah S. Storm
University of Michigan

Clarke G. Tankersley
Pennsylvania State University

Marion J. Thomas
Simon Fraser University

Rebekah J. Thomas-Young
University of Texas, San Antonio

Errol G. Thompson
Howard University

Carol E. Torgan
University of Texas

Nan T. Triplett
Pennsylvania State University

Philip S. Tsao
Thomas Jefferson University

Frank B. Underwood
University of Missouri

Esther E. Versteegden
University of Texas

Zuyul Wang
Howard University

Michael J. Webster
University of South Alabama

Yun Xia
Ohio State University

Bo Xu
Indiana University

Sai Yang
Louisville, Kentucky

Benedict B. Yaspelkis
University of Texas

Mason Guest Professorship of Physiology

M. Mason Guest, who had a long and successful career in physiology, died on June 21, 1991. He was active in teaching and research as well as in many community activities despite his 85 years and had just completed writing a grant to support his research efforts for the next three years.

Guest was chairman of the department of physiology at the University of Texas Medical Branch, Galveston, until 1973. His research was in blood coagulation and fibrinolysis. Guest's greatest contribution was the discovery of urokinase, the fibrinolytic activator, that recently has gained widespread clinical use as a result of recombinant technology.

In memory of his many contributions to our knowledge of physiology, a fund has been established at the University of Texas Medical Branch for a M. Mason Guest Professorship of Physiology. Contributions may be sent to M. Mason Guest Professorship of Physiology, c/o Dr. Luis Reuss, Department of Physiology and Biophysics, The University of Texas Medical Branch, Galveston, TX 77550.

Austin Henschel Memorial Fund Established at APS

A fund has been established at APS in memory of Austin Henschel, who died earlier this year. Henschel, who was a member of APS since 1944, spent more than 50 years in environmental and occupational health programs of the US Army and the National Institute of Occupational Safety and Health (NIOSH). Although he had retired from NIOSH in 1974, he continued to work at the agency two days a week until about one month before his death.

Contributions should be made to the Austin Henschel Memorial Fund and sent to APS, 9650 Rockville Pike, Bethesda, MD 20814-3991.

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.

STAUB

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is also considered a major one. Raised on debate and public speaking, British physiologists have not yet accepted posters as equals. At the Oxford meeting I attended in July 1990, there were 125 oral papers and 15 posters. Because I am a strong poster advocate, this distressed me.

The Physiological Society has moved aggressively into secondary school education. They have established symposia for high school seniors, teacher workshops, and a lecture service for schools (in cooperation with other science organizations); have published several paperback study guides; and are actively participating in the Association for Science Education. These activities may be in response partly to a declining interest in science careers and partly to the weak science curriculum in British primary and secondary schools.

The Physiological Society faces the same challenges as does the American Physiological Society in education, research funding, animal welfare, and public image. Both have a century of proud heritage; both have strong publications and stable financial bases. We need more interactions between our Societies for the good of all physiological sciences.

Norman C. Staub

Guiding Principles in the Care and Use of Animals

Approved by the Council of The American Physiological Society¹

Animal experiments are to be undertaken only with the purpose of advancing knowledge. Consideration should be given to the appropriateness of experimental procedures, species of animals used, and number of animals required.

Only animals that are lawfully acquired shall be used in laboratory research, and their retention and use shall be in every case in compliance with federal, state and local laws and regulations, and in accordance with the NIH Guide.²

Animals used in research and education must receive every consideration for their comfort; they must be properly housed, fed, and their surroundings kept in sanitary conditions.

All experimental procedures must be carried out in accordance with the NIH Guide. Appropriate anesthetics must be used to eliminate sensibility to pain during all surgical procedures. Muscle relaxants or paralytics are not anesthetics and they must not be used alone for surgical restraint, but may be used in conjunction with drugs known to produce adequate analgesia. The postoperative care of animals shall be such as to minimize discomfort and pain, and in any case shall be equivalent to accepted practices in veterinary medicine. All measures to minimize pain and distress that would not compromise experimental results must be employed.

If the study requires the death of an animal, the most humane euthanasia method consistent with the study must be used.

When animals are used by students for their education or the advancement of science, such work shall be under the direct supervision of an experienced teacher or investigator.

¹Revised September 28, 1991.

²*Guide for the Care and Use of Laboratory Animals*, DHEW Publication No. (NIH) 85-23, Revised 1985, Office of Science and Health Reports, DRR/NIH, Bethesda, MD 20892.

NICOLL

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mal is capable of making. It is a further illustration that we are not just like other animals.

In 1896 the prominent American physician and physiologist Dr. Walter B. Cannon made a statement with regard to opponents of animal research that is as appropriate today as it was nearly 100 years ago: "[T]he antivivisectionists are the second of the two types Theodore Roosevelt described when he said, 'Common sense without conscience may lead to crime, but conscience without common sense may lead to folly, which is the handmaiden of crime.'"

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Postmark APS: Five Letters Express APS Concerns Ranging From Ethics and Misconduct to Lab Dogs

APS Protests Proposal Banning Federal Employees Participation in Society Internal Affairs

The Office of Government Ethics (OGE), in a move to set ethical standards for federal employees, is proposing regulations that would bar federal employees from participating in the affairs of professional membership organizations, such as the American Physiological Society.

The regulations, if promulgated, would prohibit federal employees from serving as volunteer officers, directors, committee members, journal editors, or in any other capacity, whether elected by the membership or appointed by a board of directors.

As proposed, the regulations would keep a federal employee from using official time to "administer the internal affairs of any such organization (professional associations) or to carry out its business affairs, or to attend or to participate in meetings or events that primarily serve those purposes."

In a letter to the OGE, the Society urged that the paragraph barring federal employees' participation in professional membership organizations be withdrawn from the proposed "Standards of Ethical Conduct for Employees of the Executive Branch." The letter noted that APS membership includes many who are employed by the federal government.

"[T]he result (of the proposed regulation) is to effectively prevent federal employees from taking part in the leadership of professional societies, such as APS, thus depriving the profession of valuable expertise and knowledge. The federal government also loses as its employees are deprived of opportunities to exchange ideas and to advance their profession.

"Moreover, to deprive associations of the talents of individuals solely because they are employed by the federal government lessens the benefits accrued to both the profession and society and creates a barrier between the government and the citizens it serves.

"Federal employees in agencies such as the National Institutes of Health, National Science Foundation, Department of Veterans Affairs, Department of Agriculture (to identify a few) will be denied opportunities to learn the needs and concerns of colleagues, and vice versa, if participation is limited only to attendance at conferences and seminars. . . ."

The letter also noted that in the preamble of the proposed regulations and in the section dealing with professional membership organizations, it is stated that the federal government encourages its employees to participate in the activities of professional associations organized to enhance their skills and abilities.

The final rules are expected to be announced by the OGE soon after the first of the year.

Testing Service Deletes Question on Animal Research

The Educational Testing Service (ETS) has retired a question from its Preliminary Scholastic Aptitude Test/National Merit Scholarship Test that said concern for research animal abuse was a breakthrough.

In a letter to the Princeton, NJ, testing service, APS charged that the question was not only factually incorrect but also was a subliminal message and led exam takers toward value judgments concerning the use of animals in research. The question was

"28. Viewed against a century of public apathy, these long overdue stirrings of concern about the abuse of animals in scientific research are nothing short of _____.

- (A) a travail (B) an oversight
- (C) a breakthrough (D) a legacy
- (E) an eon."

[Correct answer: (C) a breakthrough].

The question was discovered by J. R. Haywood, who is a member of the APS Animal Care and Experimentation Committee, after his daughter had taken the test in San Antonio.

In its response, ETS said, "The considered critique of our tests and questions that we receive from individuals aid our continuing endeavor to maintain high standards of quality, fairness, and accuracy. This question (No. 28) will be retired and any other similar questions, should they come to light, will be reevaluated."

Society Voices Concerns About Misconduct Policies

The APS has voiced its concerns about the definitions of scientific misconduct and the policies and procedures under which the Office of Scientific Integrity (OSI) coordinates and conducts investigations of alleged misconduct.

The OSI defines scientific misconduct as fabrication, falsification, plagiarism, or "other practices that seriously deviate from those commonly accepted within the scientific community for proposing, conducting, or reporting research."

In a letter to the Office of Scientific Integrity Review, the Society said that "fabrication, falsification, and plagiarism are definable. However, practices 'that seriously deviate' and 'those commonly accepted' are not definable and are, at best, subjective interpretations. Thus, originality or even sloppiness could be interpreted as misconduct."

It is the Society's recommendation that the definition of

scientific misconduct be limited to fabrication, falsification, and plagiarism.

APS' concerns about the OSI's policies and procedures for investigation is that "they establish a system wherein the accused is considered to be guilty and must prove his or her innocence, which is contrary to the nation's judicial code of presumed innocence."

Among the examples cited is the placing of the name of the accused on the Public Health Service's ALERT List. The ALERT List is used for collecting, controlling, and disseminating information about an individual who is under investigation for possible misconduct or when a decision has been made to undertake an investigation of an individual.

The Society believes placing an investigator's name on the ALERT List should be deferred until the individual is proven guilty.

APS also believes the OSI policy of investigation is unfair in that no opportunity is provided for subjects of the inquiry or investigation to confront and cross-examine witnesses interviewed by the OSI. Moreover, the OSI can limit materials available to the accused if such disclosure would violate individual confidentiality.

"Protection of informants is a commendable virtue," the APS letter said, "but it is not superior to the right of the accused to confront informants directly without the OSI acting as an intermediary."

"It is the American Physiological Society's belief that if the OSI's policies and procedures are to be effective for dealing with allegations of scientific misconduct, they must be perceived by the scientific community as being fair. Otherwise, evasion rather than adherence will be the result."

Encyclopedia Statement on Lab Dogs Challenged

In a letter to Encyclopaedia Britannica, Inc., APS has challenged a statement concerning the use of dogs in research.

In the section entitled "Dogs," the 1991 edition of The New Encyclopaedia Britannica makes the following statement: "Another common use of dogs, especially purpose-bred beagles, is in biomedical research. Such use, which often entails much suffering, has been questioned for its scientific validity and medical relevance to human health problems."

The APS letter noted that scientific validity and medical relevance has been questioned only by those in the animals rights movements, which represents about one percent on the nation's population. The letter also cited several lifesaving techniques and procedures developed using laboratory dogs.

The Society also charged as misleading and inflammatory the statement that the use of dogs often entails suffering. Federal regulations and procedural requirements for animal use were cited along with the government's Fiscal Year 1990 animal use report which shows that of the 109,992 dogs used in research only 1,274 dogs were used in experiments involving pain and no drugs.

APS, Biology Teachers at Odds Over Laboratory Animal Monograph

The National Association of Biology Teachers' (NABT) monograph, "The Responsible Use of Animals in Biology Classrooms," has resulted in a clarification of the association's policy as a result of an outcry from both NABT members and nonmembers, including APS.

In a letter to NABT, APS said, "The Society supports the proposal that experiments using animals should be undertaken only for the purpose of advancing knowledge and that considerations should be given to the appropriateness of experimental procedures, species, and the number of animals to be used."

"The monograph, however, goes beyond this claim and promotes eliminating the use of animals in the classroom. Throughout the monograph there is strong undercurrent of the antivivisection sentiment. The consultants for the monograph are almost exclusively prominent members of the animal activist community. Recommended literature for teachers and students includes literature provided by animal activists; only one reference is made to material provided by the biomedical community."

"Entirely lacking from the monograph is any indication that great strides in medical knowledge have been made possible only by the use of animals." The letter itemized specific problem areas and contradiction of objectives.

In its response, NABT said APS "misconstrued the purpose of the monograph" and noted that some claims made by APS were acknowledged in the clarification of policy statement, which was issued after publication of the monograph because it (monograph) "has engendered 'much debate and confusion among members and nonmembers'."

W. M. Samuels

(APS members may obtain a copy of the correspondence by writing to APS National Office, 9650 Rockville Pike, Bethesda, MD 20814-3991. Please indicate which letter(s) you want.)



Senate Again Approves Lab Break-in Bill

The Senate has approved by unanimous consent the "Animal Research Facilities Protection Act of 1991," a bill, if enacted by the Congress, would make break-ins and thefts at animal research facilities a federal offense.

This marks the second time the Senate has unanimously approved such legislation. A similar Senate bill introduced in the 101st Congress died last year in a House committee. Two bills that would make break-ins and theft of animal research facilities a federal offense currently are under consideration by the House.

The Senate bill carries three penalties for persons guilty of violating the statute. Any person convicted of breaking into, vandalizing, destroying, stealing, or causing unauthorized or intentional release of animals; or, aiding, abetting, or counseling the commission of such acts; or, knowingly receiving stolen property or comfort to prevent an offender from apprehension, trial, or punishment can be fined a maximum of \$5,000, imprisoned for not more than one year, or both, for each violation.

If an individual is convicted of causing willful and malicious harm to a person or property, the maximum fine is \$10,000, 10 years imprisonment, or both, for each violation. If the life of any person is placed in jeopardy as a result of a violation, the maximum fine is \$25,000, 20 years imprisonment, or both.

Oregon Supreme Court Refuses to Grant Standing to PETA

The Oregon Supreme Court has ruled that PETA lacked standing to bring suit against the University of Oregon.

PETA was appealing lower court rulings of refusing to hear a 1988 suit because the animal rights organization did not have standing. PETA had sued

the university with failure to comply with federal and state animal research laws.

The supreme court said there are three ways an individual or an organization may have legal standing to file civil suits. They must show they have been injured because of government action, they must seek to further an interest the legislature wishes to have considered, or they must have a strong enough stake that they would be legally affected by a government decision.

In its ruling the court said, PETA "has not shown, or even claimed, that it fits within any of the criteria required by the legislature for standing. What PETA argues, in essence, is for good government—its own particular view of good government."

The original suit claimed that the university's institutional animal care and use committee did not comply with the law in approving a research project involving three barn owls. The project, supported by the National Institutes of Health, is a study of how barn owls use sound to visualize space below them and to determine what applicability, if any, could be used by the blind.

Magazine, Writer Settle PETA Suit Out of Court

Washingtonian magazine and freelance writer Katie McCabe settled out of court the \$3 million libel suit filed against them by the People for the Ethical Treatment of Animals (PETA).

The suit was filed after a February 1990 article, entitled "Beyond Cruelty," claimed the animal rights movement has little concern for the humane treatment of animals and wants to end man's use of animals including those uses that are saving lives.

The magazine, which also paid for McCabe's defense, agreed to apologize to PETA, to make an unspecified donation to the animal rights movement, "acknowledge that some of the statements in the article are incorrect and that others require clarification," and to express "sincere regrets for any difficulties caused by the statements."

Sears Ends HSUS Promotion After Wildlife Group Protest

Sears, Roebuck & Company has withdrawn its catalog merchandise promotion with the Humane Society of the United States (HSUS) after a protest was lodged by the Wildlife Legislative Fund of America (WLFA).

The promotion was based on the sale of stuffed animals in which HSUS would receive funds from each catalog sale.

According to a WLFA news release, an assistant to the president of Sears called the wildlife group and issued a formal apology after receiving the protest. The Sears spokesman said, "All tags promoting the HSUS will be removed from the 67,000 stuffed animals in stock" and that "every customer ordering stuffed animals from the catalog will be informed that the promotion is over and that no money will go to HSUS. Sears has sent no money to HSUS and none will be forthcoming."

The Columbus, OH, wildlife organization said that it has contacted the suppliers of stuffed animals in an effort to prevent any existing or future promotions with HSUS or any other animal rights group.

AMA Says Animals Essential in Physicians Education

The American Medical Association (AMA), citing increasing activism against using animals in teaching programs, has reaffirmed the need to use animals in the training of physicians.

The AMA's Council for Scientific Affairs has issued guidelines stating "the use of animals in the general education of physicians is essential" and that no alternative teaching methods "can completely substitute for the limited use of animals." The guidelines also state that faculty should consider using nonanimal systems only when they would achieve the same educational goals as using animals.

The guidelines also state that all edu-

cation involving animals "should be carried out in a humane manner that minimizes pain and uses anesthetic and analgesic drugs when procedure may cause more than momentary or slight pain."

In a survey of 126 medical schools, 92 reported using live animals in their curriculum and 76 reported losing a total of more than \$4.5 million over the last five years due to break-ins, vandalism, and other demonstrations by animal activists.

The survey also revealed that animal rights protests, stricter animal handling regulations, increased security, and higher animal prices are costing medical schools \$17.3 million annually.

NIH Awards 310 Shannon Grants

The National Institutes of Health (NIH) has awarded Shannon grants to 310 investigators at 146 institutions.

The grant mechanism was established last spring to help sustain projects of scientists who research applications fall just short of the funding level. It was created in recognition of the impact declining award rates have had on both experienced and emerging scientific talent.

Shannon grants differ from other NIH awards in that NIH institutes and centers recommend to the NIH director potential recipients rather than investigators applying for the grant.

The majority of Shannon awards are two-year, nonrenewable grants for \$100,000, with a fixed indirect cost rate of 20 percent.

Moving?

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

APS Workshop Panel Tells About Activist Attacks

A panel speaking at the APS Conference in San Antonio related their experiences of being attacked by animal activists and how they and their institutions responded to the attacks.

The workshop program featured Adrian Morrison, whose office at the University of Pennsylvania was raided by the Animal Liberation Front, and Ken Wildes, director of university relations at Northwestern University, where the Evanston campus has been a long-time target of an animal rights group. Amy Finan of the National Association for Biomedical Research spoke on institutional crisis control.

Morrison said the best tactic when being attacked is to take "yourself out of the fray and get other people to think for you." He also advised that "it is best to say nothing, as whatever you say will sound self-serving. Let others speak for you."

Wildes said that his university was caught off guard inasmuch as it does very little in the way of animal research, compared with its medical school in Chicago. The siege at the Evanston campus began when Concerned Citizens for Ethical Research distributed leaflets saying, "Cruelty to animals is

illegal unless you are a researchers at Northwestern University."

It wasn't until graffiti was sprayed on campus walls, however, that the university started its counterattack, Wildes said, using the media to tell the university's story. He also credited the incurably ill For Animal Research and the Foundation for Biomedical Research for their assistance in developing a counterattack.

Wildes said the key in developing a counterattack is to have the support of the institution's administration and that this support is known to both faculty and staff, especially those who are the targets of the attacks.

Finan told of the need to have a crisis plan in place, adding that it is too late to put a plan together after there has been an attack against the institution. Those who should be involved in developing a crisis plan include the administration, researchers, animal care personnel, public relations staff, legal department, and security.

The workshop was sponsored by the APS Animal Care and Experimentation Committee and was moderated by J. R. Haywood and Steve Mifflin.

Future Meetings

1992

FASEB Spring Meeting

April 5-9, Anaheim, CA

APS Conference:
Integrative Biology of Exercise

September 23-26, Colorado Springs, CO

APS Conference:
Cellular and Molecular Biology
of Membrane Transport

November 4-7
Orlando, FL

1993

FASEB Spring Meeting

March 28-April 1, New Orleans, LA

APS Conference:
Physiology and Pharmacology
of Motor Control

October 3-6
San Diego, CA

APS Conference:
Signal Transduction and
Gene Regulation

November 17-20
San Francisco, CA

1994

FASEB Spring Meeting

April 24-29, Anaheim, CA

Physiology as Integrative Biology

Joseph Engelberg

Office of Integrative Studies

University of Kentucky College of Medicine, Lexington

In recent decades, for historic reasons, physiology as understood by the American Physiological Society has become somewhat narrowly defined. A handful of mammalian species are favored; unicellular organisms, plants, and many other biological forms are distant from the center of focus; artificial intelligence, pathophysiology, systems theory, evolution, and developmental biology make occasional appearances but are not an organic part of the Society's mission.

Narrowness is not a sin; indeed, narrowness and focus are indispensable to the scientific investigator. However, what may be a virtue for an individual investigator may not be a virtue for the science to which he or she belongs. When sciences entrusted with global concerns begin to confine themselves to restricted areas of thought, they risk losing the reason for their existence. It is probably fair to say that physiology has been a global science from its inception, spanning most of the sciences in work and thought. That is why the Long Range Planning Committee's proposal to identify the American Physiological Society and the field of physiology with integrative biology (1) is welcomed by many scientists both within and outside the Society. This projected enlargement of purpose, if realized, cannot only be an organizational boon for the APS but can also provide a needed home, a point of identification, for an important and underdeveloped realm of scientific thought — a realm concerned with the integrative dimensions of biological thought.

The call toward an integrative biology asks us to shift our thoughts away from circumscribed, labeled areas of specialization toward global, organismal concerns — a shift from "parts" to "wholes." Such living wholes are not metaphysical entities. They are each well-defined, bounded aggregates of matter. The cell is an aggregate of molecules; the multicellular organism is an aggregate of cells; a colony is an aggregate of multicellular organisms; etc. However, an aggregate of matter is not necessarily a form of life: what characterizes a living form is the existence of an integrative matrix. This matrix is a web of connections that forges the parts into a stable, unitary whole. Along the limbs of this connective web flow the streams of information that transform some 10^{14} molecules into a single cell and transform some 10^{14} cells into a single human being. The matrix is the product of billions of years of evolution. It is, therefore, the repository of a slowly garnered, integrative "wisdom." Scholars of integrative biology attempt to uncover this wisdom; they explore the structure of the integrative matrix and investigate how a multitude of parts becomes a unitary, dynamic, living whole.

Such investigations quickly reveal, for example, that whenever two feedback cycles intersect by virtue of their hav-

ing one or more elements in common (e.g., blood pressure), the two cycles become coupled. Then, when a disturbance is introduced at any point into one of the cycles, the disturbance inevitably spreads to the other. Clearly, the coupling of cycles causes the feedback cycles in an organism to form a single interconnected web, so that a disturbance introduced into any part of the web will spread to all the others. Consequently, any localized pathologic disturbance will in time transmit its baleful influence to all the other parts of the organism. Medical case histories, therefore, are portals to integrative thought. As they are studied, and the course of the disease is followed, the mind can be led naturally to cross disciplinary boundaries, to transcend areas of specialization; one can begin to confront the organism in its wholeness. Perhaps this is why medical case histories — each a treasure, in terms of the dollar value of the information it contains, of scientific information — are becoming prevalent in physiological teaching and thought. Because physiology (as integrative biology) and medicine are closely connected, it is not useful to identify physiology exclusively with a standard, healthy, adult organism. Health, illness, dying, and death need to be included in the sphere of physiological thought. Is not physiology the means whereby the future physician is introduced to medicine?

Medical case histories describe a series of events in time. Time enters integrative biology in other ways as well. Because every face is a clock on which a person's age can be read, the static concept of the "mature or adult" organism as a paradigmatic biological system is an illusion. Every organism undergoes continual transformation from the fertilized egg onward through maturation, aging, and death. The dimension of time is an indispensable component of integrative biology. Time, however, does not merely project forward from the fertilized egg stage but also backward into the organism's evolutionary roots. Every biological system has not only a functional and adaptive but also an evolutionary significance. Clearly, developmental and evolutionary considerations (ontogeny as revealed in phylogeny) cannot be excluded from the realm of integrative biology.

What are the practical implications of physiology as integrative biology?

1. Would the physiologist, as integrative biologist, need to know everything about everything? Individuals who play an integrative role in society (e.g., the presidents of corporations) do not know everything about everything in the systems they help integrate.
2. Could a scientific investigator who specializes still be a physiologist? Yes. Experimental investigation requires specialization.

3. Would the physiologist be a general biologist? Many aspects of biological science will lie outside his or her ken. Integrative biology is only one aspect of biology; it is concerned with investigating processes through which parts are converted into wholes in space and time.
4. Would we still need a variety of organizations (plant, comparative, cell, etc.) to serve physiologists? Yes; various organizations will no doubt remain in existence. The APS, however, could serve as a focus for members of these organizations with a common interest in problems of an integrative nature.
5. Is there just one "integrative biology?" Might there not arise (might there not have to be) a variety of integrative biology societies (one for the human organism, one for the cell, etc.)? Possibly. If so, however, I would hope that the APS would opt to be the society with a global, universal perspective. If the APS declines this role, some other group will undoubtedly assume this responsibility.
6. What of physiologists with a special interest in the "integrative" part of integrative biology? These may be, in part, to physiology what theoretical physicists presently are to physics, though they will undoubtedly also have strong experimental interests.
7. Is there a distinction between "integrative biology" and "integrative science?" Probably. All integrated systems (systems whose parts are connected by streams of information) are either forms of life or products of forms of life, e.g., cybernetic devices.
8. What is an example of the nature of investigation at the level of integrative biology? Feedback cycles are well understood by physiologists on a one-by-one basis. Little thought, however, has been given to the properties of networks of these cycles, that is, to the understanding of higher levels of organization.

This article was submitted to provoke discussion, criticism, and development of ideas of this kind. A meeting is being convened for this purpose on Sunday, April 4, 1992 at Anaheim, California (at the beginning of the FASEB meeting). It is sponsored by Integrative Study in Physiology and Medicine (ISPM), a group that has met annually for the past seven years in association with the APS fall or spring meetings. ISPM's meetings have heretofore been devoted largely to the

study of medical case histories and the teaching of physiology in medical schools. The 1992 ISPM meeting, however, will deal with more general matters. There will be two parallel all-day sessions involving dialogue, not lecture. Session A will, as in the past, be devoted to integrative study as related to medicine. (Individuals interested in attending this session should contact Dr. Wayne Carley, Lamar University, Beaumont, TX 77710. Phone: 409-880-8260.) Session B will be devoted to exploring issues of integrative biology in their wider dimensions as outlined in this article. (Individuals interested in attending this session should contact Dr. Joseph Engelberg, Office of Integrative Studies, University of Kentucky College of Medicine, Lexington, KY 40536-0084. Phone: 606-233-5563.)

The first part of Session B will be devoted to a scientific discussion of specific living systems focusing, in part, on the principles of integration that permit the molecules of a cell or the cells of a tree or a frog to become an unitary system. The second part of this session will consist of a discussion on the nature of education, research, and study in the realm of integrative biology. The third part will deal with ISPM organizational matters. Members of the APS and biologists from related fields (cell physiology, plant physiology, comparative physiology, general physiology, sociobiology, systems science, etc.) are invited to attend this meeting. It is unlikely that the complex issues to be dealt with can be adequately discussed in a single day. Ninety-minute, late afternoon follow-up sessions may be held Monday through Wednesday during the FASEB meeting.

The ISPM would like to identify physiologists and other scientists with a personal interest in the development of integrative biology. I would appreciate it if readers with such an interest (whether or not they can attend the Anaheim meeting) would contact me at the above address so that a mailing list can be compiled.

Reference

1. Long Range Planning Committee: *What's Past Is Prologue: A "White Paper" on the Future of Physiology and the Role of the American Physiological Society in It.* *Physiologist* 33: 161-180, 1990.

Unique Materials

Work published in the Society's journals must necessarily be independently verifiable. Authors describing results derived from the use of antibodies, recombinant plasmids and cloned DNAs, mutant cell lines or viruses, and other similarly unique materials are expected to make such materials available to qualified investigators on request. Authors should also submit published nucleic acid/amino acid sequences to a widely accessible data bank. Sequence data submission forms for the National Biomedical Research Foundation—Protein Identification Resource Database (NBRF-PIR) are available from the APS Publications Office, 9650 Rockville Pike, Bethesda, MD 20814 (301-530-7186).

XXXII International Congress of Physiological Sciences

Glasgow, August 1-6, 1993

Organization

The International Union of Physiological Sciences, the Royal Society, and the Physiological Society under the patronage of HRH The Princess Royal and the honorary presidencies of Sir James Black, Sir Alan Hodgkin, Sir Andrew Huxley, Sir Bernard Katz, and Sir John Vane.

Invitation

Glasgow 1993 is a date with the future of Physiology. My colleagues and I have carefully planned to incorporate the growing points of research, which would formerly have been the subject of satellites, into the Congress itself. All the symposia, which were formerly satellites, will therefore be held in Glasgow and become the Main Congress; a single registration fee will entitle everyone to attend any of the symposia.

A distinguished International Program Committee has invited world leaders in each area to organize the symposia. Poster communications may also be submitted in the usual way, and some of these will be incorporated into the symposia. We also plan special features, including a Congress Book on the challenge that integrative physiological science poses at the end of the 20th century with a wealth of molecular and cellular information waiting to be incorporated into our understanding of whole organs, systems, and organisms.

On behalf of the Royal Society and the Physiological Society, I am therefore very proud indeed to invite you to join us; it will be a Congress to remember. *Don't miss it!*

Denis Noble, FRS
Chairman of Congress Organizing Committee

Congress Site

The Congress site will be the Scottish Exhibition and Conference Centre (SECC) within the city of Glasgow. It is adjacent to the Moat House Hotel, which will also be used for meetings. Further symposia will be held at the University of Glasgow, which is near the Exhibition Centre.

Exhibition

A major international exhibition of scientific equipment and services is being staged in association with this Congress. Leading manufacturers and suppliers will be displaying the latest technology in the broad field of physiological sciences.

How to Get to Glasgow

Glasgow's International Airport, which is located 15 minutes drive from the City Centre, handles over 3.8 million passengers each year. There are direct flights from North America and a growing number of European cities. There is an hourly shuttle service for those who wish to travel through London. Glasgow is well served by British Rail with direct lines between Glasgow and most major British cities and towns. By road, Glasgow can be reached by the M8 from Edinburgh and the M74 from the South.

The Official Carrier to the Congress is British Airways, who will offer advice and assistance to those attending the Congress from their offices in all parts of the world.

Social Program

A full social program is being planned for delegates and their guests, which will make the greatest use of the wide variety of the culture and scenery unique to Scotland. Glasgow was the European City of Culture in 1990 and is the home of many museums and cultural activities. The conference banquet will be staged in the magnificent surroundings of the Bute Hall of the University of Glasgow.

Glasgow is also the gateway to the Highlands and Islands of Scotland where delegates and their guests can enjoy visits to mountain scenery overlooking the lochs as well as the Lowlands, Sir Walter Scott and Burns country, fishing, golf courses, distilleries, etc. During the Conference a special program will be provided for accompanying persons. A list of tours together with booking forms will be sent with the Final Announcement.

Accommodations

Accommodations will be handled by the Greater Glasgow Tourist Board and Convention Bureau. A wide range of accommodations within the city will be available to delegates to suit their individual budgets. From 5-star hotel rooms to University Accommodation, the city of Glasgow can meet your requirements.

Scheduled Deadlines

1. Please note that the final invitation will be sent automatically to those persons who complete and return a preregistration form by **June 1, 1992**.
2. Distribution of final invitation, abstract forms, and registration forms is **July 1992**.
3. Abstracts must be postmarked before or on **January 31, 1993** and accompanied by a fully completed registration form and deposit.

Registration

Please mail completed form to CEP Consultants Limited, 24-26 Albany Street, Edinburgh, EH1 3QH, Scotland.

If you have previously completed the form from the first announcement, your name will already have been listed to receive the final registration and abstract forms in Summer 1992; you do not have to return this form.

Scientific Program

The program will consist of over 20 themes, each made up of several symposia. Each theme will last for most of the week, and individual symposia may extend for between half a day and 5 days. The following themes are currently being planned by the International Program Committee, who have considered over 300 suggestions for symposia. Each theme is reflected in the associated symposia, but some symposia may be common to more than one theme.

1. **Ion Channels:** structure and properties of membrane channels, calcium channels, channel modulation by G-proteins, second messengers, and intracellular factors.
2. **Intracellular Ions:** structure and properties of pumps and trans-

porters, transport and function of intracellular magnesium, and intracellular pH regulation.

3. **Synaptic Mechanisms:** synaptic transmission, excitation and inhibitory mechanisms and modulation, neurobiology of peptidergic afferents, and muscarinic mechanisms.

4. **Sensory Transduction and peripheral processing of sensory information:** photoreception and the retina, chemoreception, hair cells and mechanoreceptors, pain.

5. **Visual System:** division of labor within the visual system, control of head and eye movement.

6. **Cerebral Cortex:** circuitry, oscillation in neuronal circuits and seizures, cognitive neuroscience, and disorders of learning and memory.

7. **Learning, Memory, and Development:** neurobiology of learning and memory, cellular and molecular mechanisms of neurodevelopment.

8. **Somatic Sensation and Hearing:** discriminative and active touch, plasticity in the somatosensory system, processing of complex signals in the auditory systems.

9. **Neurophysiology of Motor Control:** spinal mechanisms contributing to limb movements proprioception and afferent control of movement, cerebral cortical control of movement, learning and adaptation of motor tasks, and comparative aspects of motor control.

10. **Striated and Cardiac Muscle:** skeletal muscle crossbridges, molecular aspects of excitation-contraction coupling, calcium channels, and cardiac excitation and contraction.

11. **Smooth Muscle:** molecular aspects of excitation-contraction coupling, calcium channels and regulation.

12. **Endothelium:** endothelial cell biology and vascular growth, mechanisms of vasodilatation, and pulmonary vascular regulation.

13. **Cardiovascular System:** cardiac energetics and coronary blood flow, cardiac growth, central integration of cardiorespiratory control, interstitium, connective tissues, and lymphatics and microvascular transport.

14. **Central Integration of Autonomic Function:** central autonomic mechanisms, fever as a neuroimmunological endocrine phenomenon, and central integration of cardiorespiratory control.

15. **Lungs and Breathing:** biology of the airways and alveoli, airway smooth muscle, respiratory mucosae, alveolar mechanisms, arterial chemoreceptors, and regulation of breathing and cerebral blood flow.

16. **Energetics and Exercise:** mitochondria, cross-adaptation, and exercise.

17. **Environmental Physiology:** space and gravitation, high pressure and anesthesia, underwater physiology, altitude acclimatization.

18. **Comparative Physiology:** altered metabolic state as in hibernation, diving and hypometabolism, reversible freezing.

19. **Epithelial Transport Mechanisms:** cell volume regulation and water transport, epithelial polarity, paracellular transport, sodium-coupled transporters, placental transporters, and cross-talk between epithelial cells.

20. **Secretory Pathways:** sorting and processing in secretory cells, calcium signals in secretory cells, and CF chloride channels and secretion.

21. **Integrative Aspects of Gastrointestinal Physiology:** visceral afferent mechanisms, the molecular control of gastric function, autonomic neuroeffector mechanisms, and enteroinsular axis.

22. **Integrative Aspects of Renal Physiology:** renin-angiotensin-aldosterone, renal tubular transport, and neuromediators in the kidney.

23. **Neuroendocrinology and Endocrinology:** gene structure and stimulus transcription coupling in neuroendocrine systems, transgenic animals and gene knock-out in neuroendocrinology, steroid/thyroid receptor gene superfamily, gonadotrophin releasing hormone, atrial natriuretic peptide, and the neurohypophysis.

24. **Development:** homeobox genes, sex determination, and fetal physiology.

25. **Behavior Rhythms and Stress:** reproductive behavior, biological rhythms, sleep, feeding behavior, stress and neural control of immunological responses.

XXXII International Congress of Physiological Sciences
Glasgow, 1-6 August 1993

Preliminary Registration Form

I am likely to attend the Congress. Please send me the Final Announcement.
(Use Block Capitals)

Family Name: _____

Other Names: _____ Title: _____

Address: _____

Country: _____

Telephone No: _____ Fax No: _____

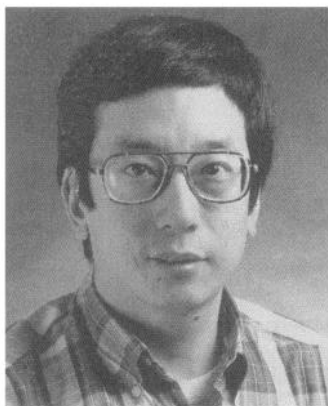
Date: _____ Signature: _____

Please indicate which type of accommodation you require: Hotel (various ratings) ☐ University Hall of Residence ☐

Number of accompanying nonparticipants (members of family etc.) _____

Return Registration Form To CEP Consultants, 24-26 Albany Street, Edinburgh, EH1 3QH, Scotland.

Tsien Receives Spencer Award



Roger Y. Tsien, professor of pharmacology and chemistry at the University of California School of Medicine, San Diego, delivered the 14th annual W. Alden Spencer Lecture, "Intracellular Signal Transduction in Four Dimensions:

From Molecules to Physiology," September 20, 1991. Following the lecture he received the prestigious Spencer Award Medal.

Tsien pioneered the development of two major methods for studying the biochemical activity of living cells. He developed fluorescent probes for measuring the intracellular concentration of physiologically important ions and metabolites. He also has developed caged compounds that rapidly alter the cellular concentrations of ions and metabolites.

As a member of the Society, Tsien has been selected as the 1992 Bowditch Lecturer, awarded to a young member for original and outstanding accomplishments in physiology.

Gordon M. Shepherd, professor of neuroscience in the neurobiology section, Yale University School of Medicine, has been appointed deputy provost for biomedical sciences.

Formerly at the Johns Hopkins University Medical School, **Apostolos P. Georgopoulos** has moved to the Brain Sciences Center, VA Medical Center, Minneapolis, MN.

Alan I. Faden has been appointed Dean of Research and Scientific Director, School of Medicine, Georgetown University. A member of APS since 1982, Faden was at the University of California, San Francisco, and was chief of neurology at the VA Medical Center.

William R. Law, of the National Naval Medical Center, has accepted a position at the Department of Surgery, University of Illinois at Chicago.

Jerry D. Gardner has moved from the National Institutes of Health to the St. Louis University School of Medicine, Department of Internal Medicine.

Formerly at the University of California, Davis, **Joseph L. Beverly** is now in the Department of Surgery, State University of New York at Syracuse.

Janice W. Maran, formerly with Parxel International Corporation, has joined Diacrin, Inc., Charleston, MA.

Christopher D. Moyes, who has been at the University of British Columbia, Vancouver, has joined the Department of Zoology, Simon Fraser University in Burnaby.

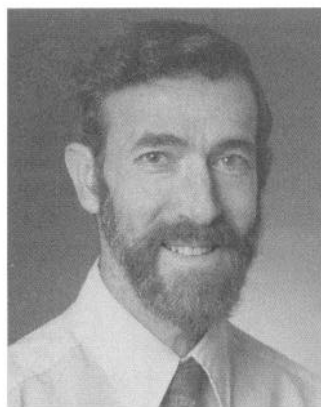
Formerly at the University of South Alabama, **Walter H. Johnson** has joined the Division of Pediatric Cardiology, University of Alabama at Birmingham.

Edward M. Lieberman has joined the Division of Behavioral and Neural Sciences, National Science Foundation. Lieberman was at East Carolina University School of Medicine, Greenville.

Formerly at the University of Texas, San Antonio, **Walter F. Taylor** has joined the Hyperbaric Environmental Adaptation Program, Naval Medical Research Institute, Bethesda, MD.

Wagner Named President-Elect of ISOTT

Peter D. Wagner, professor of medicine at the University of California, San Diego, and recently a member of Council of APS, has just been named President-Elect of the International Society for Oxygen Transport of Tissues (ISOTT). He will be president in 1992-93 and will organize the annual meeting of ISOTT, which will be held in San Diego in August 1993.



Elizondo Appointed to National Council



Reynaldo S. Elizondo was one of three new members appointed to the National Advisory General Medical Sciences Council by Secretary Louis W. Sullivan, US Department of Health and Human Services. Elizondo is dean of the College of Science and professor of biological sciences at the University of Texas at El Paso. An APS member since 1972, he is currently serving on the Porter Physiology Development Committee.

van de Werve Receives Young Scientist Award

Gerald van de Werve, director of the Department of Nutrition, Faculty of Medicine at the University of Montreal, was awarded the Young Scientist Award for 1991. He received the award from the Canadian Diabetes Association (clinical and scientific section) on September 21 at the annual meeting of the Royal College of Physicians and Surgeons of Canada.

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

American Physiological Society Endowment Fund

The APS Endowment Fund was established in 1977 to support programs for the development of physiologists and physiology, to encourage communication with other disciplines of science and the public, and to foster scientific and cultural relations with other parts of the world.

The APS Endowment Fund was established to encourage tax-deductible contributions or requests to the society at any time and in any amount, for specific or general purposes. Upon request, the society will provide to a donor or institution contributing a memorial gift a replica of the plaque bearing the name of the individual living or deceased in whose honor the gift was made. The family of or the individual being honored by a donation to the fund will be advised formally of the donor's name, unless the contributor specifically requests that the donation be anonymous.

Donations to the APS Endowment Fund or queries should be addressed to 9650 Rockville Pike, Bethesda, MD 20814.

Second Craigie Conference on Brain Capillaries

25-26 June 1992

Jeanne Timmins Amphitheatre and
McConnell Brain Imaging Centre
Montreal Neurological Institute
McGill University
Montreal, Canada

Half-Day Specialty Meeting:

Crone Memorial Symposium on Imaging of Capillary Function in the Human Brain

Organizer: Albert Gjedde, MD, PhD

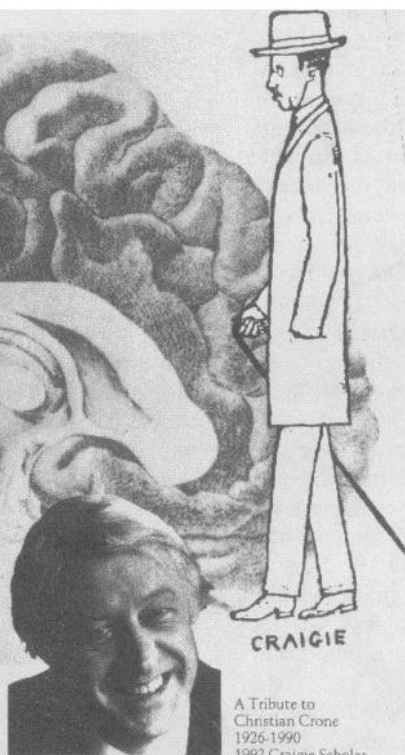
ABSTRACTS ON IMAGING TO:

Dr Albert Gjedde
McConnell Brain Imaging Center
Montreal Neurological Institute, McGill University
3801 University Avenue, Montreal, Canada H3A 2B4
Phone 514 398-7349
Fax 514 398-8948

INQUIRIES AND OTHER ABSTRACTS TO:

Dr Paul M. Gross
Neurosurgical Research Unit
Department of Surgery, Queen's University
146 Stuart Street, Kingston, Canada K7L 3N6
Phone 613 545-6464
Fax 613 545-6191

DEADLINE FOR ABSTRACTS: 15 FEBRUARY 1992



Neurobiology of Cognition

P. D. Eimas and A. M. Galaburda (editors)

Cambridge, MA: MIT Press, 1990, 250 pp., illus., index, \$22.50

Despite the many spectacular advances in brain physiology over recent years, much about the workings of the brain appears as mysterious now as it did 50 years ago. Not only is the brain an organ of awe-inspiring complexity, it also is the origin of all mental phenomena and the seat of consciousness. Most neurobiologists would agree that neuroscience will remain incomplete until the physiological bases for psychological functions such as perception and memory are known. The number of levels at which brain processes occur, reaching from receptors and synapses all the way up to movement, behavior, and mental structure, poses a particular obstacle to any correlation of brain states versus cognitive states. While much is known about each of the levels separately, we are still far from being able to relate brain processes to mental events of the kind the reader of this review is currently experiencing.

Neurobiology of Cognition is one among a growing number of books hoping to provide guidance in this difficult but pressing task. Outlining their position in an introductory chapter, the editors are careful not to adopt two modern views that are both fashionable (to different audiences), each extreme. One states that the description of all mental phenomena will ultimately and completely be reduced to purely biological terms, the other that cognitive science is completely autonomous and does not need to make recourse in detail to the underlying biological processes. Instead, the editors emphasize that the relationship of cognitive functions to corresponding brain processes is an open empirical question; the volume's contributors focus on specific examples of how this question might be answered.

The six chapters of the volume are at their best when reviewing experimental evidence but are less convincing in those parts devoted to theoretical concepts. The topics of the individual chapters cover a wide range of experimental approaches in both animals and humans. There is a fine chapter by J. L. Miller and P. W. Jusczyk on the neurobiological basis of speech perception that can serve as a very readable introduction to this difficult field; it also offers a discussion of some of the problems of using animal data to investigate a primarily human mental function. A chapter by R. Held describes how studies of early postnatal development can be helpful in finding neural correlates for behavioral or perceptual phenomena. J. A. Simmons describes research on acoustic images involved in the echolocation systems of bats. There is also a concise and informative review by C. W. Cotman and G. S. Lynch of the progress made in identifying the neural bases for learning and memory in model animal systems—a must in books of this kind.

The theoretical chapters leave the reader with a mixed feeling of hope and despair. While J.-P. Changeux and S. Dehaene argue for a theory of the brain as a selective system, a vision most deeply explored by G. M. Edelman, the attempt to explain cognition in a “grand scheme” by A. Damasio is less successful. Damasio correctly identifies several key problems of theoretical neuroscience (such as how the brain might reintegrate fragmentary traces left by previously experienced events), but much of his paper is hampered by a tendency toward abstraction and an overall lack of clarity. Damasio and several other authors discuss whether neural activity confined to particular circumscribed centers of the brain is both necessary and sufficient to cause particular mental functions; most of them argue against this hypothesis and emphasize the distributed nature of neural function.

Overall, this volume offers several highly readable contributions from leading neurobiologists and will serve its interdisciplinary purpose for both physiologists and psychologists. The editors squarely attack a most unfortunate state of affairs in neuroscience, namely that the empirical efforts made to achieve an understanding of how brain causes mind are largely unmatched by serious efforts to construct a biologically based theory of the brain. Their effort to repair this situation and bridge the “culture gap” between experimentalists and theoreticians, while remaining committed to biology as the lead science, is laudable. That the book fails to provide a unified theoretical perspective can be forgiven. The neurobiology of cognition remains a field richer in facts than in theories; it is only recently that we have begun to discern how a global theory might relate psychology to brain structure and function.

Olaf Sporns
The Neurosciences Institute
of The Neurosciences Research Program

Inflammatory Indices in Chronic Bronchitis

C. G. A. Persson, R. Brattsand, L. A. Laitinen, and P. Venge (editors)

Basel: Karger, 1990, 294 pp., illus., index, \$78.00

How are chronic bronchitis and chronic obstructive airways disease currently being studied? Where should research emphasis be placed? This small volume presents the proceedings of a meeting at which a group of international researchers considered these questions. The premise was that the role of inflammation, rather than hypersecretory glandular activity and infections, is emerging as the most important risk factor determining the decline in lung function in these diseases. They proceeded then to consider the potential and practicalities of a variety of experimental and epidemiological approaches to studying inflammation of the airways. I will give an overview of the major points covered.

The justification for the emphasis on inflammatory processes starts with pathology, supporting the hypothesis that the reduction in caliber of peripheral airways in chronic obstructive airways disease is due to a chronic inflammatory process in the wall and lumen of the peripheral airways.

A variety of investigational approaches for evaluating inflammation of the airways are available. Long-term tracking of FEV₁ remains useful. Airway responsiveness to stimuli like methacholine are neither specific nor predictive for a beneficial effect of glucocorticosteroid treatment in patients with chronic airflow limitation, although they may be in asthma. On the other hand, bronchial hyperresponsiveness does correlate with mediator release as assessed by bronchoalveolar lavage or by nasal challenge and lavage. Antiinflammatory treatment effects have not been easy to show with FEV₁s and will probably require long-term studies.

Markers of neutrophil and monocyte/macrophage activity in blood are increased in patients with chronic bronchitis and chronic obstructive airways disease irrespective of the presence of infectious exacerbations. Interestingly they show seasonal variations, perhaps reflecting the seasonal prevalence of infections, that could become important in epidemiologic studies. The technique of gathering of secretions for lavage studies maybe important, with small volumes of bronchoalveolar lavage sampling larger proximal airways and larger volumes sampling more distal regions. Similarly, although soluble proteins appearing in sputum may reflect inflammatory processes, sample collection remains a major problem in interpretation. Sputum cell counts appear to be reproducible and charac-

teristic of major disease classes (asthma, corticosteroid responsive cough, and chronic bronchitis) and therefore may be useful for drug studies. Little information is available on the usefulness of bronchial biopsies. The early changes in asthma that are recognizable at ultrastructural level may be important. Unfortunately rigid bronchoscopy may be necessary to obtain biopsies that give good sampling of the full thickness of the bronchus.

Cell populations in bronchial and bronchoalveolar lavages show nonspecific inflammation in smokers. Interestingly, in chronic obstructive airways disease patients, cell recovery is reduced and the bronchial cells have a lower viability when compared with matching bronchoalveolar lavage cells, suggesting a reduced transport of macrophages to the small airways or an enhanced turnover of these cells in the bronchi. Reactive oxygen-derived species (the oxidative burst) may be an indicator of inflammatory response to be applied to study the states of phagocytes. There is some hope for the use of monocyte/macrophage microbicidal activity measurement of specific markers of inflammatory cell activity such as eosinophil cationic protein and neutrophil-derived myeloperoxidase and the levels of proteases and antiproteases. Plasma components may in-

dicade exudation. Respiratory membrane permeability, increased in inflammation, may show up in the ratio of components of different molecular size. Studies of mucous components have not shown clear diagnostic use, partly because a major factor determining the physics and chemistry of airway secretions is the presence of infection and tissue damage itself.

The participants took seriously the charge to communicate and the presentations are generally clear. A consensus on the optimal approaches for long-term intervention studies and for choices of markers of inflammation to be used in therapeutic intervention studies was attempted. An inherent limitation in proceedings such as this is the paucity of new data (presumably the authors are saving them for submissions to the archival literature) and the result is somewhat gap-toothed. An inherent advantage, however, is that the presentations are short, addressed to a general audience, reasonably up-to-date, and comprehensive in their survey of the problem.

Frederic G. Hoppin, Jr.
Professor of Medicine & Physiology
Brown University

APS Conferences

Please send me program and registration information for the following:

- ☐ **Integrative Biology of Exercise**
September 23-26, 1992
Colorado Springs, CO
- ☐ **The Cellular and Molecular Biology of Membrane Transport**
November 4-7, 1992
Orlando, FL
- ☐ **Physiology and Pharmacology of Motor Control**
October 3-6, 1993
San Diego, CA
- ☐ **Signal Transduction and Gene Regulation**
November 17-20, 1993
San Francisco, CA

Please complete and mail to The APS Conference Office, The American Physiological Society, 9650 Rockville Pike, Bethesda, MD 20814-3991.

Name _____

Address _____

Department _____

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Country _____

To the Editor:

I am convinced many APS members are not in agreement with the recommendation of the Knobil (Long Range Planning) Committee, irrespective of the fact it has been accepted, in concept, by the APS Council. Nor do I consider it is "the old immovable guard" (whomever this may be), as Marver believes, that enjoys the status quo and is opposed to change. The recommendation is that our scientific sphere may better be defined as integrative biology. As the various dimensions and categorical disciplines of physiology have unfolded throughout the years, I am not persuaded by the forward thrust of molecular and subcellular biology and molecular genetics that physiology is "broke and needs fixin'." I am dismayed to note the committee feels physiology missed the scientific boat in the first evolution in biology and should not miss out again. It is ironic to read that the committee, in one breath, infers physiology and the APS are thriving, publications are flourishing, compensations are increasing above inflation rates, pre- and postdoctoral students are not declining in number, research support is impressive, and faculties in medical schools are growing, then, in the next breath, suggest there is, and has been for decades, a malaise within the physiological community regarding the future of our science. My goodness, there is obvious heterogeneity in physiology and for the better it has spawned many scientific disciplines. There may be an uneasiness scattered around the physiology arena. There may be a rush to get into the molecular and subcellular labs. There may be a current influx of research dollars into these labs. But, I do not believe it is panic time. Physiology has such great breadth, depth, and strength, in my view, that it is natural for subdisciplines to spin out and, depending upon their development, become established as separate scientific entities. Why shouldn't the biophysicists, neurobiologists, microcirculationists, endocrinologists, biochemists, molecular people, and others enjoy societies of their own and interact with the APS and other

societies as is their wont? Many never leave the APS and, if they do, it isn't until their new society is well established. I cannot believe they leave because of disaffection for physiology or the APS. It is the natural development of the mother science — PHYSIOLOGY — to the stage where these specialists who are firmly grounded in basic physiology are scientifically more comfortable interrelating and communicating with people who do similar research.

Zierler implies in his beautiful disquisition there is little, if any, reason to be so awestruck at the wonders of molecular technologies and subcellular mechanics that we can better relate as integrative biologists (Rothe, Greep, and Otis seem to agree). "I'm a cardiovascular integrative biologist" doesn't carry the solid punch of "I'm a cardiovascular physiologist." The former suggests a biologist broadly based in the immunology, biochemistry, genetics, and microbiology of the cv system (the gene expressionist; the DNA/RNA manipulator). The latter suggests a scientist who is more comfortable with the classic tools of the trade — biophysics, mathematics, and chemistry — but who can use the tools of molecular biology as needed. This is not totally accurate, of course, but the systematist is scientifically more gratified with research results that are repetitive and quantitative, as Zierler suggests.

Physiology is dynamic; I don't see it as a dying discipline at all (as Marver does). Through physiology we are linked with great scientific minds of the past, present, and future (many of whom were or are into animal function and regulation from backgrounds in mathematics, physics, chemistry, mechanics, engineering, etc.). It would be improper for the APS to award itself a cluster to its many badges of creative, scientific ingenuity for racing into integrative biology and, in so doing, abandon the system and organ physiologists.

Arthur W. Merrick
Professor Emeritus
Columbia, MO

BOOKS RECEIVED

Cellular Physiology of Nerve and Muscle. Gary G. Matthews. Cambridge, MA: Blackwell, 1991, 226 pp., illus., index, \$26.95.

Activity-Driven CNS Changes in Learning and Development. Jonathan R. Wolpaw, John T. Schmidt, and Theresa M. Vaughan (Editors). New York: NY Academy of Sciences, 1991, 399 pp., illus., index, \$90.00.

Neuromethods: 19: Animal Models in Psychiatry, II. Alan A. Boulton, Glen B.

Baker, and Mathew T. Martin-Iverson (Editors). Clifton, NJ: Humana, 1991, 408 pp., illus., index, \$89.50.

Long-Term Potentiation: A Debate of Current Issues. Michel Baudry and Joel L. Davis (Editors). Cambridge, MA: MIT Press, 1991, 454 pp., illus., index, \$70.00.

Handbook of Peripheral Nerve Entrapments. Oscar A. Turner, Norman Taslitz, and Steven Ward. Clifton, NJ: Humana, 1990, 227 pp., illus., index, \$56.50.

Capillary Functions and White Cell Interaction, Volume 18. K. Messmer (Editor). *Progress in Applied Microcirculation.* K. Messmer (Series Editor). Basel, Switzerland: Karger, 1991, 139 pp., illus., index, \$114.50.

Consciousness Explained. Daniel C. Dennett. Boston, MA: Little, Brown, 1991, 511 pp., illus., index, \$27.95.

Essential Medical Physiology. Leonard R. Johnson (Editor). New York: Raven, 1992, 770 pp., illus., index, \$59.50.

Assistant/Associate Professor. The Department of Biology, Westmont College, invites applications for a tenure-track position in vertebrate physiology. Area of research specialization is open, but candidates should show clear potential for developing a vigorous program of research involving undergraduates. Teaching responsibilities entail introductory physiology plus one or two courses from specialty at an advanced undergraduate level. Westmont College is a four-year, church-related, Carnegie Level I "national" liberal arts college. Programs in the sciences have a strong tradition of successful research collaboration between faculty and students, supported by both an institutional commitment to its vitality and a record of obtaining nationally competitive external funding. Ph.D. required; post-doctoral experience preferred. Women and minorities are especially encouraged to apply. Send letter, vita with names and telephone numbers of four references, and statement describing relation of teaching and scholarly interests to the Christian liberal arts tradition, by February 29, 1992 to Physiologist Search Committee, Department of Biology, Westmont College, Santa Barbara, CA 93108. Tel: 805-565-6151. Fax: 805-565-6220.

Research Scientist — responsible for the development of a nonradioactive technique for labeling and in situ hybridization in neuroglial cell cultures; preparing and maintaining glial cell culture, perform routine

physiological and molecular biological experiments; analyze data, prepare scientific reports and manuscripts; must have PhD in Animal Science-Physiology, and must have documentation of at least 2 years post-doctoral research experience including biochemistry, molecular biology and morphology; also must have documented experience of at least 2 years in the following techniques: Biochemical: all types protein and enzyme assays, electrophoresis, receptor binding analysis (equilibrium, kinetic and competitive-displacement analysis); Molecular biology: radioactive and non-radioactive in situ hybridization on tissue culture and fixed sections, RNA and DNA isolation and purification, Northern blot analysis; Morphologic: 14C and 3H autoradiography, histochemistry and immunocytochemistry, Nissl, silver stain; must have documented evidence of research with respect to brain function; must also have statistical and computer experience with microcomputer; (all experience may be cumulative); Salary \$26,000 per year, per 40 hour week (9:00 AM - 5:00 PM); send resumes to 7310 Woodward Avenue, Room 415, Detroit, MI 48202; Reference #70191; (employer paid ad).

Faculty Position, Physiology. Applications are invited for a tenure-track appointment at the rank of assistant or associate professor at Tulane University. Candidates should hold the PhD or MD degree, have a record of excellence in research, and be committed to academic programs in medi-

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 February 15 for the April issue). Mail copy to APS, 9650 Rockville Pike, Bethesda, MD 20814.

cal and graduate education. Research areas marked for expansion include, but are not limited to, cardiovascular-renal, cellular/molecular, and epithelial transport physiology. The successful applicant will be expected to have an established research program (associate professor) or to develop an independent extramurally funded research program. Send a resume, description of research program, reprints, and four letters of recommendation to Dr. L. Gabriel Navar, Chairman, Tulane University School of Medicine, Department of Physiology, SL-39, 1430 Tulane Avenue, New Orleans, LA 70112. [EOAAE]

ANNOUNCEMENTS

1992 FASEB Summer Research Conferences

Vermont Conferences

Protein Folding in the Cell
Retinoids
Biology and Chemistry of Vision:
Visual Processing
Renal Hemodynamics
Calcium and Cell Function
Phospholipases
Vitamin C and Vitamin E in Free
Radical Reactions
Viral Assembly
Folic Acid, Vitamin B-12 and One
Carbon Metabolism
Thrombin Structure and Function

Copper Mountain Conferences

Transcription Regulation: Differentiation,
Development and Disease
Micronutrients: Trace Elements
Neurobiology of Central Nervous
System Injury

Molecular Basis of Gastric Mucosal
Defense
Receptors and Signal Transduction
Protein Phosphatases
Physiology and Pathophysiology of the
Splanchnic Circulation
Regulation of Energy Balance: From
Organism to Gene
Plant Molecular Genetics

Snowmass Conferences

Yeast Chromosome Structure, Replication
and Segregation
Hepatic Regeneration and Carcinogenesis:
Molecular and Cellular Pathways

To receive complete conference schedules and the application form, contact the FASEB Summer Research Conference Office, 9650 Rockville Pike, Bethesda, MD 20814-3998. Fax: 301-530-7014.

Scientific Meetings and Congresses

Symposium on Mechanisms of Hypertension, London, UK, March 24, 1992. *Information:* Mary Lawson, London Hypertension Society, c/o Clinical Pharmacology, St. Bartholomew's Hospital, London EC1A 7BE, UK. Fax: 071 061 8134 (UK), 44 71 601 8134 (International).

Myasthenia Gravis and Related Disorders: Experimental and Clinical Aspects, Washington, DC, April 12-15, 1992. *Information:* Conference Department, New York Academy of Sciences, 2 East 63rd Street, New York, NY 10021. Tel: 212-838-0230, Fax: 212-888-2894.

First International Congress of the African Association Physiological Sciences and Society of Neuroscientists of Africa, Nairobi, Kenya, September 21-28, 1992. *Information:* Dr. K. O. Adeniyi, Congress Secretary, Department of Medical Sciences, University of Jos, P.M.B. 2084, Jos, Nigeria.

APS Sustaining Associate Members

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



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Planning for the 1993 IUPS Congress in Glasgow

Planning is now well underway for the 1993 Congress of the International Union of Physiological Sciences (IUPS), which will be held in Glasgow, Scotland, August 1-6, 1993. At the July 22-23, 1991 meeting of the International Program Committee, the decision was made to restructure the five-day Congress so that it will consist of a series of symposia, each of which may occupy between one-half and three days. Based on approximately 300 suggestions for topics and speakers, the Committee selected a list of topics for these symposia and identified certain individuals who, by their knowledge and stature in the field, could act as organizers or chairpersons for the symposia. The symposium organizer, based on his/her knowledge of the topic and of the scientists involved in the field, will set up the symposia. Each symposium organizer will be provided with the list of suggested topics and speakers but will not be bound by the suggestions. In many respects, each symposium will be run on the lines of the highly successful Gordon Research Conferences and those sponsored by the FASEB.

In addition to this striking innovation, which will serve to incorporate "satellite conferences" within the Congress itself, the meeting will include six named lectureships, poster sessions, and review lectures. Glasgow will provide a remarkably attractive site for the Congress, and extensive use will be made not only of conference rooms and meeting places at the University but also at a reasonably built Convention Center. A shuttle system is being planned to facilitate movement between meetings held at the University and at the Conference Center. For those interested in pre- or post-Congress excursions, Glasgow provides an attractive point of departure not only for the Edinburgh Festival but also for many other attractive places of interest.

(See p. 322 for complete information and registration form.)

APS/FASEB Spring Meeting
Anaheim, California
Wednesday, April 8, 1992, 4:45 p.m.

Physiology in Perspective Walter B. Cannon Memorial Lecture

"Coupling of Exercise To Cellular Respiration During Exercise: 'The Wisdom of the Body' – Revisited"



Karlmann Wasserman
Professor of Medicine and Chief
Division of Respiratory and Critical Care
Physiology and Medicine
University of California, Los Angeles

(Sponsored by the Grass Foundation)