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Lessons Learned From a Scientist's Personal Confrontation With Animal Zealots

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How Brain Trauma Research Was Curtailed In The US

I was a neurosurgeon in Vietnam in 1968-69 where my team operated on more than 300 people with brain wounds, 93 of them American soldiers. During the Vietnam War postoperative neurosurgical mortality for American soldiers was 10-12% (1, 2), almost exactly the same as during World War II, 25 years earlier (3).

On returning from Vietnam, I discovered that fewer than 25 scientific papers had ever been written on brain wounding where a missile wound had been replicated in the laboratory on anesthetized animals (4-23). For comparison MEDLINE reveals that almost 3,000 animalbased research papers on stroke were written from 1983 to 1989 (24). Clearly, hardly anything is known about the pathobiology of brain wounding in modern terms.

Head wounds account for nearly 20% of all "hits" in combat and almost one-half of all single-wound combat deaths (25). For almost a decade after returning from Vietnam I wondered how this country could send young men (and now young women) off to war after war without knowing the best way to treat their wounds. I

also wondered how we could know so little about brain wounds when it is such an important public health issue right here in America. Today gunshot wounds kill more than 33,000 people yearly, and more than 22,000 of these wounds involve the brain (26). Furthermore, more than 70,000 Americans a year suffer severe brain injuries not involving guns (27).

So I decided to take the problem to the laboratory. After much consideration of the optimal animal, we developed a feline model for technical reasons. In Vietnam, the mean weight of a missile causing a fatal brain wound was 110 mg (the human brain weights about 1,300 g). The smallest missile we could reliably employ was a 32-mg sphere. We needed a laboratory animal with as large a brain as possible and yet small enough that isotope doses would not be prohibitively expensive. We chose the cat with about a 25-g brain. Cats have been a highly used laboratory animal, especially for neurophysiological studies.

Deeply anesthetized cats were painlessly wounded in the right cerebral hemisphere. At sufficient missile energy, respiratory difficulties developed, although the missile track was away

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Lessons Learned From a

Scientist's Personal

Confrontation With

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Home, Home on the (WWW) Range

Finally, APS has a presence on the World Wide Web. Thanks to the efforts of APS staff member **Kelly Thompson**, the Society has a home on the WWW range. While we are far from being one of the first societies on WWW, as we were with our APS Gopher Information Server, we are definitely planning on making the APS Home Page one of the best.

We recognize that we still have a long way to go before the APS Home Page is able to provide the community with all that it needs. But then again, remember that the WWW is a fairly new entity.

At the time that this article was prepared, the following information could be found on the APS Home Page: Membership, Meetings, Awards, Publications, Education, and Public Affairs. Hopefully, by the time you read this issue of *The Physiologist* you will find even more on the site.

In planning the site, the Society want-

ed to provide a Home Page that would provide you with information about the Society's activities and allow you to download the forms and application materials relevant to our programs. Currently, you can download a copy of the membership application for use by colleagues interested in becoming members. We also hope to have the applications for the various award programs available in the near future.

The Home Page also provides you with a handy link to our on-line journal, *APStracts*. In the future, you will be able to use this link to identify abstracts of interest on *APStracts* and order the full article using a form available on the APS Home Page. Every effort will be made to make reprints available to the membership at a reasonable price. Similarly, you will be able to subscribe to the APS journals by accessing an order form on the site.

One of our goals is to link the APS

Home Page to the Home Pages of the various departments providing training in the physiological sciences. In addition, we would be interested in including links to APS member Home Pages, segregating them on our server by disciplinary interest. Hopefully, such links will help to direct students to programs and laboratories in physiology and enable the membership to identify colleagues with mutual research interests. If you or your department have a Home Page or are planning to create one in the near future, please use the form below to provide us with its URL.

I hope you have a chance to visit the APS Home Page. If you have suggestions for additions to the APS Web Site or would like us to provide a link to your departmental or personal Home Page, please contact webmaster@aps.faseb.org. �

Martin Frank

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Integrative Physiology: You Must Plant Trees Before You Can Have a Forest

"Long ago it became evident that the key to every biological problem must finally be sought in the cell, for every living organism is, or at some time has been, a cell" (1).

Physiology is the study of function. Organ and tissue result from multicellularity, but specialization stems from the cell and subcellular components themselves. Thus, if one wants to study the larger functional units, i.e., tissues or organs, it is only logical to start at the basis of these functions, i.e., the cell and its components, the molecules. The two approaches, study of a tissue or organ and study of molecules, are neither contradictory nor exclusive. They are additive.

It seems that it is incumbent on tissue and organ physiologists to bring into their vision the work of the cellular and molecular biologists and not the reverse. The reason is that the "reductionists" have no real motivation to partner with the physiologists, but, on the contrary, the physiologists have everything to gain from such relationships. This is an appeal to physiologists to come out of your ivory towers, initiate contact with your molecular biology colleagues, and become true integrative physiologists.

When resources for biomedical research are scarce, the natural competition that exists between different investigative interests often intensifies (2). Given the current fiscal climate, it is not surprising that one overhears much discussion in the scientific community about the respective contributions that newer versus more traditional disciplines are likely to make toward our understanding of human health and disease. Although the promise of subcellular and molecular techniques is widely appreciated, there is much debate about their relative emphasis in the "big picture."

These new technologies have been hailed by many as the final keys to unlock nature's mysteries—the ultimate path to future advances—and because they are in their infancy, they are being nurtured vigorously. At the same time, more traditional scientists tend to be wary of reductionist approaches and to view enthusiasm for these new technologies as symptomatic of a "tunnel vision" that will ultimately set back science. It is time to bring it all together.

The great potential of the new technologies is so fascinating, so innovative, and so glamorous (as has been said), that it is impossible to overlook. With their simple yet powerful techniques these new approaches can provide the instructions that specify the very structure of biological molecules and help us understand where, in fact, natural processes go awry and how we can correct them. The implications for a variety of interventions—from gene therapy, to rational drug design, to tailored risk assessment—cannot be overstated.

Nonetheless, the determinism of genetics, for example, has its limits. Although information encapsulated in the nucleus of the recently fertilized egg is enough to generate and sustain the course of events that leads to development of a complex adult organism, much happens along the way that cannot be ascribed to independent properties of the primary products of genes. To paraphrase an eloquent colleague, it is as in music: the heavenly harmony of the choir can never be appreciated by listening in turn to each chorister, however accomplished, singing independently.

It should be clear that the full realization of the implications of this new knowledge will not occur without the concurrent and inspired efforts of scientists who apply this information to the larger organism and who use it the context of the vast knowledge already assembled about living creatures. The goals and importance of such efforts are reflected in the new term "integrative physiology" that is now being used to describe this function. The discovery of a new gene, adhesion molecule, gap junction, or intracellular process is not an end but rather a new beginning in the time-honored process of sorting out the nature and function of living things.

Thus, far from being left behind in the modern scramble for meritorious research ideas, the physiologist is at the threshold of an unprecedented scientific era. To him or her will fall the task of making sense of the bits and pieces of new knowledge that are so rapidly accumulating. The whole is more than the sum of its parts, but an intimate appreciation of the parts is needed to assemble a coherent whole. This is the challenge and the privilege of today's integrative physiologist.

Claude Lenfant, MD Director National Heart, Lung, and Blood Institute National Institutes of Health

References

 Wilson, E. B. The Cell in Development and Heredity (32nd Ed.). New York: MacMillan, 1925.
Lenfant, Claude. Circulation 91: 1901, 1995.

Integrative Physiology: A Response

In this issue of The Physiologist, Claude Lenfant, director of the National Heart, Lung, and Blood Institute, has agreed to share with us some of his thoughts on the role of physiology in future biological research. I was delighted to see his recognition of the critical role to be played by physiologists in the future. In the course of his discussion, however, Lenfant raised some potentially contentious issues related to the recent history of research patterns, the attitudes of the members of The American Physiological Society, and the underlying philosophy of our discipline. I think it appropriate to comment on some of our Society's responses to the challenges that he identifies.

Certainly, there was a time when the relations between the "new biology" and classical physiology were strained. However, I think it would be impossible for there to have been such fundamental changes in the conduct of science and major shifts in the allocation of resources without some anxiety and stress. It may be that some physiologists took a reactionary posture and did not respond as rapidly as they might have, but now is the time to look at our progress and at what needs to be done in the future.

Far from looking at the world with "tunnel vision," during the past several years the leadership of The American Physiological Society has attempted to steer a thoughtful course between the two possibilities of either abandoning those elements of biological thought that make physiology unique or ignoring the promise and excitement of knowledge derived from more reductionist approaches to biology. These years have been a mixing time and a period of assimilation. We are now well on the way toward integrating the recent conceptual revolutions derived from a deeper understanding of the molecular and cellular basis of function with an understanding of the interplay of cells,

tissues, and organs. During this time, our Society has undertaken many initiatives that will foster exactly the sort of synthesis to which Lenfant refers and that might even be models for other national funding sources such as the NIH.

For example, we have created a series of scientific meetings, the APS Conferences, that are designed to bring together the best scientists in the world to consider physiological problems "from molecules to humans." For the conferences to be supported by the Society, a significant fraction of their content must incorporate relevant new aspects of molecular and structural biology and genetics, as well as study of the functions of the intact organism.

This year at the Experimental Biology Meeting, we will introduce a new programming effort, Physiology InFocus, Two full days of programming will be devoted to the genetic and physiological basis of disease, and programming for these meetings must stimulate the broadest sorts of interpretations of biological research. Our annual meeting structure has also been altered to emphasize workshops and invited lecturers in large numbers. These are venues where leaders in the fields of cell and molecular biology and genetics are invited to come and present their findings in a context that can be applied to the intact organism. These initiatives are being undertaken at the expense of substantial resources both in terms of programming and money by the Society.

We have also invested in programs that will assist those already trained in classical physiology by allowing members to learn new ways in which recent discoveries at the molecular and cellular level can be applied to their problems. Our Research Career Enhancement Award program offers several thousand dollars to investigators who propose to undertake specialized training in new techniques, new concepts, and new paradigms, allowing these tools to be more readily incorporated into the study of physiology, a discipline that, we concur with Lenfant, bears the responsibility for placing discoveries derived from reductionist approaches into the context of the functioning organism.

We have also committed our resources to the creation of a research fellowship that encourages young investigators to begin the process of integrative thought early in their scientific careers. This proactive undertaking is one which few other scientific societies or national funding agencies have been willing to address. We have done this in collaboration with Genentech, Inc., creating the APS-Genentech Postdoctoral Fellowship, a prestigious award that supports talented young investigators who propose to combine molecular approaches in the context of an integrative framework into a single research experience. I personally served on the review committee for this fellowship for two years and was enormously excited both by the quality of the applicants and by the fulfillment of the promise of the blending of molecular and genetic approaches with in vivo experimentation.

Let me close on a philosophical note but one with fundamental implications for long-term direction of Watzlawick et al. have research. observed that there are hierarchies in human understanding of systems, whether they be physical, psychological, or biological, and that each level in the hierarchy contributes something unique to understanding the way in which the system works. In Lenfant's article, he emphasizes that molecules and cells define the behavior of every living organism. This obvious and inarguable fact has led to the enormous emphasis placed on a reductionist approach to understanding biological

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Confrontation With Animal Zealots

(continued from page 1)

from brain stem respiratory centers. That respiratory difficulties can occur following brain injury has been known for a long time (28, 29), but in our experiments this respiratory response to missile energy deposits of equal energy was bimodal: within minutes, animals that eventually died from respiratory insufficiency exhibited reduced minute volumes. Although some lived up to Articles denigrating my research began appearing in the national newspapers, and in August 1988 animal activists gave a disparaging press conference in New Orleans. Their comments were printed in the *New Orleans Times Picayune* (33) and in other newspapers around the country. Try as I might, I could not get the reasons for my research included in these articles. Animal activists then bombarded

the panel concluded in a written report that "[Dr. Carey] had developed a unique model and funding should be continued"

one hour, they never regained normal respirations. Those that lived never showed minute volume reductions after wounding (30). What physiological or biochemical effects differentiated these two groups? Regional cerebral blood flow studies showed that the respiratory abnormalities did not result from brain stem ischemia. Because respiratory difficulties are so important following head injuries, we wondered whether there were drugs that could prevent or treat respiratory insufficiency associated with brain injury.

Preliminary data also indicated that GM-1 Ganglioside appeared to speed and enhance behavioral recovery following brain wounding, but, unfortunately, these drug experiments were never completed (31).

In the spring of 1988, animal activists obtained copies of our experimental protocols and reports from the US Army, which funded our research. They then conducted their own "review" of our research by individuals, such as radiologists and emergency room physicians, with no training in brain trauma research. Of the 4,000 neurosurgeons in the US they found 3 who spoke against my work. None is a recognized authority in the field of brain trauma. Even a paleobiologist, a dinosaur expert, negatively reviewed my research (32)! Congress, the White House, and Louisiana State University with thousands of letters. I received hundreds of letters from all over the world. The activists then approached a member of Congress who, without making any inquiries to me or my university, launched a General Accounting Office (GAO) investigation into my research.

Accountants from the GAO visited my laboratory twice during 1989 and gathered scientific data that they presented to a scientific panel the GAO itself convened (34). Collectively, six of the scientists on the panel had published more than 350 brain research papers. Although the GAO prevented any direct interaction between the panel and me, withheld information about my research from the panel, and included an animal activist on the panel who continually spoke against virtually all aspects of my research, the panel concluded in a written report that "[Dr. Carey] had developed a unique model and funding should be continued" (35). John Jane, Professor of Neurosurgery at the University of Virginia and Chairman of the panel, subsequently reiterated this finding in the Journal of the American Medical Association (36). Meanwhile our initial paper had been accepted by the Journal of Neurosurgery (37).

Inexplicably the GAO did not accept their own panel's opinion but then ver-

bally consulted a group of veterinary anesthesiologists. Medline shows that none had published a single paper on brain research in the prior 15 years. In its final report, the GAO virtually ignored the positive findings of their own original panel of experienced scientists and based the executive summary about my research on the often erroneous and irrelevant unwritten remarks allegedly made by the veterinary anesthesiologists. This report can only be described as unorthodox in the extreme and possibly fraudulent. The only way that I can account for this action is to assume that animal zealots are exerting undue influence on some members of Congress.

In October 1989 after this bizarre investigation, before the GAO report was complete and before I had seen anything in writing, language was added to the FY 1990 defense appropriations bill that withheld funding from my research. I did not have the opportunity to respond to the draft report of the GAO investigation until July 1990. This was one and one-half years after the investigation of my laboratory began and eight months after my research funding had been cut off. Where was "due process"?

I became the first person in America whose peer-reviewed, Animal Welfare Act-compliant, federally funded research money was shut off by Congress. This is an extremely dangerous legislative precedent, which is a real threat to American science and shows that, given the will, special interest groups can induce Congress to prohibit whatever scientific research they target no matter how necessary or potentially rewarding to society that research might be.

Following this Kafkaesque experience I developed a heightened awareness of animal activist activities and their impact on biomedical science. In the following I delineate their success against other trauma research programs, methods they use to attack research, and what the scientific community can do to counter them.

The Success of Animal Activists Against Other Trauma Research

Animal activists also have successfully derailed or severely harrassed many other injury or wound projects (Table 1). Additionally, for fear of confronting animal activists, several central nervous system trauma laboratories have switched to often less optimal rat models to study brain injury. At the 1993 International Brain Trauma meeting in Glasgow, UK, animal models used in the presented papers were as follows: 33 papers on the rat, 3 papers on the cat, and 1 paper each on the dog, ferret, gerbil, mouse, rabbit, and monkey (38). Tax or foundation dollars used to fund trauma research on rats with a 1-g brain instead of often more appropriate animals may produce less optimal scientific results.

Methods Used by Animal Zealots to Attack Research

In many countries animal zealots have launched a multi-pronged campaign against any biomedical research using animals. First, they attack and destroy laboratories and harass investigators. Such attacks are documented in newspapers. Second, they disseminate mis-For example, Neal information. Barnard, President of the group called Physicians Committee for Responsible Medicine, an antivivisectionist organization, stated in a letter to Science that a primary conclusion of the "Report of the Presidental Commission on the Human Immunodeficiency Virus Epidemic" (39) was that animal research is unlikely to be of value in the battle against AIDS (40).

To report this "conclusion" Barnard selectively combined sentences from the Commission's report that were four to eight pages apart (41)! This report actually concluded that "the develop-

ment of appropriate animal models for HIV-related research [be] an immediate and high priority" (39). Another example of misinformation relates to my research. In a yearly report to the Army I wrote: "After anesthetic induction, after again checking that a satisfactory level of anesthesia was present...the cats were wounded" (42). This report was obtained by animal zealots through the Freedom of Information Act and the following appeared in the Jefferson Parish Pet Gazette: "The animals were only given local anesthesia to the wound itself after receiving a severe brain injury" (43).

Third, animal activists have begun a long-term campaign to convince Americans that animal-based biomedical research is evil by insidiously equating biomedical research with animal suffering. Antivivisection snippets appear in local papers often under the aegis of the local humane society. Animal activists visit grade schools to brainwash young children so they will insidious purpose is to convince the public that animals are just like us and should be awarded "rights" too.

If you think this interpretation is extreme, note the following books that I found on a single visit to a local bookstore: 1) Understanding Your Cat by Michael W. Fox ("America's best-loved veterinarian") who is associated with the Humane Society of the US. Fox, writing for the Encyclopaedia Britannica, wrote: [Dogs are used in biomedical research] "which often entails much suffering and has been questioned for its scientific validity and medical relevance to human health problems." Even though the publishers have since retracted that egregious statement, it remains in many already published copies of the Encyclopaedia Britannica. 2) The Best Cat Ever by Cleveland Amory. This book's jacket states that Amory is a humanitarian because he is perhaps the country's foremost animal defender, being president of the New England Antivivisection Society and

Table 1. Scientific Projects Halted or Harrassed By Animal Zealots

Research Institution	Project	Result
University of Pennsylvania	Brain trauma	Closed in 1984
University of Cincinnati	Brain trauma	Closed in 1989
Louisiana State University	Brain trauma	Closed in 1989
Uniform Services University of the Health Sciences	Muscle trauma	Closed in 1985
Letterman Army Institute of Research	Bone trauma	Closed in 1989
General Motors Corporation	Automobile impact protection	Closed in 1992
Uniform Services University of the Health Sciences	Brain plasticity	Under attack
Boston University	Brain plasticity	Under attack

embrace the animal "rights" philosophy. I believe also that animal activists are both encouraging and profiting from the enormous number of programs about animals on television. Their the "powerful" Fund For Animals. I submit that Amory might be considered an antihumanitarian because of his adamant and propagandistic opposition to the use of animals in biomedical research designed to help humans.

Other book titles included 3) Cats at Work by Rhonda Gray and Stephen Robinson, 4) Know Yourself Through Your Cat by Vivienne Agnus, 5) Astrology for Cats by Traudl and Walter Reiner, 6) A Cat Abroad—Further Adventures of Norton the Cat Who Went to Paris and His Human by Peter Gethers, 7) Why Dogs Are Better Than Men by Jennifer Berman, 8) Cats Are Better than Dogs by Missy Dizick, and 9) Cats Are People Too by P. C. Vey. exercises designed to help wounded soldiers. They have even been able to generate a Congressional Friends of Animals Caucus.

Fifth, activists also use the courts to adversely impact animal research. When the Silver Spring monkeys were moved to Tulane University's Delta Regional Primate Center for continued care, the International Primate Protection League sued Tulane University for their release (46). Tulane University spent about \$50,000 suc-

support for so-called "animal rights" has become "politically correct."

Although some may consider these merely genre humor books, they influence people either consciously or subconsciously so that people begin to accept that "a rat is a pig is a dog is a boy," the often-quoted statement made by Ingrid Newkirk, cofounder of People for Ethical Treatment of Animals (PETA). Indeed, some books imply that a cat or a dog is better than a boy! It does not require much of a mental jump to begin thinking, "How indeed can mere humans consider using creatures just like us for biomedical research?"

Thus, dogs and cats, instead of being understood as animals that people use as companions (just as cows are used for milk, steers for meat and hides, and fish for food), are cleverly transformed into "companion" animals, as if there were some a priori force in the universe that decreed such companionship. It also follows that one would not use companions for research.

Fourth, animal zealots interact with governmental agencies to adversely affect national, state, or city laws concerning the use of animals in biomedical research. In many states pound animals cannot be used for any teaching or research (44, 45). Animal activists got Congress to outlaw the use of "companion animals" (dogs and cats) in Department of Defense (DOD) training

cessfully arguing against this. The Progressive Animal Welfare Society (PAWS) has thus far successfully argued that the University of Washington must, if requested, make public even unfunded grant proposals. This not only violates researchers' intellectual property rights but makes research involving animals more vulnerable to attack by animal zealots. Arguing against this suit has thus far cost the University of Washington more than \$150,000 (47). Ohio State University has been forced to release the names and work addresses of animal research scientists (45). These campaigns are designed to intimidate researchers.

Sixth, animal zealots are trying to invade Institutional Animal Care and Use Committees (IACUCs) nationwide to thwart animal-based research.

In my opinion animal zealotry is part of the anti-intellectual, anti-Western culture movement currently popular in much of the US and Europe. Anti-intellectuals would have us believe that alternative therapies will magically conquer disease where the keenest scientific intellects in the world have been thwarted. Those touting animal rights would have us believe that one of the signal achievements of Western culture, scientific inquiry into life processes, is wrong. They pervert the true findings and conclusions of scientific inquiry for their own anti-human purposes.

Because of the success of the animal zealots among lay people and legislators, support for so-called "animal rights" has become "politically correct." For brain trauma researchers the rat is now a more politically correct animal than a cat, dog, or primate even though it may not provide as good a brain trauma model. The political correctness regarding animal experimentation also extends to universities and funding agencies and to politicians who fund the funding agencies. It was more politically correct for the University of Pennsylvania and the NIH not to support Tom Langfitt in his brain injury research, more politically correct for the University of Cincinnati not to support Pat Tornheim in her brain injury research, more politically correct for Cornell University to return Michiko Okamato's NIH funding for her drug addiction research than to stand up to the animal zealots tormenting her, and more politically correct for a Congressman to cut off my brain wound research funds than stand up for the welfare of our service people who defend our country. Imagine the tragic irony: our legislators, who should preserve the commonwealth and help those who defend our country, and our major universities, who should preserve the right of free inquiry to help humans, are succumbing to the animal zealots!

What Do We Do About This Situation?

First, all scientists using animals must be scrupulously concerned with the welfare of the animals they use and must project this concern. They must adhere to the IACUC and funding agency's approved scientific protocols. If, in the course of their experiments, aspects of a protocol, particularly involving anesthesia or analgesia for the animals, need to be changed,

Confrontation With Animal Zealots

IACUC approval must be obtained. If animals are allowed to live after the experiment, their status should be documented daily until full recovery occurs: not only food and water intake but whether they seem comfortable. If they do not, appropriate veterinary advice should be immediately obtained.

Second, compulsive record keeping is essential, particularly with regard to anesthetic administration in case one's laboratory is investigated. Researchers might take a page from the clinicians' experience where every patient's hospital and office record must be considered a legal document. In the current world where "animal abuse" (and, indeed, "research fraud") is being so widely searched for (whether justified or not), researchers must begin to think of their record books not just as an aid in setting down methodology and experimental results but also as legal documents.

Third, universities and granting agencies must not give in to animal activists demands to sit on IACUCs that review research proposals. Activists must not be given access to any research activities because animal welfare is not their goal; their goal is destruction of animalbased biomedical research.

Fourth, universities must support researchers under attack. When an attack begins, university officials may not know the specifics of the research or how to react because what animal zealots say about a particular research project may be false. An extremely expedited investigation of the research under attack must be made using faculty of the highest rank and prestige. Outside experts with no vested interest may give particular credibility to such an investigation, which should be openly embraced by the targeted researcher. If the questioned research passes review (scientific, not political), then the university should immediately come to the active defense of the researcher by showing support within the university itself, to the Board of Regents/Trustees, and to the lay and scientific communities at large, both locally and nationally.

Communicating such support is best handled by professionals in the university's communications office who can explain the importance of the research in lay terms and can obtain optimal local and national media coverage to counter the invariably well-publicized claims of the animal activists.

Fifth, biomedical scientists who largely use public money must speak up and help themselves at every opportunity by informing the public in simple and effective terms about the importance of humane animal-based research for the public's own welfare. They must learn how to get their message out by effectively using the media. In August 1991, 60 Minutes approached me about the closure of my laboratory. After their own 18-month evaluation of all aspects of my research and after interviewing all principals, in January 1993 60 Minutes portrayed the extent of the animal activist attack on me. That such an airing took four years to occur says a great deal about how hard it is to get a message into public view when the researcher is media naive. However, the fact that the truth finally emerged shows that scientists have media power too, if we learn to use it.

Currently the animal activists use "op ed" pieces and letters to the editors in local and national papers to spread misinformation about biomedical research using animals. Such propaganda should not be dismissed by the biomedical community with the assumption that the really helps them.

Sixth, scientists must realize that the animal zealots have enormous financial resources (\$60-\$200 million per year) with which to exploit the media and work for their benighted cause. They will not go away. Scientists must be prepared for a continuing fight for their cause. Organizations such as the American Medical Association, the National Association for Biomedical Research, the Incurably Ill for Animal Research, Americans for Medical Progress, and Thank You Research; professional societies such as The American Physiological Society; and state organizations stand ready to help with programs to demonstrate the importance of animal research to the public or with programs to teach scientists how best to counter the animal activists. Some of these organizations are also developing school programs to show the need for animal-based biomedical research to youngsters who have been on the receiving end of antivivisection propaganda for years. Practicing scientists should help in this effort; they should get out and explain biomedical research to adolescents who may be misinformed. Let the school children see that scientists really do care about people! Make Americans realize how critical animal-based biomedical research is for their personal well being.

Organizations promoting research should also educate Congress and other

Practicing scientists should...get out and explain biomedical research

public will see through such deceit. Most of the public is now unschooled in science and may not be able to discern scientific untruths. The false claims of animal activists appearing in newspaper should be promptly answered by biomedical scientists so that the public will understand how animal-based research elected officials who make laws and policies directly bearing on biomedical research. The 1992 Animal Enterprise Bill, sponsored by Sen. Heflin (D-AL) and Rep. Stenholm (D-TX), which makes damage to biomedical laboratories a federal crime, is one such achievement that came about because of the concerted efforts of several organizations promoting biomedical research.

If those of us who are most knowledgeable about animal research do not take on these educational tasks, no one will, and the work to help our fellow humans will fail for lack of public support. If scientists do educate legislators and the public, individually and with the help of various organizations promoting biomedical research, then public confidence in biomedical research will continue and the political substrate necessary to do research with public money will be maintained.

Finally, organizations promoting biomedical research must be actively supported intellectually, emotionally, and financially by all researchers because animal-based biomedical science is up against a \$60 to \$200-million-a-year animal zealot behemoth. I urge all researchers and departments to communicate with and contribute to any of the above-named (or other) organizations so that animal-based research may continue unimpeded in the future. *****

Notes

1. Hammon, W. M. Analysis of 2187 consecutive penetrating wounds of the brain from Vietnam. *J. Neurosurg.* 34: 127-131, 1971.

Carey, M. E., H. F. Young, and J. L. Mathis. The neurosurgical treatment of craniocerebral missile wounds in Vietnam. Surg. Gynecol. Obstet. 135: 386-390, 1972.
Matson, D. D. The Treatment of Acute Craniocerebral Injuries Due To Missiles. Springfield, IL: Thomas, 1948, p. 84.

4. Gerber, A. M., and R. A. Moody. Craniocerebral missile injury in the monkey: an experimental physiological model. *J. Neurosurg.* 36: 43-49, 1972.

5. Clemedson, C. J., B. Falconer, L. Frankenberg et al. Head injury caused by small-caliber, high velocity bullets. An experimental study. *Z. Rechtsmed.* 73: 103-114, 1973.

6. Djordevic, M., J. Lofgren, H. Steiner et al. Intracranial pressure effects of missiles. In: *Intracranial Pressure III*, edited by D. A. Bosch and M. Brock. New York: Springer-Verlag, 1976, p. 79-83.

7. Crockard, H. A., F. D. Brown, A. B.

Calica et al. ICP CVR and cerebral metabolism following experimental missile injury. In: *Intracranial Pressure III* edited by D. A. Bosch and M. Brock. New York: Springer-Verlag, 1976, p. 73-78.

8. Calica, A. B., H. A. Crockard, and J. F. Mullan. Predicting injury to the brain-the death equation. *Surg. Forum* 27: 470-471, 1976.

9. Crockard, H. A., F. D. Brown, L. M. Johns et al. An experimental cerebral missile injury model in primates. *J. Neurosurg.* 46: 776-783, 1977.

10. Crockard, H. A., F. D. Brown, A. B. Calica et al. Physiological consequences of experimental cerebral missile injury and use of data analysis to predict survival. *J. Neurosurg.* 46: 784-794, 1977.

11. Crockard, H. A., F. D. Brown, J. Trimble et al. Evoked potentials, cerebral blood flow and metabolism following cerebral missile trauma in monkeys. *Surg. Neurol.* 7: 281-287, 1977.

12. Brown, F. D., L. M. Johns, J. J. Jafar et al. Systemic and cerebral hemodynamic response to mannitol after cerebral missile injury. *Surg. Forum* 29: 525, 1978.

13. Crockard, H. A., L. Johns, J. Levett et al. "Brainstem" effects of experimental cerebral trauma. In: *Neural Trauma*, edited by A. J. Popp et al. New York: Raven, 1979, p. 19-25.

14. Brown, F. D., L. M. Johns, H. A. Crockard et al. Response to mannitol following experimental cerebral missile injury. In: *Neural Trauma*, edited by A. J. Popp et al. New York: Raven, 1979, p. 281-287.

15. Brown, F. D., L. M. Johns, and J. F. Mullan. DMSO treatment in an experimental missile injury. *Surg. Forum* 30: 444, 1979.

16 Brown, F. D., L. Johns, J. J. Jafar et al. Detailed monitoring of the effects of mannitol following experimental head injury. *J. Neurosurg.* 50: 423-432, 1979.

17. Brown, F. D., L. M. Johns, and S. Mullan. Dimethylsulfoxide in experimental brain injury, with comparison to mannitol. *J. Neurosurg.* 53: 58-62, 1980.

18. Brown, F. D., L. Johns, and S. Mullan. Dimethylsulfoxide therapy following penetrating brain injury. *Ann. NY Acad. Sci.* 41: 245-252, 1983.

19. Levett, J. M., L. M. Johns, R. L. Replogle et al. Cardiovascular effects of experimental cerebral missile injury in primates. *Surg. Neurol.* 13: 59-64, 1980.

20. Allen, I. V., R. Scott, and J. A. Tanner.

Experimental high-velocity missile head injury. *Injury* 14: 183-193, 1982.

21. Maynard, R. L., G. J. Cooper, V. A. Evans et al. *Pathophysiological Effects of Experimental Medium Velocity Penetrating Head Injury*. Porton Down, Salisbury Wilts, UK: CDE, 1983. (Technical Note No. 567) 22. Allen, I. V., J. Kirk, R. L. Maynard et al. An ultrastructural study of experimental high velocity penetrating head injury. *Acta Neuropathol.* 59: 277-282, 1983.

23. Allen, I. V., H. A. Crockard, R. L. Maynard et al. *Pathological Changes Following Experimental Medium Velocity Penetrating Head Injury.* New York: Raven, 1982.

24. Medline search conducted by author, 1989.

25. Carey, M. E. Learning from traditional combat mortality and morbidity data used in the evaluation of combat medical care. *Mil. Med.* 152: 6-13, 1987.

26. Kaufman, H. Civilian gunshot wounds to the head. *Neurosurgery* 32: 962, 1993.

27. Ditunno, J. F. Functional assessment measures in CNS trauma. *J. Neurotrauma* 9, *Suppl.* 1: S301-S305, 1992.

28. Horsley, V. The destructive effects of small projectiles. *Nature Lond.* 50: 4-108, 1984.

29. Webster, J. E., and E. S. Gurdjian. Acute physiological effects of gunshot and other penetrating wounds of the brain. *J. Neurophysiol.* 6: 255-262, 1943.

30. Torbati, D., A. F. Jacks, M. E. Carey et al. Cerebral cardiovascular and respiratory variables after an experimental brain missile wound. *J. Neurotrauma* 9, *Suppl.* 1: S143, 1992.

31. Carey, M. E. Experimental missile wounding of the brain. *Neurosurg. Clin. North Am.* 6: 629-642, 1995.

32. Letter sent to author by an animal activist "reviewer."

33. New Orleans Times-Picayune, August 1989.

34. Panel Members: J. A. Jane (Panel Chairman), Professor & Chairman of Neurosurgery, University of Virginia, Charlottesville, VA; H. R. Champion, Chief, Trauma Services, Washington Hospital Center, Washington, DC; E. S. Flamm, Professor & Chairman of Neurosurgery, University of Pennsylvania, Philadelphia, PA; R. F. Hoyt, Chief, Laboratory Animal Medicine & Surgery Section, National Institutes of Health, Bethesda, MD; E. R. Perl, Professor & Chairman of Physiology,



University of North Carolina, Chapel Hill, NC; J. T. Povlishock, Professor of Anatomy, Medical College of Virginia, Richmond, VA; R. R. Traystman, Director, Anesthesiology & Critical Care Medicine Research Division, Johns Hopkins School of Medicine, Baltimore, MD; C. L. Walters, Neurological Surgeons, P.C., Phoenix, AZ.

35. GAO Report to the Honorable Robert L. Livington, House of Representatives: Army Biomedical Research; Concerns About Performance of Brain Wound Research. Washington, DC: GAO, 1990, p. 298. (GAO/HRD-91-30)

36. Jane, J. A. Letter to the Editor. J. Am. Med. Assoc. 266: 3285, 1991.

37. Carey, M. E., G. S. Sarna et al. Experimental missile wound to the brain. *J. Neurosurg.* 71: 754-764, 1989.

38. Second International Neurotrauma Symposium Abstracts of Presentations, July 4-9, 1993. Glasgow, UK.

39. Nicoll, C. S., and S. M. Russell. Commentary: animal rights animal research and human obligations. *Mol. Cell. Neurosci.* 3: 271-277, 1992.

40. Barnard, N. D. Animal experimentation (Letter to the Editor), *Science Wash. DC* 245: 583, 1989.

41. Report of the Presidental Commission on the Human Immunodeficiency Virus. Washington, DC: Government Printing Office, 1988, p. 44.

42. Carey, M. E. The Effect Of An Experimental Missile Wound To The Brain On Brain Electrolytes, Regional Cerebral Blood Flow And Blood Brain Barrier Permeability. Final Summary Report, 1 July 1993–31 December 1985. Contract DAMD17-83-C-3145.

43. *The Pet Gazette*. Offical Publication of the Jefferson Parish SPCA, 6 November 1988.

44. National Assocation for Biomedical Research Update, Vol. 14; 1 March 1993. 45. National Association for Biomedical Research Update, Vol. 15, No. 27; 22 December 1994.

46. International Primate Protection League, et al. vs. Administrators of the Tulane Educational Fund, et al. in the District Court for the Eastern District of Louisiana; CA No 88-5713.

47. Sind-Flor, V. Science 266: 1635, 1994.

A Matter of Opinion

Integrative Physiology: A Response

(continued from page 5)

problems over the past several years. Watzlawick et al. go on to point out, however, that it is impossible to understand one level of a systems organization from a lower perspective in the hierarchy. Thus, I think it reasonable to conclude that the reductionists do in fact have a motivation to "partner" with the physiologist, at least to the degree that they seek a true understanding of biological problems. Exclusive reliance on a reductionist approach will limit or prevent the discovery of factors impinging on a system from above.

Put simply, one cannot understand how the kidney works by knowing all there is to know about the structure and membrane associations of the water channel. An understanding of renal function also depends on knowledge of the biology of the cells expressing the channels, the osmotic gradients surrounding those cells, and the structure and organization of the nephron. Furthermore, the functions of the channels and the magnitudes of the osmotic

gradients are in turn dependent on ions and hormones delivered to the kidney by complex and highly regulated cardiovascular and endocrine systems.

The preceding comments lead to the idea that the reductionist approach provides the means for describing the ways in which molecules can behave. The ways in which molecules do behave are determined in turn by the context in which the molecules and cells exist. We are very fond these days of using

the word "multidisciplinary" in referring to our activities and in allocating resources to scientific planning. I think it is additionally important to include in our planning for the conduct of biological research, the idea that research must be multilevel, as well as multidisciplinary. A long-term vision must incorporate provisions for assuring a continuous synthesis of information, progressing both up and down organizational hierarchies; failure to do so will leave us with a fragmented understanding of the world and with no systematic means by which outcomes in a multivariate system can be predicted and treated.

Only by appreciating the codependency of reductionist and integrative biology will our understanding continue to flourish and grow. If the professional organizations nurture scientists who practice both approaches to science and if the funding bodies maintain a "balanced portfolio" supporting both reductionist and integrative approaches, creative scientists will determine the appropriate mix of tools required to understand the most significant biological problems. *****

Reference

1. Watzlawick, P., J. Weakland, and R. Fisch. *Change: Principles of Problem Formation and Problem Resolution*. New York: Norton, 1978.

Brian R. Duling Past President

Moving?

If you have moved or changed your phone, fax, or e-mail address, please notify the APS Membership Office at 301-530-7171 or fax the information to 301-571-8305. Be sure to include your name, degree(s), title, department, institution, complete mailing address, telephone and fax numbers, and e-mail address.



Council Meets In Newport Beach

The Council met November 10-11, 1995, in Newport Beach, CA, in conjunction with the APS Conference "New Discoveries Within the Pancreatic Polypeptide Family: Molecules to Medicine." The primary purpose of the meeting was to review the Society's progress toward the fulfillment of the goals from the 1992 Strategic Plan. The APS staff member responsible for coordinating the implementation of each element of the Strategic Plan provided a status report that was considered by the Council. After a discussion of the actions associated with each element, Council had in-depth discussions about four elements: finance, public policy, meetings, and education. These discussions were designed to focus the Council's concerns about aspects of these elements and to develop recommendations for the future.

The subgroup reviewing the Society's finances was concerned about the anticipated deficit in 1995 and the projected deficit in 1996. To address the problem, the subgroup recommended that the Finance Committee explore using APS reserves as endowment funds, allocating a fixed percentage annually to Society operations. In so doing, it was recommended that APS continue to maintain a strong reserve position. The subgroup also directed the Finance Committee to review the Society's expenditures with a view toward evaluating the cost-benefit relationship of each program, better enabling the Society to evaluate the value of new and existing programs.

The public policy subgroup recommended that the Society maintain its interactions with FASEB for the development of common positions on public affairs issues. At the same time, APS should continue to promote its agenda, especially in the area of NIH funding and animal research, independently of FASEB. To facilitate those efforts, the APS staff was encouraged to expand its e-mail network, NetAlert, in order to increase the Society's voice in public policy forums through the participation of our members.

The subgroup concerned with the

In reviewing the APS meeting program, the subgroup recommended continuing the APS Conference program but encouraged the Program Committee to identify leading scientists to organize



The APS Council: Back row (1 to r): Gerald DiBona, Eric Feigl, Heinz Valtin, Francis Belloni, Ethan Nadel, Walter Boron. Front row (1 to r): Barbara Horwitz, James Schafer, Leonard Jefferson, Brian Duling, Diana Kunze.

Society's education program examined all its elements, including outreach, professional development and continuing education, professional education, and graduate education. The group encouraged the Council to continue its outreach programs for K-12 education. It was recommended that the Society continue developing refresher courses and techniques workshops in conjunction with scientific meetings to enhance the continuing education of the membership. APS should also strengthen its mentoring and career counseling programs to assist young physiologists in their transition from student to faculty member. The subgroup also recommended that the proposed joint meeting of the APS Council and Association of Chairs of Departments of Physiology might focus on the graduate student pipeline and on the physiology curriculum for medical and graduate students.

them to ensure their scientific excellence. Staff was encouraged to identify one or two outstanding sites and use them on a regular basis for the Conferences. Staff was encouraged to identify means of cost containment so that the APS Conferences could generate a profit in the future. Similarly, the subgroup recommended the continued participation of APS in the Experimental Biology meeting but encouraged the Program Committee to strengthen the program through the inclusion of "hot topic" symposia and the Physiology InFocus program. APS also should work with the other participating societies to revise the current EB theme structure to make it current and related to evolving research areas.

During the meeting, Council received the Membership Committee Report, as prepared by **Hannah Carey**, recommending that 126 regular and 52 corre-

sponding candidates be approved for membership. Council also approved the transfer of 58 regular and 3 corresponding members to emeritus status. It was also reported that as of October 25, 1995, APS membership was 7,851: 5,582 regular, 915 emeritus, 31 honorary, 645 corresponding, 10 affiliate, and 608 student members.

The Finance Committee report, prepared by Franklyn G. Knox, was presented to the Council for their review and recommendation. The 1996 preliminary budget projects an income of \$11.634.086 and expenses of \$12,189,022, producing a deficit of \$554,936. After considerable discussion, Council approved the 1996 budget, urging the Finance Committee to identify cost savings to reduce the anticipated deficit. Included in the recommendation was an increase in the 1996-1997 dues structure, raising the dues for regular and corresponding members to \$90. The finance subgroup recommendation to use the reserve accounts as endowment funds will be factored into the 1996 budget presentation made to the Council during the spring meeting.

Leonard Johnson reported that the Publications Committee had selected Kim Barrett as the new editor of the American Journal of Physiology: Cell Physiology and had reappointed Harris Granger as the editor of the American



Leonard Jefferson reviews recommendations from the Public Affairs subgroup.

Journal of Physiology: Heart and Circulatory Physiology. The Committee also approved a mandatory submission form that all authors will be asked to use. The form will include a statement of originality, of copyright, transfer adherence to the responsibilities of authorship, and acknowledgement of any possible conflict of interest (see related article on page Council was also 26). informed that 1998 will be a momentous year for the program for it represents

the centennial of the publication of the *American Journal of Physiology*. The Publications Committee has asked **John Williams** to chair a subcommittee to make recommendations on how the centennial should be celebrated.

The Awards Committee, chaired by D. Neil Granger, reported on the results of their review of applications submitted for the Research Career Enhancement Awards program. Six applications were received for the August 15 deadline, and the Committee recommended that awards be made to Craig H. Gelband and Peter J. Wilkin. It was also reported that the Society has received 36 applications for the second APS-Genentech Postdoctoral Fellowship Award and that the Committee expected to complete its review in January. The Council also enthusiastically accepted the recommendation of the Daggs Award Committee that Franklyn G. Knox be awarded the 1996 Ray G. Daggs Award for contributions to physiology and the Society.

The Program Committee, chaired by Ethan Nadel, reported on the status of the Physiology InFocus Program organized by Ray Frizzell for the Experimental Biology '96 Meeting. Entitled "Genetic Strategies for Understanding the Physiological Basis



Society and its publication Barbara Horwitz and Walter Boron discuss subgroup recommendations.

of Disease," the program will consist of four half-day sessions with presentations by leading investigators in the field including a Nobel laureate and the head of the Human Genome Project. In addition, the EB '96 program will include two "hot topic" symposia approved in November 1995. Nadel also provided a status report on the proposed joint Spanish Physiological Society/APS meeting planned for Malaga, Spain in February 1997 and on the joint Association of Latinamericano Ciencias Fisiologicas (ALACF)/APS meeting scheduled for Caracas, Venezuela in September 1997.

The Council was also updated on the APS Chapter Program, receiving a report on the meeting of the Ohio Physiological Society in Toledo. In addition, the Council approved the bylaws of the Iowa Physiological Society, making it the second APS Chapter. Their first meeting will be held at the end of April 1996 in conjunction with the Iowa Academy of Sciences.

Eric Feigl, Public Affairs Committee Chair, met with the Council to review the status of a number of public affairs issues, allowing for extensive discussion and development of Society positions on a number of issues. *

1995 APS Conference Report New Discoveries Within the Pancreatic Polypeptide Family: From Molecules to Medicine

The second APS Conference of 1995 on "New Discoveries Within the Pancreatic Polypeptide Family: From Molecules to Medicine," was held November 8-11, at the Newport Beach Marriott Hotel in Newport Beach, CA. The Organizing Committee, consisting of William Zipf, Professor and Vice

APS Conference Registration		
Category	Number	
Member	10	
Nonmember	86	
Postdoctoral	15	
Student	37	
Guest	4	
Invited Speaker	35	
Total	187	

Chairman of the Department of Pediatrics, Children's Hospital; Ian Taylor, Chief of Gastroenterology, Duke University; Claes Wahlestedt. Neurology Department of and Neuroscience, Cornell University Medical College; **Richard Rogers**,

Department of Physiology, The Ohio State University: and Helen J. Cooke, Department of Physiology, The Ohio State University, focused the meeting on the polypeptide pancreatic family of peptides, which includes pancreatic polypeptide (PP), peptide YY (PYY), and neuropeptide Y (NPY). The conference program included 32 state-of-the-art lecture presentations, 10 oral presenand 2 poster sessions. Ten cussing posters. abstracts that described

exciting new developments in the field were chosen by the Organizing Committee to be included in the program as short oral presentations.

In planning this conference, the organizers tried to take advantage of the explosive growth in interest in the NPY/ PYY/PP family of peptides during the last several years. The field had seen major advances in the molecular biology and biochemistry of this family



Organizing Committee (l to r): Claes Wahlestedt, Richard Rogers, Helen Cooke, William Zipf, Ian Taylor.



tations by junior faculty, APS Conference attendees enjoy their buffet dinner while dis-

of peptides, and transgenic animal models had been developed that provided insights into the importance of these peptides in central and autonomic functions. The meeting provided the opportunity for cell biologists, physiologists, molecular biologists, neuroscientist, anatomists, gastroenterologists, and pharmacologists to meet and foster integration of findings from all these disciplines.

The conference started with an evening plenary lecture presented by Ronald Chance, Eli Lilly Company, which provided an historical overview of the discovery of the NPY/PYY/PP family. On subsequent evenings, the organizers held poster sessions of contributed abstracts during which light buffet dinners were provided for the attendees. This provided an opportunity for considerable interaction and discussion of the research being presented. It also provided the opportunity for students and junior faculty to interact with the invited faculty.

Seventy-one abstracts were submitted and programmed as poster presenta-



Award Recipients (1 to r): Laura A. McCullough, Anders Bergdahl, Carla Cannizzaro, Jacques-Andre St-Pierre.

tions for the conference; 31% or 22 of the abstracts listed women as first authors. Three abstracts (4.2%) were submitted by scientists working in government laboratories, and 13 abstracts (18.3%) were submitted from investigators in industry. The international the field of pancreatic nature of polypeptides was reflected in the fact that 36 abstracts (51%) were submitted by scientists working in laboratories outside the Americas. The volunteered abstracts were submitted by scientists working in 21 different departments including 15 abstracts (21.1%) from pharmacology-related departments, 6 abstracts (8.4%) from physiology-related departments, and 8 abstracts (11.2%) from departments of medicine.

The scientific abstracts submitted by students were judged for scientific excellence, and the four best abstracts were selected for awards consisting of a \$500 check, complimentary registration, and a certificate. Awards were presented by the organizers to Anders Bergdahl, University of Lund, Sweden; Carla Cannizzaro, Catholic University of the Sacred Heart, Rome, Italy; Laura A. McCullough, St. Louis University School of Medicine, Missouri; and Jacques-Andre St-Pierre, McGill University and Douglas Hospital Research Center, Montreal, Quebec, Canada. The Society also continued its efforts to increase the participation of underrepresented minority students in APS meetings by providing support for three students and one faculty member to attend the conference. George J. Hammons, PhD, Philander Smith College, Kelven E. Jeames, Stillman College, Kentrell M. Liddell, Tougaloo College, and Latasha P. Wright, Tougaloo College, received travel fellowships funded by the Institute National of Diabetes,

Digestive, and Kidney Diseases (NIDDK), which enable them to attend and participate in the meeting. In addition, the Society also hosted five underrepresented minority students from East Los Angeles College, Monterey Park, CA.

A total of 187 scientists, both invited and paid registrants, attended the conference. Scientists from outside of the Americas accounted for 35.2% (66) of the registrants, industry-based scientists for 32.6% (61) of the registrants, and government scientists for 1.6% (3) of the registrants (see table for a breakdown of registrants by category).

The scientific success of the conference was clearly a result of the efforts of the organizers. In addition, the invited speakers, abstract presenters, and attendees provided the opportunity for the fruitful discussions that make a meeting a success. The Society also gratefully acknowledges the contributions received in support of the conference from the NIDDK, Burroughs Wellcome Company, Ciba-Geigy Limited, Dr. Karl Thomae GmbH, Lilly Research Laboratories, Pfizer Central Research, and Sanofi Recherche. *****



NIDDK Award Recipients (l to r): Latasha P. Wright, George J. Hammons, Kentrell M. Liddell, Kelven E. Jeames.

APS Chapter News

Ohio Physiological Society

The Ohio Physiological Society (OPS) held its Tenth Annual Meeting on September 28 and 29, 1995, in Toledo, Ohio. The title of the program was "Physiology: From Molecules to Man." Besides being the Tenth Anniversary of the OPS, the meeting was historic because it was the first meeting as the first official chapter of the APS. The meeting was opened with the first APS Lecture delivered by Leonard S. Jefferson, APS President. His lecture was entitled "Regulation of Protein Synthesis in Mammalian Cells by Hormones and Nutrients."

Also presented was the Tenth Anniversary Lecture by **Peter Lauf**, the founder and first president of the OPS. Lauf spoke on "The Erythrocyte K-Cl Transport System." Following these two distinguished lectures, the annual society Business Meeting was held. Major agenda items included discussion and adoption of proposed amendments to the OPS Bylaws, announcement of initiatives to increase OPS and APS membership within our constituency, and comments by both Leonard Jefferson and **Martin Frank**, APS Executive Director, about the role of OPS as a chapter of the APS.

Other keynote addresses were given by **John Rapp** on "Molecular Genetic Analysis of Hypertension in the Rat" and **Helen Cooke** on "Enteric Nervous System: Gut Sensations and Reactions." In addition, a poster session with 35 abstracts, representing 90 coauthors, was presented.

Total registration for the two-day meeting was 75. There were delegations from the Medical College of Ohio, Wright State University, Northeastern Ohio Universities College of Medicine, and Ohio State University. Other institutions that were represented included Bowling Green State University, Ohio University, The Cleveland Clinic, Sinclair Community College, and Westminster College (PA).

Iowa Physiological Society

The Iowa Physiological Society held an organizational meeting on October 7, 1995. The Bylaws of the Society were drafted and approved to be submitted to

the APS Council for final approval as an APS Chapter.

Elections were held with the following results: **Richard McCabe** was elected as President, **Charles Wunder** as President-elect, and **David Gutterman** as Treasurer.

Plans are underway for holding joint meetings with the Iowa Academy of Science, which holds its next meeting at Simpson College in Indianola on April 26 and 27, 1996. This will enable the society to avoid duplication of effort and will aid in maximizing exposure for the new organization.

Brian Duling, APS Past President, was selected as the first APS Lecturer. In addition, plans are underway to invite a clinical speaker as well that would be largely supported by funds solicited from outside sources.

Luke Mortenson was appointed to chair the Membership Committee and publish the societal newsletter. He will be assisted by Jeannine Matz.

At the fall Council meeting in Newport Beach, CA, Council voted to approve the Iowa Physiological Society's Bylaws and accept the group as an official chapter of the APS. *



G. Edgar Folk, Jr., Senior Physiologist Award

The G. Edgar Folk, Jr., Senior Physiologist Fund has been set up through the generosity of family and former graduate students and postdoctoral fellows to provide modest but helpful assistance to senior physiologists 70 years or older who no longer have grant funds available to them.

The awards might be used for such purposes as attending an APS meeting to present a paper, engaging in a series of modest experiments, or completing a manuscript (paying for typists or perhaps page charges).

Recipients will be selected with the assistance of the Senior Physiologists Committee throughout the year. Names of awardees will not be made public. Mary Folk writes that the purpose of the fund is for the Senior Physiologists Committee "to have *fun* assisting colleagues and for Emeritus APS members to keep in closer touch with APS."

Inquiries concerning the G. Edgar Folk, Jr., Senior Physiologist Fund should be made to Martin Frank. Executive Director, APS. Please write The to: American **Physiological** Society, 9650 Rockville Pike, Bethesda, MD 20814 or call 301-530-7118 or fax to 301-571-8305.

Research Career Enhancement Awards

The Research Career Enhancement Awards (RCEAs) are designed to enhance the research careers of APS members in good standing, strengthening their research programs and making them more competitive scientists. The awards are given competitively twice a year. APS members in good standing are invited to apply for RCEAs. The deadlines for application are February 15 and August 15.

In 1995 the spring round of applications resulted in two of six applications being accepted, those of Jane E. McGowan and Xiao-Jian Yuan.

Jane E. McGowan, University of Pennsylvania, will use the award to attend a Cold Spring Harbor Laboratory course on "Molecular Cloning of Neural Genes." McGowan's current research focuses on the cellular mechanisms of cerebral dysfunction during hypoxia in the fetus and newborn. The course will offer McGowan the opportunity to become familiar with the techniques required to investigate the changes in gene expression that occur as a result of altered glutamate receptor function following hypoxia and/or hypoglycemia in order to understand the long-term alterations that result in cerebral function.

The award to Xiao-Jian Yuan, University of Maryland, Baltimore, will enable him to attend a Cold Spring Harbor Laboratory course on "Molecular Approaches to Ion Channel Structure, Expression, and Function." Yuan's current research focuses on the roles of ion channels in regulating membrane potential and calcium ion concentration in pulmonary artery myocytes, as well as their relationships to the mechanisms of hypoxic pulmonary vasoconstriction. The course will provide Yuan with a chance to learn the combined use of molecular biological techniques and electrophysiological analysis for the study of ligand-gated and voltage-gated channels.

In the fall, round six applications were again received, with two awards given. These awards were made to **Craig H. Gelband** and **Peter J. Wilkin**.

Craig H. Gelband, University of Florida, Gainesville, will use the award to attend a Marine Biological Laboratory, Woods Hole course on "Optical Microscopy and Imaging in the Biomedical Sciences." After the course, he will visit the laboratory of Douglas Tillotson, Boston University, an expert on fluorometric measurements of intracellular calcium. Gelband is studying the control of excitation-contraction coupling of vascular smooth muscle and the role of intracellular calcium.

The award to Peter J. Wilkin, Purdue University North Central, will allow him to work in the laboratory of Michael Dickinson, University of Chicago, for one month to learn the methodology to measure and record wingbeats, air flows, and instantaneous forces of the sphingid moth, Manduca sexta, in simulated hovering flight. The data will be used to develop a threedimensional model that can be compared with aerodynamic theories of force production by beating wings. The significance of the work resides in the combination of methods that Wilkin will be able to use to study the same wingbeat: kinematics, instantaneous forces, and air flows. *



APS Annual Business Meeting Tuesday, April 16, 5:15 pm Washington, DC Convention Center Room 39



Distinguished Lectureships

1996 HENRY PICKERING BOWDITCH AWARD



Kim E. Barrett University of California, San Diego

"Intra- and Intercellular Regulation of Intestinal Epithelial Transport"

Monday, April 15, 5:15 PM Convention Center, Room 39

Cardiovascular Section ROBERT M. BERNE DISTINGUISHED LECTURE



Richard J. Traystman Johns Hopkins University

"Brain Protection: Lessons From the Animal Farm"

Tuesday, April 16, 11:45 AM Grand Hyatt, Independence A PHYSIOLOGY IN PERSPECTIVE: WALTER B. CANNON MEMORIAL AWARD (Supported by The Grass Foundation)



Richard W. Tsien Stanford University

"Calcium Channels as Versatile and Efficient Signal Transducers"

Sunday, April 14, 5:15 PM Grand Hyatt, Independence A

Cell and General Physiology Section HUGH DAVSON DISTINGUISHED LECTURE



Günter Blobel Rockefeller University

"Protein Translocation Across Membranes"

Tuesday, April 16, 2:00 PM Grand Hyatt, Constitution B

Central Nervous System Section JOSEPH ERLANGER DISTINGUISHED LECTURE



J. Allan Hobson Harvard Medical School

"Waking, Sleeping, and Dreaming: The Neurobiological Control of Conscious States"

Monday, April 15, 2:00 PM Convention Center, Room 32 Comparative Physiology Section AUGUST KROGH DISTINGUISHED LECTURE



Knut Schmidt-Nielsen Duke University

"Life at the Edge: Survival in Hostile Environments"

Tuesday, April 16, 8:30 AM Grand Hyatt, Constitution A

Endocrinology and Metabolism Section SOLOMON A. BERSON DISTINGUISHED LECTURE



Robert J. Lefkowitz Duke University

"G Protein-Coupled Receptors and Receptor Kinases: From Molecular Biology to Potential Therapeutic Applications"

Tuesday, April 16, 8:30 AM Convention Center, Room 40

Environmental and Exercise Physiology Section EDWARD F. ADOLPH DISTINGUISHED LECTURES



John T. Reeves University of Colorado

"Pulmonary Circulation During Exercise at Sea Level and High Altitude"

Wednesday, April 17, 11:45 AM Convention Center, Room 40

Gastrointestinal Section HORACE DAVENPORT DISTINGUISHED LECTURESHIP



Alan F. Hofmann University of California, San Diego

"The ABCDs of Bile Acids and the Enterohepatic Circulation"

Monday, April 15, 2:00 PM Convention Center, Room 39 Neural Control and Autonomic Regulation Section CARL LUDWIG DISTINGUISHED LECTURE



Diana L. Kunze Rammelkamp Center

"Neural Integration of Cardiovascular Reflexes: A View From the Cell"

Monday, April 15, 8:30 AM Grand Hyatt, Constitution C

Renal Physiology Section CARL W. GOTTSCHALK DISTINGUISHED LECTURE



Mark A. Knepper National Heart, Lung, and Blood Institute

"Mechanisms of Vasopressin Action in the Kidney"

Wednesday, April 17, 12:45 PM Convention Center, Room 40 Respiration Section JULIUS H. COMROE, JR. DISTINGUISHED LECTURE



Marlene Rabinovitch Hospital for Sick Children, Toronto, Ontario

"Endogenous Vascular Elastase and Beyond: Retro and Pro-Spectroscopic Insights"

Wednesday, April 17, 2:00 PM Grand Hyatt, Constitution C

Teaching of Physiology Section CLAUDE BERNARD DISTINGUISHED LECTURE

Stanley G. Schultz University of Texas, Houston

"Homeostasis, Humpty-Dumpty, and Integrative Biology"

Monday, April 15, 11:45AM Grand Hyatt, Constitution A



Water and Electrolyte Homeostasis Section

ERNEST H. STARLING DISTINGUISHED LECTURE

Allen W. Cowley, Jr. Medical College of Wisconsin

"Role of Renal Medulla in Volume and Arterial Pressure Regulation"

Wednesday, April 17, 8:30AM Grand Hyatt, Constitution B

Animal Care and Experimentation Sunday, April 14, 8:30 AM Grand Hyatt, Renwick

Awards Monday, April 15, 7:30 AM Grand Hyatt, Latrobe

Career Opportunities Monday, April 15, 7:30 AM Grand Hyatt, Roosevelt

Committee on Committees Sunday, April 14, 8:30 AM Grand Hyatt, Burnham

Education Sunday, April 14, 1:00 PM Grand Hyatt, Renwick

Monday, April 15, 7:30 AM Grand Hyatt, Burnham

Committee Meetings

International Physiology Sunday, April 14, 1:30 рм Grand Hyatt, Washington Board Room

Liaison With Industry Tuesday, April 16, 7:30 AM Grand Hyatt, Burnham

Long-Range Planning Monday, April 15, 12:00 NOON Grand Hyatt, Latrobe

Membership Tuesday, April 16, 7:30 AM Grand Hyatt, Latrobe

Porter Physiology Development Tuesday, April 16, 12:00 NOON Grand Hyatt, Burnham

Program Tuesday, April 16, 12:00 NOON Grand Hyatt, Latrobe Program Advisory Sunday, April 14, 8:00 AM Grand Hyatt, Lafayette Park/ Farragut Square

Wednesday, April 17, 12:00 NOON Grand Hyatt, Lafayette Park/ Farragut Square

Public Affairs Monday, April 15, 4:00 PM Grand Hyatt, Burnham

Section Advisory Sunday, April 14, 8:00 AM Grand Hyatt, Latrobe

Women in Physiology Wednesday, April 17, 7:00 AM Grand Hyatt, Burnham

APS Headquarters for Experimental Biology '96 in Washington, DC: Grand Hyatt Hotel, Bulfinch Room

The Physiologist

Sections Special Functions

Cardiovascular Dinner Tuesday, April 16, 6:30 PM Ramada Renaissance, Congressional Hall A

Cell and General Physiology Steering Committee Tuesday, April 16, 7:30 AM Grand Hyatt, Wilson

Banquet and Lecture Tuesday, April 16, 6:30 PM Ramada Renaissance, East Salon

Central Nervous System Steering Committee Tuesday, April 16, 12:00 NOON Grand Hyatt, Wilson

Reception Tuesday, April 16, 6:30 PM Grand Hyatt, Wilson

Comparative Physiology Steering Committee Monday, April 15, 12:00 NOON Grand Hyatt, Wilson

Business Meeting, Social, Scholander Awards Tuesday, April 16, 6:30 PM Grand Hyatt, Independence G

Endocrinology and Metabolism Steering Committee Monday, April 15, 11:00 AM Grand Hyatt, Cherry Blossom Board Room

Business Meeting Tuesday, April 16, 6:30 PM Grand Hyatt, Independence B/C Reception Tuesday, April 16, 7:15 PM Grand Hyatt, Independence D/E

Environmental and Exercise Physiology Steering Committee Monday, April 15, 7:30 AM Grand Hyatt, Renwick

Business Meeting Tuesday, April 16, 6:30 PM Grand Hyatt, Independence H/I

Dinner Tuesday, April 16, 7:15 PM Grand Hyatt, Lafayette Park/ Farragut Square

Gastrointestinal Steering Committee Monday, April 15, 7:30 AM Grand Hyatt, Washington Board Room

Reception/Business Meeting Monday, April 15, 6:45 PM Grand Hyatt, Roosevelt

History of Physiology Group Lecture Sunday, April 14, 7:00 PM Grand Hyatt, Independence B/C

Neural Control and Autonomic Regulation Reception Tuesday, April 16, 6:30 PM Grand Hyatt, Roosevelt/Cabin John

Renal Physiology Steering Committee Monday, April 15, 7:30 AM Grand Hyatt, Wilson Dinner Tuesday, April 16, 7:00 PM Cosmos Club, Powell Room

Respiration Steering Committee Tuesday, April 16, 12:00 NOON Grand Hyatt, Renwick

Dinner Tuesday, April 16, 6:30 PM Ramada Renaissance, West Salon B

Teaching of Physiology Steering Committee Monday, April 15, 7:30 AM Grand Hyatt, Potomac Board Room

Business Meeting Sunday, April 14, 9:30 PM Grand Hyatt, Latrobe

Reception Monday, April 15, 5:00 PM Grand Hyatt, Constitution A

Dinner Sunday, April 14, 6:30 PM Grand Hyatt, Independence D/E

Water and Electrolyte Homeostasis

Steering Committee Tuesday, April 16, 7:30 AM Grand Hyatt, Renwick

Luncheon and Business Meeting Tuesday, April 16, 11:30 AM Red Sage Restaurant

Publications Special Functions

Journal Editorial Boards Group Meeting Sunday, April 14, 3:00 PM

Convention Center, Room 29

Advances in Physiology Education Editor and Associate Editors Tuesday, April 16, 7:30 AM Grand Hyatt, Roosevelt

AJP: Cell Physiology Editor and Associate Editors Monday, April 15, 7:30 AM Grand Hyatt, Lafayette Park

AJP: Gastrointestinal and Liver Physiology Editor and Associate Editors Tuesday, April 16, 7:30 AM Grand Hyatt, Washington Board Room

AJP: Heart and Circulatory Physiology Editor and Associate Editors Monday, April 15, 12:00 NOON Grand Hyatt, Roosevelt AJP: Lung Cellular and Molecular Physiology Editor and Associate Editors Monday, April 15, 12:00 NOON Grand Hyatt, Potomac Board Room

AJP: Regulatory, Integrative and Comparative Physiology Editor and Associate Editors Monday, April 15, 7:30 AM Grand Hyatt, Cabin John

AJP: Renal, Fluid and Electrolyte Physiology Editor and Associate Editors Tuesday, April 16, 12:00 NOON Grand Hyatt, Washington Board Room

Journal of Applied Physiology Editor and Associate Editors Saturday, April 13, 8:30 am Grand Hyatt, Latrobe Clinical Physiology Series Book Committee Monday, April 15, 7:30 AM Grand Hyatt, Franklin Square

Handbook Committee Tuesday, April 16, 7:30 AM Grand Hyatt, Potomac Board Room

History of Physiology Book Committee Monday, April 15, 12:00 NOON Grand Hyatt, Cabin John

Technical Series Book Committee Tuesday, April 16, 12:00 NOON Grand Hyatt, Potomac Board Room

The Fourth Annual Women in Physiology Mentoring Program and Reception

Grand Hyatt Hotel, Washington, DC Monday, April 15, 1996 6:30 PM

Featuring a speech by Helen J. Cooke, Ohio State University

To be followed by information and a brief update on The APS Mentoring Program for Women in Physiology Sponsored by the APS Committee on Women in Physiology

Symposia and Workshops

Sunday

Refresher Course for Teaching of Gastrointestinal Physiology Norman Weisbrodt Sunday, April 14, 9:00 AM Grand Hyatt, Constitution A

Physiology in a Changing Medical School Curriculum: Crisis or Opportunity? Aviad Haramati Sunday, April 14, 1:30 рм Grand Hyatt, Constitution B

Methods for Evaluating Higher Order Learning Roger Thies Sunday, April 14, 2:00 РМ Grand Hyatt, Constitution C

Hot Topic Symposium: Direct Gene Transfer to the Developing Lung Bruce R. Pitt and John Engelhardt Sunday, April 14, 2:00 PM Grand Hyatt, Independence A

Public Affairs Symposium: Animal Welfare Update: The Guide, the Regs, and the Congress C. T. Hawk Sunday, April 14, 2:00 PM Convention Center, Room 13

Adhesion Biomechanics: Molecular, Cellular and Biomechanical Aspects of Cell Adhesion K.-L. Paul Sung (Biomedical Engineering Society) Sunday, April 14, 2:00 PM Grand Hyatt, Independence H/I

Careers in Physiology Steven L. Bealer Sunday, April 14, 6:30 PM Grand Hyatt, Constitution C

Monday

APS Past President's Symposium: Intercellular Signaling in the Vascular Wall Brian R. Duling Monday, April 15, 8:30 AM Grand Hyatt, Independence A

Physiology InFocus: Genetic Tools for Physiological Studies Garry R. Cutting Monday, April 15, 8:30 AM Convention Center, Room 40

The Kidney as a Target Organ for Growth Hormone Aviad Haramati Monday, April 15, 8:30 AM Ramada Renaissance, South Salon

Fatigue and Endurance Capacity of Respiratory Muscles: Emerging Concepts Ralph F. Fregosi Monday, April 15, 8:30 AM Grand Hyatt, Constitution B

Comparative Aspects of Membrane Transport: Functional Variation Within Common Paradigms Gregory Ahearnand Stephen H. Wright Monday, April 15, 8:30 AM Convention Center, Room 39

Physiology InFocus: Transgenic Strategies for Physiological Studies Craig Malbon Monday, April 15, 2:00 PM Convention Center, Room 40

Hot Topic: Integrins in Vascular Biology Jahar Bhattacharya Monday, April 15, 2:00 PM Grand Hyatt, Independence B/C Potassium Channels and Blood Vessels Donald D. Heistad and David Harder Monday, April 15, 2:00 PM Grand Hyatt, Independence A

Effects of Growth Hormone Excess in Transgenic Mice T. E. Wagner and Andrzej Bartke Monday, April 15, 2:00 PM Ramada Renaissance, South Salon

Transport of Peptides and Proteins Cynthia Sung and P. F. Morrison Monday, April 15, 2:00 PM Grand Hyatt, Independence H/I

Nitric Oxide and Reactive Oxygen in Skeletal Muscle T. L. Reid and Matthew B. Grisham Monday, April 15, 2:00 PM Grand Hyatt, Constitution B

Fourth Annual Women in Physiology Mentoring Workshop Cheryl M. Heesch Monday, April 15, 6:30 PM Grand Hyatt, Constitution C/D/E

Tuesday

Epithelial Na⁺ Channels: Conclusions and Controversies Sandy I. Helman and Douglas C. Eaton Tuesday, April 16, 8:30 AM Convention Center, Room 39

Role of Natriuretic Peptides in Body Fluid Homeostasis Samuel M. McCann and T. Mack (Society for Experimental Biology and Medicine) Tuesday, April 16, 8:30 AM Grand Hyatt, Independence D/E

New Approaches to Membrane Potential Studies Using Voltage-Sensitive Dyes James M. Beach Tuesday, April 16, 8:30 AM Grand Hyatt, Independence H/I

Mechanisms of Angiogenesis Kathryn G. Lamping Tuesday, April 16, 8:30 AM Grand Hyatt, Independence A

Role of Nitric Oxide in the Physiology and Pathophysiology of the Digestive System Matthew B. Grisham and Paul Kubes Tuesday, April 16, 8:30 AM Grand Hyatt, Constitution B

From Receptor to Response: Brain Stem Cholinergic Mechanisms of Autonomic Control Helen A. Baghdoyan Tuesday, April 16, 8:30 AM Convention Center, Room 30

The Juxtaglomerular Apparatus I: Structural and Functional Characteristics Jurgen B. Schnermann and A. Kurtz Tuesday, April 16, 8:30 AM Grand Hyatt, Constitution C

Physiology InFocus: Genetic Diseases Affecting Ion Channels Ray A. Frizzell Tuesday, April 16, 2:00 PM Convention Center, Room 40 Oxidants and Thiol Redox Control in the Gastrointestinal Tract Tak Yee Aw and Dean P. Jones Tuesday, April 16, 2:00 PM Grand Hyatt, Independence B/C

The Role of Ras in the Transmission of Growth and Developmental Signals T. Roberts and Deborah K. Morrison Tuesday, April 16, 2:00 PM Convention Center, Room 30

Lung Inflammation: Cells, Secretory Products and Signaling Mechanisms James D. Crapo Tuesday, April 16, 2:00 PM Grand Hyatt, Constitution C

Central Mechanisms of Long-Term Arterial Pressure Regulation: A New Perspective John W. Osborn and Virginia L. Brooks Tuesday, April 16, 2:00 PM Grand Hyatt, Independence A

Wednesday

Physiology InFocus: Ion Sensors and Transporters in Health and Disease Steven C. Hebert Wednesday, April 17, 8:30 AM Convention Center, Room 40

Molecular Targets of Vascular Disease David L. Crandall Wednesday, April 17, 8:30 AM Grand Hyatt, Independence A Cell-Matrix Interactions in Lung Development Robert M. Senior and Jesse Roman Wednesday, April 17, 8:30 AM Grand Hyatt, Constitution A

The Single Smooth Muscle Cell: 25th Anniversary Roland M. Bagby and Frederick S. Fay Wednesday, April 17, 8:30 AM Convention Center, Room 39

Gene Regulation of Mechanical Force in Mammalian Cells

Larry V. McIntire and B. R. Alevriadou (North American Society of Biorheology) Wednesday, April 17, 2:00 PM Grand Hyatt, Constitution B

Intercellular Calcium Communication A. Charles and Michael L. Woodruff Wednesday, April 17, 2:00 PM Convention Center, Room 39

Signaling Mechanisms and Genes Involved in the Development of Cell Hypertrophy Patricia Preisig Wednesday, April 17, 2:00 PM Grand Hyatt, Independence A

The Juxtaglomerular Apparatus II: Role of Nitric Oxide in Functional Regulation Ian A. Reid and Ronald H. Freeman Wednesday, April 17, 2:00 PM Convention Center, Room 40

Annual Teaching Section Dinner

The annual dinner of the teaching section will feature the third annual Arthur C. Guyton Teacher of the Year Award, sponsored by the W. B. Saunders Company. Plan to attend this informal gathering and mix with your colleagues.

The dinner is Sunday, April 14 at 6:30 PM in the Grand Hyatt, Independence D/E. The buffet dinner will include Vegetable Crudite and Tapas Salad, Moo Shu, and Dessert Buffets. For tickets, send a check for \$32 made out to APS Teaching Section to: Wayne W. Carley, NABT, 11250 Roger Bacon Drive #19, Reston, VA 22090-5202. We hope to see you there.

Physiological Reviews Boards Meet In Paris and Scottsdale



Physiological Reviews Editorial Board Meeting of the European Committee, Paris, 1995. Back row (I to r): S. Grillner, J. M. Besson, T. Clausen, R. Green, B. Kanner. Front row (I to r):B. Rauner, W. F. Boron, J. Bures, C. Bauer, L. R. Johnson.

Two meetings of the Editorial Boards of *Physiological Reviews* were held in 1995, one on June 11 in Paris by the Chair of the European Committee, Roger Green, and one on November 2 in Scottsdale, Arizona, by the Editor of the journal, Walter Boron. The Paris meeting was hosted by Jean-Marie Besson.

Physiological Reviews publishes comprehensive, analytical, and critical reviews by authors whose research has had a major influence on the development of the topic reviewed. A good review presents new concepts or approaches as a result of the contribution of several laboratories engaged in research on the topic. Authors are encouraged to write with both a general and specialized readership in mind.

At each meeting the Boards discussed the invited reviews from previous years that are still in progress, as well as the new invitations that each board member brought to the meeting. There are currently over 200 invited manuscripts in the database maintained by the Editor. Not all of the authors will honor their commitment, and others will submit their manuscript only after a long delay, which makes the task of maintaining a steady flow of manuscripts that cover all aspects of physiology a real challenge for the Editor. Each board member contributes to the excellence of the journal by submitting the most suitable topics with the names of the best possible authors to write the review, by following up on their individual assignments, and by assuring competent peer review. As a result, from the US and Europe; representatives from South America, Australia, and Japan; and others chosen by several societies at the Editor's invitation (American Society for Biochemistry and Molecular Biology, Society of General Physiologists, American Insti-tute of Nutrition, The Biophysical Society, The Society for Neuroscience, and The American Society for Cell Biology).

Since July 1995, each author has been providing an abstract for the review that is posted in the Society's electronic abstract journal, *APStracts*, which means that the abstract of articles scheduled for the next issue are posted electronically and can be accessed through Gopher (at either the server gopher.uth.tmc.edu 3300) or on the World Wide Web (at http://www.uth. tmc.edu/apstracts).

A supplement to the journal on cystic fibrosis is planned for publication in



Physiological Reviews Editorial Board Meeting, Scottsdale, AZ, 1995. Back row (1 to r): J. Lichtman, J. Neill, M. Czech, J. Dowling, B. Duling, W. Visek, D. Clapham, S. Hamilton, G. Giebisch, C. Hartzell, R. Frizzell, R. Green. Front row (1 to r): R. Godt, J. Lippincott-Schwartz, W. Boron, N. Rosenthal.

Physiological Reviews not only has the highest Impact Factor of all APS journals but the highest factor of the 55 physiological journals listed by the Institute of Scientific Information. Its preeminent position in the field attests to the dedication of the Editorial Board, which consists of regular members late 1997 or 1998. Ray Frizzell has been appointed Guest Editor to organize the project. He presented a list of chapters and authors at the recent meeting in Scottsdale, which were approved by the Board. The supplement will be sent to all subscribers as well as being offered for separate purchase.

Publications Committee Implements Important Policy Changes

On January 1, 1996, two important changes were implemented for the publications of the American Physiological Society: a submission form signed by all authors must accompany submitted manuscripts, and published "received" and "accepted in final form" dates will be based on authors meeting all APS publication requirements.

Submission Form

The Publications Committee decided to adopt a mandatory submission form for several reasons: to ensure that all authors are aware of all the responsibilities of authorship, to obtain originality statements and copyright transfers in a more efficient manner, and to obtain possible conflict of interest statements. In the past, the Publications Office has spent considerable time, energy, and funds obtaining the necessary paperwork to ensure that authors have met basic submission requirements. The Committee feels that with the increase in submitted manuscripts to over 6,500 per year, the Publications Office can no longer afford the costs of this effort and that upon submission authors must adhere to the requirements.

The new mandatory submission form must be completed and signed by all authors before the paper will be sent out for review. The form requires the authors to attest to all the responsibilities of authorship that are outlined in the Information for Authors, acknowledge any possible conflict of interest, and transfer copyright to the Society unless the article is in the public domain. All authors must sign the form, as recommended by the Public Affairs Committee.

The mandatory submission form is appearing in every issue of the research journals and is available for downloading from the APS Gopher server (gopher.uth.tmc.edu 3300). The form can be obtained from the Publications Office (tel: 301-530-1816, fax: 301-571-1814). The published "received" date for the manuscript will be the date that the completed form and the manuscript are received.

Although this change may not appear to be particularly user-friendly and may seem to needlessly formalize procedures, most authors already comply with all the existing requirements. For them the new form will actually simplify procedures.

Responsibilities of Authorship. By signing the form each author attests that 1) the manuscript is not currently under consideration elsewhere and the research reported will not be submitted elsewhere until a final decision has been made as to its acceptability by the journal; 2) the manuscript is truthful original work without fabrication, fraud, or plagiarism; 3) the author has made an important scientific contribution to the study and is thoroughly familiar with the primary data; and 4) the author has read the complete manuscript and takes responsibility for the content and completeness of the manuscript and understands that if the paper or part of the paper is found to be faulty or fraudulent, he or she shares the responsibility. If the paper depends critcally on another paper that is as yet unpublished, three copies of that paper should be included for reviewers.

Conflict of Interest. The Publications Committee and the editors-in-chief of the APS journals agreed that acknowledgment of possible conflict of interest by the author should be added to the form to protect the reputation and credibility of both investigators and the journals. On the form, the author must attest that all funding sources supporting the work and all institutional or corporate affiliations are acknowledged. The author also certifies that, except as disclosed on a separate attachment, he or she has no commercial associations (e.g., consultancies, stock ownership, equity interest, patent licensing arrangements) that might pose a conflict of interest in connection with the submitted article. The separate attachment will not be sent to reviewers, and manuscripts will continue to be selected for publication solely on the basis of scientific merit and suitability for a specific journal. If an author acknowledges a possible conflict of interest, a statement will appear in the acknowledgment section when the article is published.

Copyright Transfer. The form allows for the transfer of copyright to the Society except, of course, for those papers in the public domain. Authors will no longer receive a Copyright Transfer Form with the acknowledgment letter. Under the new policy, all authors will have already signed for the transfer of copyright when the manuscript is submitted, which saves another round of communication between the Publications Office and authors. After a manuscript has been accepted for publication, it is the corresponding author's responsibility to inform all coauthors and the Publications Office of any change in authorship (order, deletions, or additions) because a new form has to be signed acknowledging the change and kept on file.

Optional Referee Suggestions. For convenience, the form allows space for names of suggested referees. Editors will still welcome letters from authors detailing significant points about their manuscripts and any possible problems of duplicate publication.

"Accepted In Final Form" Date

In the past, the "accepted in final form" date was the date on the letter from the editor informing the author that the (continued on page 27)

Education

Female Role Models In Life Science **Highlighted at Four APS Workshops**

Middle and high school teachers attending workshops in Arizona, Maryland, Texas, and Jamaica had a chance to explore the new APS classroom modules highlighting the lives and work of 20 female life science role models. The workshops were presented as part of the APS project, "Female Role Models in Science: Out of the Periphery and Into the Core Curriculum," sponsored by the National Science Foundation.

Role models selected for the project cover a variety of life science fields, including botany, microbiology, ecology, animal behavior, molecular biology, and biochemistry, as well as physiology. APS member physiologists included as role models are Kim Barrett of the University of California, San Diego and Joyce Jones of the University of

Publication Policy Changes

(continued from page 26)

manuscript had been accepted, although minor revisions might still be needed. The new date will now be the date that the Publications Office receives the complete, final version of the manuscript, including all figures in the correct format and the computer disk.

This change in policy is necessary because some members of the scientific community have the opinion that publication time-the interval from acceptance to publication-is longer for APS journals than other journals. Although a variety of factors can delay publication, common among these are author delays in providing the means to put the manuscript into production.

For a new submission form, call APS Publications at 301-530-1816 or fax at 301-571-1814.

Missouri, Columbia, Each role model is the subject of a curriculum module consisting of a brief biography and a hands-on or problem-solving activity for students, related to the research area of the role model. Resources and suggestions for teachers using the materials in their classrooms are also included.

Haley-Oliphant from Miami

University in Oxford, OH, to present two workshops. The first workshop allowed teachers at the October 28, 1995 annual meeting of the National Association of Biology Teachers in Phoenix, AZ, to learn about the lives and work of botanist Ynez Mexia and entomologist Deborah Gordon. Teachers were enthusiastic about the materials. One participating ninth grade biology teacher wrote, "[This is] a nice way to integrate history [and] role models with investigative and explorative activities."

The second workshop was held November 11, 1995, during one of the four regional meetings of the National Science Teachers Association (NSTA), in Baltimore. MD. Participants explored the work of marine biologist Sylvia Earle and mycologist and children's writer Beatrix Potter. A seventh grade environmental science teacher wrote, "I am thrilled with the activities...[T]he activities will stir up interest that will give students a 'hook' to hang the biographies upon. I like the idea of inserting the biographies throughout our curriculum so that they become a part of our routine and not [just] a few days devoted to female scientists."

For the third workshop, Matyas traveled to a second NSTA regional meeting in San Antonio, TX, on December 12.



APS Education Officer Marsha Matyas describes how to track down the source of a Matyas worked with Ann E. typhoid outbreak as part of a simulation game.

> She was joined by April Gardner of the University of Northern Colorado in leading a workshop focused on ecologist Rachel Carson and public health physician Sara J. Baker. Participants found the epidemiology activity in the Baker module challenging, as participants tried to quickly track down possible sources of a present-day typhoid outbreak. As one participant stated, "I really like the Baker activity because it makes the students think!"

> Finally, Haley-Oliphant and Gardner conducted an additional workshop on July 28 at the Third Internationa Conference at Ocho Rios, Jamaica. Their workshop included both the Baker module and one on primatologist Dian Fossey. One participant who teaches a college science methods class for future teachers expressed an opinion on the workshop. "These [modules] should be given to preservice teachers as an example of how gender neutral (equitable) lessons can be included within the curriculum."

> The full set of 20 modules, which are also being field-tested in middle and high school classrooms, will be published this spring. APS members interested in the program should contact the APS Education Office (301-530-7132) e-mail Marsha or Matyas at mmatyas@aps.faseb.org. �

Summer Research Teachers Speak at Science Teacher Conventions

Former summer research teachers and Frontiers in Physiology Project Coordinator **Phyllis Edelman** encouraged teachers to apply for the APS Frontiers in Physiology Science Teachers Summer Research Program during workshops entitled, "Physiology Research: Connections for You and Your Students," held at regional conventions of the National Science Teachers Association this past fall.

Edelman described the Frontiers program goals and application procedures to the teacher attendees. She was joined at the NSTA Baltimore Regional Convention on November 15 by Lesli Adler, Summer Research Teacher (SRT) '90, a teacher at Wootton High School in Rockville, MD, and Denise St. Clair (SRT '93), a teacher at Boca Ciego High School in St. Petersburg, FL.

St. Clair, who worked with John Dietz at the University of South Florida, led teachers through the making of a DNA strand using colored paper, tape, glue, and staples. The hands-on activity was developed as a result of St. Clair's experience as a summer research fellow. Adler described how her research fellow. Adler described how her research with Gregory L. King at the Armed Forces Radiobiology Research Institute in Bethesda, MD, resulted in changing her teaching techniques. "It didn't happen overnight, but over a period of time, my labs became open-ended." Adler's labs evolved from being a reconfirmation of principles and data she had already given her students to giving students the problem and having them design the experiment. "This is much more in line with how researchers work," Adler added.

The process of changing one's teaching techniques over a period of time as a result of research experience was reiterated by former summer research fellows at the NSTA San Antonio Regional Convention on December 15.

Cynthia Alvarado (SRT'94), a teacher at Southside High School in San Antonio, **Bob Melton** (SRT '93), the science curriculum coordinator of the Putnam City Schools in Oklahoma, and **Ernest Schiller** (SRT '91), a teacher at Central Lee High School in Donnellson, IA, joined Edelman to discuss with nearly two dozen teachers their experiences as summer research fellows.

Alvarado, Melton, and Schiller worked with APS members Walter F. Ward at the University of Texas Health Science Center at San Antonio, Robert Foreman at the University of Oklahoma Health Sciences Center in Oklahoma City, and Carl V. Gisolfi at the University of Iowa, Iowa City, respectively.

Thanks to the enthusiastic testimony of the former summer research teachers, many of the teachers attending the Baltimore and San Antonio workshop sessions expressed interest in applying for the 1996 summer program.

APS Volunteers Needed for Workshop at EB '96

For the fifth year, APS will sponsor a special workshop, "Physiology in Action" for local high school teachers and their students on Tuesday, April 16, 1996, during the Experimental Biology meeting in Washington, DC.

Students and teachers will attend separate afternoon sessions. Teachers will participate in activities developed by two of the 1995 summer research teacher fellows and learn about summer research programs available to them. Students will attend presentations on mathematics, physiology, and on career opportunities in physiology.

As in past years, APS member volunteers are needed to serve as host/tour guides during lunch when volunteers serve as guides for the teachers and students to the poster sessions and exhibit hall. Guides are needed from 11:30 AM to 1:40 PM on Tuesday, April 16. This is a great opportunity to talk directly with young people who may be the generation of biomedical next researchers! Last year, students considered meeting a "real" scientist and their tour one of the highlights of the day's program. Box lunches will be provided for teachers, students, and all host/tour guide volunteers.

If you are interested in serving as a host/tour guide, please contact Phyllis Edelman, Project Coordinator, Frontiers in Physiology (tel: 301-571-0692; fax: 301-571-8305; or e-mail: pedelman@aps.faseb.org).

APS Society Mixer Sunday, April 14, 9:00 PM to MIDNIGHT Dance to the sounds of "The Loving Lorena Band" at the Grand Hyatt, Constitution A/B

NIH Gets \$11.939 Billion Thanks to Extraordinary Efforts

In a moment of triumph after months of uncertainty, the NIH finally got its FY 1996 appropriation plus a hefty 5.7 percent over its FY 1995 level. However, NIH's opening was further delayed because that very night the Washington, DC area was buried in the first of two major snowstorms in quick succession.

On Saturday, January 6, President Clinton signed into law a measure providing NIH with a budget of \$11.939 Republican leaders, urging them to include the NIH on their short list of agencies that would be assured funding for the rest of the fiscal year even if Congress and the White House continued to spar over budget priorities. Porter also urged that NIH be funded at the level contained in the House-passed appropriations bill.

Although the NIH's funding level is now in place, one unresolved issue is

NIH finally got its FY 1996 appropriation plus a hefty 5.7 percent over its FY 1995 level...a budget of \$11.939 billion retroactive to the October 1, 1995 start of the new fiscal year.

billion retroactive to the October 1, 1995 start of the new fiscal year. The legislation was one of three bills to reopen the government after a shutdown that began at midnight on December 15, 1995. One piece of legislation returned all federal workers to their jobs and provided back pay. Another bill extended until January 26 many of the programs that still lacked regular funding. But the NIH and the CDC were plucked out of the stillstalled Labor-HHS-Education appropriations bill and included in H.R. 1358, a bill that provided full-year funding to high-priority programs. Under the provisions of H.R. 1358, the NIH will receive its full FY 1996 appropriation despite the fact that it had been operating at lower funding levels and had twice been forced to suspend operations entirely during the preceding months.

Rep. John Edward Porter (R-IL), the chairman of the House Appropriations Subcommittee on Labor-HHS-Education, is credited with being the force behind this favorable outcome for the NIH. As budget negotiations intensified in early January, Porter went repeatedly to House and Senate how those funds will be distributed within the agency. The most notable question has to to with the distribution of AIDS funding. The House-passed bill broke with recent tradition and allocated funding for AIDS research directly to each institute rather than to the Office of AIDS Research (OAR). The bill approved by the Senate Appropriations Committee did channel AIDS funding into a consolidated OAR account. Porter and his Senate counterpart, Sen. Arlen Specter (R-PA) agreed to leave the distribution an open question in H.R. 1358 so as of this writing it remains uncertain how the Office of Management and Budget will allocate the funds.

When the new fiscal year began on October 1, 1995, the NIH was left without a regular appropriation because the Labor-HHS funding bill was stalled in the Senate due to a variety of policy disputes. Rep. Porter made it his top priority to secure the House-passed 5.7 percent increase for the NIH. Prospects for his success in this endeavor had seemed increasingly small as Congress and the White House remained deadlocked over how to the balance the federal budget.

From October 1 until November 13. NIH was forced to operate at 95 percent of its FY 1995 funding level. At midnight on November 13, with no overall deficit reduction plan in hand, the Republican-dominated Congress refused to renew the government's temporary spending authority, forcing NIH and other government programs to shut down for six days until the Clinton administration agreed in principle to a deficit reduction package. The continuing resolution passed at that time provided the NIH with a one-month extension to operate at its FY 1995 level. When Congress and the White House still couldn't agree, a second shutdown began on December 16 and lasted three weeks.

As that shutdown dragged on, the press began reporting on the hardships the shutdown was causing to many sectors of society and the economy. Curiously NIH did not figure prominently in those news reports just before the end, when stories began to appear about cancer research grants being held back, patients being turned away away from clinical trials, and AIDS projects being halted.

Despite the huge backlog of work to be tackled, NIH employees were not able to join their colleagues elsewhere in returning to work on Monday, January 8, because of a blizzard that had blanketed much of the East Coast during the preceding weekend. Government offices in the Washington, DC area were forced to remain closed for three more days while the area dug itself out, and then again on Friday, January 12, when a second storm dumped another load of snow just before the Martin Luther King Day So except for Thursday, weekend. January 11, the NIH was shut down

(continued on page 30)

Public Affairs

NIH Gets \$11.939 Billion

(continued fron page 29)

from December 16, 1995 until January 16, 1996.

Needless to say, it will be some time before things return to normal. NIH Deputy Director for Extramural Research Wendy Baldwin provided information to the extramural community during the shutdown through postings to the NIH Home Page (http://www.nih.gov). In a January 5 posting, she indicated that in addition to delays in awarding 750-1,000 already approved new and competing grants and another 1,000 noncompeting renewals, an entire cycle of 10,000 grant reviews that might yield 2,000 awards was in jeopardy because of delays due to the shutdown. Four DRG

study group meetings had already been postponed with the expectation that others might be similarly unable to meet because their members would not have had the opportunity to review the grants. In an interview with the Associated Press that took place before the snowstorms had added insult to injury, Baldwin estimated that it might take NIH six to nine months to catch up fully.

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ACE Committee Sponsors EB '96 Symposium on Animal Welfare

APS Animal Care The and Experimentation Committee (ACE) is sponsoring symposium a at Experimental Biology **'96** in Washington, DC. The symposium is entitled "Animal Welfare Update: The Regs, The Guide, and The Congress." The symposium will feature various speakers, including:

Dale Schwindaman, US Department of Agriculture's Deputy Administrator for Regulatory Enforcement and Animal Care, who will discuss USDA regulation and enforcement of the Animal Welfare Act.

AAALAC Associate Director **Kathryn Bayne**, who was a member of the National Academy of Sciences' committee that produced the newly published revision to the NIH *Guide for the Care and Use of Laboratory Animals*.

John Miller of NIH's Office of Protection from Research Risks, who will outline the efforts of the Public Health Service to ease the burden to institutions of complying with animal care requirements.

Barbara Rich, Executive Vice President of the National Association for Biomedical Research, who will provide an update on how animal issues are currently being addressed in Washington, DC.

Steve Mifflin of the University of Texas Health Science Center at San Antonio, who will discuss the impact of federal animal care regulations and guidelines on the conduct of research involving the use of animals.

The symposium will be held Sunday, April 14, from 2:00 to 4:30 PM in the Washington, DC Convention Center.

EB '96 Offers Opportunity to Visit Capitol Hill

If you are planning to attend Experimental Biology '96 in Washington, DC, from April 14 to 17, try to set aside some time to visit your elected representatives on Capitol Hill.

Medical research is important to our nation's future, and the strong emphasis by both Congress and the Administration on balancing the budget means that there will be far fewer federal dollars to spend on many worthy programs over the next several years.

Furthermore, due to the electoral turnover on Capitol Hill in recent years, many lawmakers are relatively new to their jobs and unfamiliar with how and why the federal government supports medical research through the National Institutes of Health. Therefore, we need to take advantage of every opportunity to let Members of Congress know that medical research should be one of our nation's priorities.

Elected officials want to know what their constituents think. Visits are persuasive and also surprisingly easy to arrange. Your university's government relations office can help you identify the senators from your state as well as the representative from your district. That office may even be able to help you arrange an appointment, or you can do it yourself.

The US Capitol Operator (202-224-3121) can connect you with the office of any Member of Congress. Tell the legislator's receptionist that you are a constituent and ask to speak to the scheduler. The scheduler can set up an appointment for you to meet with your representative or senator when you are in Washington. The purpose for your visit is simple: you want your elected representatives to know that you as a constituent support federal funding for medical research through the NIH.

Poynter Center and Kennedy Institute Sponsor Conference on Ethical Issues in Animal Research

May 30-June 1, 1996. A conference entitled "Ethical Issues of Animal Research" will be held at the Poynter Center for the Study of Ethics and American Institutions, Indiana University, Bloomington, IN. This conference is jointly sponsored with the Kennedy Institute of Ethics, Georgetown University. Registration fee is \$300.

This is a conference for those broadly interested in the profound questions of ethics and animal use. Well-balanced, contrasting viewpoints concerning the use of animals in biomedical and agricultural research will be presented. Experts in the field will address the following topics: the moral standing of animals, major philosophic arguments for and against animal research, ethical decision making on Institutional Animal Care and Use Committees, personal ethical conflicts in animal research, and genetic manipulation of animals.

Additional information is available from Kenneth D. Pimple, Poynter Center for the Study of Ethics and American Institutions, Indiana University, 410 North Park Avenue, Bloomington, IN 47405. Tel: 812-855-0261; fax: 812-855-3315; e-mail: pimple@indiana.edu.

NAS Recommends New Funding Strategies

Federal research funding should be directed primarily to projects that will result in new knowledge or new technology, according to the National Academy of Sciences (NAS). research programs are made by several different authorizing and appropriating committees that may have overlapping and competing interests in the programs.

the budget should exclude projects that are predominantly applied research

In the report Allocating Federal Funds for Science and Technology, a NAS panel headed by former NAS President Frank Press also recommended revising the way federal research and development investment is presented within the budget. The report said the budget should exclude projects that are predominantly applied research, such as the development of new weapons systems. Such projects presently account for about one-half of the \$70 billion the US government spends each year on Research and Development (R & D). The Press committee argued that changing to a "federal science and technology budget" would provide a more accurate measure of US investment in "new knowledge and new or enabling technologies."

The report also advocates amalgamating all federal science and technology spending into a single budget for presentation to Congress and for Congress to consider this budget as a whole. The administration has begun releasing a special budget analysis of research and development funding, and congressional Budget Committees sometimes hold overview hearings on scientific investment. However, under the current system, congressional decisions on The Press report was commissioned by the Senate Labor-HHS-Education Appropriations Subcommittee as part of its FY 1995 funding legislation. That congressional panel, then headed by Sen. Tom Harkin (D-IA), asked the NAS, the National Academy of Engineering, and the Institute of Medicine for advice on allocating federal dollars to various areas of science. It asked for "criteria that should be used in judging the appropriate allocation of funds to research and development activities, the appropriate balance when research funding is unlikely to expand, outdated research programs must be reduced to free up funds for promising new areas.

The report calls for the US to have a world-class effort in certain areas of science and to be a world leader in other selected fields with federal funding allocated to a given research area increased or decreased accordingly. Although the report calls for the government to essentially declare what fields will be given preference, it offers no examples of what the "winners" and "losers" should be.

The panel endorsed competitive merit review and research performed at universities but qualified the latter with the statement that excellent research can be performed at all kinds of institutions. It also recommended supporting projects and people rather than institutions and keeping the national laboratories tightly focused on their missions. It further

[The report] enumerates guiding principles for policy makers in allocating R & D funding.

among different types of institutions that conduct such research, and the means of assuring continued objectivity in the allocation process."

The 18-member Press committee released its 97-page report on 29 November 1995. In addition to calling for a more coherent calculation of federal investment in research, it also enumerates guiding principles for policy makers in allocating R & D funding. The committee concluded that at a time urged skepticism about government involvement in commercial technology development unless the research is essential to a government effort, i.e., space research, or no other funding source is available.

The report is available from the National Academy Press (202-334-3313) for \$27 plus \$4 shipping and handling. It can also be seen on the World Wide Web at http://www.nas.edu/nap/online/.

APStracts: an online abstract publication

Available at gopher gopher.uth.tmc.edu 3300 or on the Web at http://www.uth.tmc.edu/apstracts. If you do not have access to a gopher and would like to receive free information, send e-mail to: aps_server@oac.hsc.uth.tmc.edu.

Chief, Neurobiology and Anesthesology Branch. The National Institute of Dental Research (NIDR) invites nominations and applications for Chief, Neurobiology and Anesthesiology Branch (NAB). The Chief, NAB, is responsible for the scientific and administrative management of a multidisciplinary research program

spanning the basic and clinical sciences in oral-facial sensation, with emphasis on pain mechanisms and the development of new methods of pain control.

This is a Federal Civil Service position at the GS-15 level, salary range \$71,664 to \$93,166 per annum (including Washington, DC, locality pay). The individual selected may be considered for 1) Physicians Comparability Allowance up to \$20,000 per year; 2) physician special pay under Title 38; 3) a recruitment bonus of up to 25% of base pay, subject to individual approval; or 4) a relocation bonus of up to 25% of base pay, subject to individual approval. A one-year probationary period must be served by the individual selected if not currently in the Federal service.

Alternatively, appointment in the PHS Commissioned Corps may be considered. The individual selected also may be considered for appointment in the Senior Biomedical Research Service (SBRS). Salary range for SBRS is \$71,664 to \$148,400 per annum and may include ability to transfer current retirement system (if portable) into NIH employment.

US citizenship is required for appointment to the Federal Civil Service or the PHS Commissioned Corps. US citizens and citizens of countries allied to the US are eligible for appointment to the SBRS. Other employment options may also apply to foreign nationals. Applicants should have a DDS, MD, or PhD in a science related to health, dentristry, or medicine (or possess equivalent combination of experience and training); research accomplishments in an area of relevance to the position; and demonstrated leadership qualities.

Applicants may apply by submiting a curriculum vitae and bibliography, a resume, Optional Application for Federal Employment, OF-612 (available in any Federal Personnel Office), or an application in any other written format. Applicants are encouraged to address the knowledge, skills, and abilities required for this position. Application materials must be postmarked by February 26, 1996. Further information may be obtained from: Faye M. Harbrant, Personnel Management Specialist, National Institute of Dental Research, National Institutes of Health, 31 Center Drive, MSC 2290, Building 31, Room 2C-23, Bethesda, MD 20892-2290 (Tel: 301-496-6971).

Assistant Professor, tenure track position in Departments of Movement and Exercise Science and Biomolecular Sciences at Chapman University, an independent, comprehensive university located 30 miles south of Los Angeles. Funding is pending. Position is effective fall 1996. Applicant will teach courses in exercise physiology and microbiology and mentor/advise exercise science majors. Salary will be commensurate with qualifications and experience. PhD in physiology or exercise physiology with coursework in microbiology is required, demonstrated excellence in teaching and scholarship is necessary, and commitment to working with students and developing collaborative required. research is Applicant must show demonstrated ability or potential to acquire extramur-

Positions Available

There is a \$50 charge for each position listed. Positions will be listed in the next available issue of *The Physiologist* and immediately upon receipt on the APS Gopher. A check or money order payable to The American Physiological Society must accompany the position listing. Ads not prepaid will not be printed. Copy must reach the APS office before the 15th of the month, two months preceding the month of issue. Mail copy with payment to: *The Physiologist*, APS, 9650 Rockville Pike, Bethesda, MD 20814-3991.

al funding, and interest and ability to teach in interdisciplinary core courses is highly desirable. Please submit cover letter, resume, evidence of qualifications, statement of teaching philosophy, teaching evaluations, list of references with addresses and telephone numbers, and three letters of reference to: Penny Brush, ChapMan University, Orange, CA 92666. Deadline is March 1, 1996. ChapMan University is an Equal Opportunity employer, committed to providing career opportunities to all people, without regard to race, religion, sex, age, national origin, or disability.

Chairperson of the Department of Physiology and **Biophysics.** Applications are invited for the position of Chairperson of the Department of Physiology and Biophysics at the School of Medicine at the State University of New York at Stony Brook. The successful candidate will hold a PhD or MD degree, will be an academic leader in the School of Medicine, and will be a senior investigator with a strong research program. The present faculty consists of active investigators in biophysics and molecular physiology. Departmental faculty provide required courses in the medical curriculum and participate in multidisciplinary graduate programs that include an active NIHfunded training grant in biophysics based in the department. Other teaching activities are in the School of Nursing and School of Health Technology. The Biomedical Sciences at Stony Brook are in a period of strong growth with major resources being committed to this recruitment. Applications must be received by April 15, 1996. They should include a curriculum vitae and a letter detailing research interests and administrative and teaching experience. The names and addresses of five references should also be furnished. Applications should be sent to: Lorne M. Mendell, Chair, Physiology and Biophysics Search Committee, Office of the Dean, School of Medicine, Stony Brook, NY 11794-8430. [EOAAE] 🚸

Tingus Working to Improve Health Care

APS member Steven J. Tingus is enjoying his job as health care policy analyst for the Department of Health and Human Services of California. Governor Pete Wilson appointed Tingus to the post in May 1995. Tingus had previously worked as a postgraduate researcher for the Department of Human Physiology at University of California, Davis. His new job entails working on Wilson's initiative for the integration of long-term care services.

Tingus has been eager to work with the government in improving health care for some years. He suffers from a neuromuscular stiffening disease that necessitates the use of a respirator during sleep. Tingus also cannot walk and does not have full use of his hands. He was told by doctors he would not live to be nine years old, but in his 31 years has earned a degree in biological sciences and both a masters and a doctoral degree in physiology at University of California, Davis. \clubsuit

Correction

We apologize for an error in the December issue "People and Places." Alan M. Lefer has not moved permanently to the University of California, San Diego. He is currently on a six-month sabbatical in California to escape the winter weather in Pennsylvania. He maintains his current position as chairman of the Department of Physiology at Jefferson Medical College in Philadelphia.

News From Senior Physiologists

Letter to Robert Grover

Jacqueline Claus-Walker writes, "Being 80, I am dealing with a few illnesses but [am] still OK. I keep my house, with a beautiful flower garden, and paint the flowers. I also try to do some landscapes—oils and watercolors."

I do not have any professional occupations. The era of the computer took over, and I only keep up on medical discoveries via newspapers. Sometimes they are 10 or 20 years behind—perhaps because some poorly informed "researcher" has had no time to document his ideas."

I am very happy to live in Houston: a wonderful city and—except during summer—a lovely climate. I sell my paintings at the Millford Gallery on Richmond and many, in addition, are on the walls of the houses of my friends."

Words of wisdom: 1) The more we learn, the more we realize how little we know. 2) Physiology, to be understood, needs a thorough knowledge of physics, chemistry, and physical chemistry, the two last requirements being too often neglected. 3) Work hard, be humble in

what you know because such knowledge is due to the accumulation of the creativity of many persons—since the creation of the world!

Letter to John R. Blinks

Robert B. Chiasson writes, "I retired in October 1992 but taught my Histology course once more in the spring of 1993. The University [of Arizona] was good enough to provide me with a large office and the facilities of the department (Veterinary Science) office. As long as I am able, I will continue to write new editions of my dissection guides (Laboratory Anatomy). My publisher, William C. Brown Publishers (Times Mirror Higher Education Group) has agreed to a revision schedule that promises to keep me busy for at least 5 years.

"Since retirement I have published one research paper, three Laboratory Anatomy guides, and I am currently doing the index for another Laboratory Anatomy guide. Two more guides are in preparation and three more will be started when these two manuscripts are sent in." �

Who's Moved?

Stanley Schultz stepped down from the Chair of the Department of Integrative Biology at the University of Texas Medical School in Houston effective January 1, 1996 after 17 years in that position in order to devote full-time to research, teaching, and editorial activities.

David Busath recently accepted a position with the Zoology Department of Brigham Young University, Provo, UT. Prior to his new position, Busath was with the Physiology Section of Brown University, Providence, RI. Having moved from the Department of Physiology Education, Ball State University, Human Performance Laboratory, Muncie, IN, Alison Jozsi has recently joined The Pennsylvania State University, University Park, PA.

Uwe Mehlhorn has moved to Cologne, Germany, having accepted a position with the Clinic for Cardiac Surgery, University of Cologne. Prior to moving to Germany, Mehlhorn was affiliated with the Department of Anesthesiology, University of Texas, Houston Medical School, Houston, TX.

Renal Function (Third Edition)

Heinz Valtin and James A. Schafer Boston, MA: Little, Brown and Co. 1995, 314 pp., illus., index, \$27.95. ISBN: 0-316-89560

The physiology of the kidney and body fluids advanced so rapidly in the 1950s that it did not take long until a need developed for introductory texts on the subject. The balance and clearance studies that made this early growth possible attracted clinical investigators of this period to the kidney. They were able to benefit from the accessibility of the methods of study and from the fact that the results were directly applicable to bedside medicine.

The introductory texts of Homer Smith, Louis Welt, and Robert Pitts were widely used by medical students, house officers, and fellows in the clinical specialties. This early period lasted into the 1960s when new experimental techniques for the study of individual renal tubules, epithelial cells, and individual cell membranes became available and led to a rapid expansion of knowledge.

With the growth of molecular biology and genetics over the last decade, the number of facts that has become eligible for inclusion in a textbook has continued to increase rapidly. As a result, comprehensive text books expanded into a second or third volume, but the authors of introductory texts for medical students were forced to make real choices and to reduce the factual material they included to comply with new core curricula. Authors began to minimize their references to the uncertainties and complexities that are a part of explorations in any field. This way, their product became attractive to the majority of students. Basic principles were emphasized and the serious student was encouraged to go into the literature, either directly or via self-study problems.

Another approach is based on the selection of original studies that had played a historical role in the field or of experiments of nature that had become prototypical. Students get realistic examples around which they can organize their knowledge. This approach introduces some initial confusion and uncertainty but probably provides an understanding that is more lasting and applicable to new situations.

Books Received

- Calcium and Phosphorus in Health and Disease. John J.B. Anderson and Sanford C. Garner (Editors). Boca Raton, FL: CRC Press, 1996, 395 pp., illus., index, \$139.95. ISBN: 0-8493-7845-1.
- Cellular and Aging and Cell Death. Nikki J. Holbrook, George R. Martin, and Richard A. Lockshin. New York, NY: Wiley-Liss, 1996, 319 pp., illus., index, \$89.95. ISBN: 0-471-12123-1.
- Exercise Gas Exchange in Heart Disease. Karlman Wasserman (Editor). Armonk, NY: Futura Publishing Company, Inc., 1996, 311 pp., illus., index, \$65.00. ISBN: 0-87993-629-0.
- Fundamentals of Clinical Trials. Third Edition. Lawrence M. Friedman, Curt D. Furberg, David L. DeMets. St. Louis, MO: Mosby, 1996, 361 pp., illus., index, \$49.95. ISBN: 0-8151-3356-1.

Renal Function reaches an admirable compromise between the need for conciseness and the need for exposure to the literature and to "real world" examples. The essential parts of renal physiology are clearly presented and preserve the precision and high quality that may be expected from authors with strong track records as teachers and original investigators.

The material is well organized, and the new format of the third edition assures that the reader stays in focus. Key points are summarized in red. Each chapter starts with a table of contents. Those who like to have a list of objectives can easily add the verb "describe" to the listed topics. The suggested readings, the problems, and to some extent the rather elaborate legends and figures all serve to stimulate students and invite them to get a pencil out and mark the remaining space on the pages of the book.

The text is also attractive to housestaff, fellows, and faculty as it reflects the current state-of-the-art in renal physiology. Valtin, who had prepared the first two highly successful editions by himself, was joined for the third edition by Schaefer, an expert in renal tubular function and in renal applications of molecular and cellular biology. Sections have been added to cover new

- Neurobiology and Clinical Aspects of the Outer Retina. M.B.A. Djamgoz, S.N. Archer, and S. Vallerga (Editors). New York, NY: Chapman & Hall, 1995, 501 pp., illus., index, \$86.00. ISBN: 0-412-60080-3.
- The Physiology of Reproduction. Second Edition. A Two-Volume Set. Ernst Knobil and Jimmy D. Neil (Editors-in Chief). Gilbert S. Greenwald, Clement L. Markert, and Donald W. Pfaff ((Assoc. Editors). New York, NY: Lippincott-Raven, 1994, 3,302 pp., illus., index, \$375.00. ISBN: 0-7817-0086-8.
- The Visual Brain in Action. A. David Milner and Melvyn A. Goodale. New York, NY: Oxford University Press, 1995, 248 pp., illus., index, \$62.00. ISBN: 0-19-852136-7.

knowledge on the control of the renal circulation and on the nature and regulation of water channels and other transporters. The third edition is a well-balanced introductory text that preserves the best from the classic tradition and provides a most enjoyable and up-to-date summary of the field.

Philip R. Steinmetz University of Connecticut School of Medicine

Information Processing Underlying Gaze Control

J.M. Delgado-Garcia, E. Godaux, and P.-P. Vidal (Editors)

Pergamon Studies in Neuroscience, No. 12 Oxford, UK: Elsevier Science Ltd., 1994, 460 pp., illus., index, \$134.00. ISBN: 0-08-042506-2

This book represents the proceedings of a satellite workshop associated with the 16th European Neuroscience Association meeting. The workshop was held September 22-24, 1993, at the Colegio Hernando Colon of the University of Sevilla in Spain. The focus of the workshop was oculomotor con-

trol and resulted from the contributions of an international collection of researchers, predominantly European, most of whom are recognized leaders in the field. Chapter authorship was truly international, since many of the contributors also attended the Eibsee, Germany meeting in tribute to David A. Robinson the following week.

The editors employed a novel plan in their organization of this book. They were fairly successful in their sequencing of chapters, in each of seven sections, as they related to anatomy, electrophysiology, behavior, and modeling. The seven sections are morphology and physiology of extraocular motor nuclei; anatomo-functional organization of the saccadic system: vestibular and otolithic systems; optokinetic and smooth pursuit systems; other sensory systems involved in the control of the oculomotor function; role of the cerebellum in the genesis and control of eve movements: and coordination of eve, head, and body movements. This imposition of order to the collection of research results was a helpful educational aid in considering each section as a cohesive unit. The contents of the fifth section, which may not be apparent from the title, included chapters on extraocular muscle afferents, saccades to auditory targets, and vergence eye movements.

One value of this book derives from the editors' goal of giving "special emphasis" to areas of research such as neurochemistry and brain slice preparations that have not been traditionally well represented in references on oculomotor research. For example, from a systems level point of view the important characteristic of extraocular motoneurons is their burst-tonic firing rate that encodes eye velocity and eye position. The chapters by Durand et al. and Cheron et al. indicate, however, that there is more to these motoneurons than meets the eye. The membrane of abducens neurons appears to contain a variety of voltage-dependent conductances, as well as NMDA, AMPA, and metabotropic glutamate receptors. Although the complexity of the dendritic membranes of abducens neurons is intriguing, the roles that these different conductances and receptors play in modulating abducens discharges remain unclear. Persuasive evidence was presented that NMDA receptors are necessary for the neural integrator function of the prepositus hypoglossi (Cheron et al.).

Most of the chapter topics are representa-

tive of books that focus on the oculomotor system, but papers on goldfish optic tectum, lamprey VOR anatomy, and vestibular plasticity in the frog are also included. As is typical of symposia proceedings, many of the chapters represent the efforts of the authors' laboratories current in 1993. Overall, the chapters are relatively well referenced and current until 1993. However, the time elapsed since the original workshop presentations may reduce the utility of these proceedings for researches active in the field. For those less familiar with those areas, the work may furnish useful introductions, albeit at a nonintroductory level.

The inclusion of a section dedicated to the topic of coordinated eve, head, and body movements, plus related chapters scattered in other sections, is a reflection of the growing interest in expanding ocular motor studies to address questions concerning coordination with other motor behaviors. To be sure, the study of coordinated eve and head movements has a significant history, but the number of investigators interested in this topic seems to have increased significantly over the past 10 years. Graf et al. offer an excellent mini-review of the evolution of the "head-neck system" in mammals, while Dieringer and Meier compare the different strategies for gaze orienting behavior in different vertebrates with a focus on turtles and rats. Other chapters are concerned with gaze behavior and a model of gaze control centered on the superior colliculus.

Given the increased interest in gaze control, perhaps it is time for ocular motor researchers to be more precise about their use of the term "gaze." In the past, the term "gaze position" was often used interchangeably with "eye position." Although this usage is correct for head-fixed conditions, the increasing use of head-free (at least in one plane) preparations necessitates the specific usage of "gaze" as applied to the headfree condition. As commonly accepted, gaze is the sum of eye-in-head and head-inspace positions. Confusion between eyeonly and eye-plus-head movements can be avoided by being careful to distinguish, for example, between "gaze position" and "eye position" or "gaze saccades" and "(eye) saccades."

Overall, the book provides many significant insights into varied aspects of ocular motor function. Brief background reviews, which the authors were encouraged to provide, are an additional benefit of this book. The editors were accurate in stating that the workshop confirmed that "gaze control is, more than ever, a valuable model in which basic questions on the functional properties of the central nervous system...can be addressed with the most recent and advanced techniques on anatomy, electrophysiology, and molecular biology."

The only concern is that the price, while typical of current specialty book prices, seems somewhat high for a reference that by its nature will be a bit less current by the time it reaches the hands of interested readers. However, given the lengthy delays commonly associated with publishing experimental results, a significant portion of the results reported in this book may not be seen elsewhere for some time. This workshop proceeding is, therefore, a recommendable reference for those who desire to keep current with research being conducted by the international community of oculomotor researchers.

> David A. Suzuki Indiana Universit

Mechanics and Physiology of Animal Swimming

Linda Maddock, Quentin Bone, and Jeremy M.V. Rayner (Editors)

Cambridge University Press, 1994, 250 pp., illus., index, \$54.95. ISBN: 0-521-46078-6

Question: what do bacteria in a liquid medium, planktonic protozoa, lampreys, Mesozoic marine reptiles, and penguins have in common? Answer: they are all subjects of chapters in this eclectic, multi-authored treatment of swimming (and related phenomena) in animals (and related organisms). The book grew out of a symposium held at the Plymouth Marine Laboratory in 1991. The diversity of topics included in the book is a tribute to the breadth of interest among the organizers of the symposium.

About one-half of the chapters (6 of 13) deal with fish. One theme that emerges is that distinct mechanisms (gaits) are used in swimming at different speeds. In squids, increased swimming speed involves a change from fin propulsion to jet propulsion

Book Reviews

(Hoar et al.); in fish, increasing speed often involves a transition from fin muscles to trunk muscles as sources of power (Webb) and from lateral, largely aerobic trunk muscles to more medial, anaerobic muscles (Rome, Altringham).

The two chapters by Rome and by Altringham are thoughtful, complementary accounts of the mechanics of trunk muscle during swimming. Wardle and Videler develop a diagrammatic representation of changing muscle strain and activation pattern along the body of a swimming fish that illustrates differences, but also some unsuspected similarities, among the few species for which information is available. In swimming eels and lampreys there is more than a single full cycle of curvature along the body at any time, and muscle activation is progressive with substantial delays from head to tail, whereas in most of the more fishlike fish with large tail blades (excepting, surprisingly, trout) there is less than a single wave of curvature along the body and muscle activation is nearly simultaneous along a side.

This approach is developed further in a recent paper with Altringham (1). The chap-

ter by Graham and others presents results from a set of heroic experiments measuring cardiovascular performance, thermoregulation, and energetics in large, fast-swimming sharks and tunas. Carling et al. summarize their efforts to develop sophisticated models of central pattern generation, kinematics, and hydrodynamics of swimming lampreys. I found this chapter to be tantalizing but too brief to be really useful other than as a source of references to more complete accounts.

The topics of other chapters include buoyancy control in air-breathing marine vertebrates (Taylor) and in protozoa (Febvre-Chevalier and Febvre). convection-driven patterns of cell density in shallow cultures of swimming bacteria (Kessler et al.), and a detailed examination of the skeletal and muscular system of wings in penguins, which effectively fly through the water (Bannasch). Massare evaluates the swimming capabilities of Mesozoic reptiles and concludes that ichthyosaurs were faster swimmers than plesiosaurs or mosasaurs, but this conclusion rests largely on the assumption that the mass-specific metabolic rate was higher in ichthyosaurs than in the other two taxa, an assertion for which there is, of course, no direct evidence. The last chapter (Fish) is a charming demonstration that the cost of locomotion by paddling ducklings is substantially reduced if they swim in formation. The book ends with a single set of references and a remarkably detailed index.

Because of the great diversity of the organisms and approaches represented in this book, few biologists will find it useful as a whole. However, there are many who will find individual chapters to be interesting and rewarding. This is a book whose natural habitat is more likely to be the university library and the copy machine than the shelf of one's personal library. \clubsuit

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Reference

1. Wardle, C. S., J. J. Videler, and J. D. Altringham. Tuning in to fish swimming waves: body form, swimming mode, and muscle function. *J. Exp. Biol.* 198: 1629-1636, 1995.

Announcements

Neuromuscular Control Resources on the Internet

The Neurology Section-American Physical Therapy Association (NS-APTA) has produced two Internet tools of interest to physiologists studying the neuromuscular control of movement. NeuroMus (neuromuscular aspects of motor performance research forum) is a listserver with nearly 600 basic and applied motor control scientists from 22 different countries. The NeuroMuscular Control Web Site is under aggressive construction, serving as a clearinghouse of information featuring motor control funding opportunities, post-doctoral positions, laboratory profiles, and a

monthly invited commentary by prominent scientists in the field. Questions can be directed to Andy Messaros (andrew-messaros@ uiowa.edu).

NeuroMus listserver subscription directions:

To: listserv@sjuvm.stjohns.edu Message: subscribe neuromus yourfirstname yourlastname

The NeuroMuscular Control Web Site:

http://indy.radiology.uiowa.edu/ Providers/PhysicalTherapy/!N.Section/ NEUROPT.html �

NIH Data Group Publishes Diabetes Impact Compilation

The US National Diabetes Data Group, National Institutes of Health, has published a compilation and assessment of the scope and impact of diabetes in the US entitled Diabetes in America, 2nd Edition. The book's 36 chapters, written by recognized experts, address the descriptive epidemiology of diabetes, complications of the disease, characteristics of therapy and medical care for diabetes, economic aspects, and diabetes in special race/ethnic populations.

(continued on page 38)

Diabetes Text

(continued from page 37)

The volume is 781 pages and includes tables, figures, appendices, and an index. It can be obtained for \$20 (postage and handling charge) from the National Diabetes Information Clearinghouse, National Institutes of Diabetes and Digestive and Kidney Diseases, One Information Way, Bethesda, MD 20892-3560, tel: 301-654-3327. ◆

Fulbright Scholar Awards

The competition opens March 1, 1996. Opportunities for lecturing or advanced research in over 135 countries are available to college and university faculty and professionals outside academe.

US citizenship and the PhD or comparable professional qualifications is required. For lecturing awards, university or college teaching experience is expected. Foreign language skills are needed for some countries, but most lecturing assignments are in English.

The deadline for lecturing or research grants for 1997-98 is August 1, 1996. Other deadlines are in place for special programs: distinguished Fulbright chairs in Western Europe and Canada (May 1) and Fulbright seminars for international education and academic administrator (November 1).

Contact the USIA Fulbright Senior Scholar Program, Council for International Exchange of Scholars, 3007 Tilden Street, NW, Suite 5M, Box GNEWS, Washington, DC 20008-3009. Tel: 202-686-7877.

Web page (on-line materials): <http://www.cies.org/>; e-mail: cies1@ ciesnet.cies.org (requests for mailing application materials only). �

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Scientific Meetings and Congresses

- Obesity: Advances in Understanding and Treatment, March 4-6, 1996, Washington, DC. *Information*: IBC USA Conferences, 225 Turnpike Road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.
- Seventh Annual Spring Brain Conference, March 6-10, 1996, Sedona, Arizona. Information: James E. Smith, Bowman Gray School of Medicine, Dept. of Physiology and Pharmacology, Medical Center Boulevard, Winston-Salem, NC 27157. Tel: 910-716-8506; fax: 910-716-8501; e-mail: jamsmith@isnet.is.wfu.edu
- The Fourth International Congress of Behavioral Medicine, March 13-16, 1996, Washington, DC. Information: Society of Behavioral Medicine, 103 South Adams Street, Rockville, MD 20850. Tel: 301-251-2790; fax: 301-279-6749; e-mail: SocBehMed@aol.com.
- Latest Therapeutic Applications of Cytokines: Control of Inflammation, Growth and Differentiation, March 14-15, 1996, Philadelphia, PA. *Information*: IBC USA Conferences, 225 Turnpike Road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.
- 16th International Symposium on Intensive Care and Emergency Medicine, March 19-22, 1996, Brussels, Belgium. *Information:* J. L. Vincent, Dept. of Intensive Care, Erasme University Hospital, Route de Lennik 808, B-1070 Brussels, Belgium. Tel: 32-2-555-3215; fax: 32-2-555-4555.
- Fifth Annual Conference on Nitric Oxide, March 28-29, 1996, Philadelphia, PA. *Information:* IBC USA Conferences, Inc., 225 Turnpike Road, Southborough, MA 01772-1749. Tel: 508-481-6400; fax: 508-481-7911.
- VI International Symposium on Avian Endocrinology, March 31-April 5, 1996, Alberta, Canada. *Information:* Dr. Robert J. Etches, University of Guelph, Dept. of Animal and Poultry Science, Guelph, Ontario, Canada N1G2W1. Tel: 519-824-4120; Fax: 519-836-9873; e-mail: retches@aps.uoguelph.ca.
- 17th Annual International Gravitational Physiology Meeting, April 14-19, 1996, Warsaw, Poland. *Information*: Professor Hilding Bjurstedt, Environmental Physiology Laboratory, Karolinska Institute, 171 77 Stockholm, Sweden. Tel: 46-8334012; fax: 46-8339702.
- 21st Annual AAAS Colloqium on Science and Technology Policy, April 17-19, 1996, Washington, DC. *Information*: Directorate for Science and Policy Programs, American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005. Tel: 202-326-6600; fax: 202-289-4950; e-mail: science_policy@aaas.org.
- ARVO Annual Meeting, April 21-26, 1996, Ft. Lauderdale, FL. Information: ARVO Central Office, 9650 Rockville Pike, Bethesda, MD 20814. Tel: 301-571-1844; fax: 301-571-8311.
- 6th Annual Cell Adhesion Molecules, and Matrix Proteins, May 6-7, 1996, San Francisco, CA. Information: IBC USA Conferences, 225 Turnpike Road, Southborough, MA 01772-1749. tel: 508-481-6400; fax: 508-481-7911.

- Society for Information Display International Symposium Seminar & Exhibition, May 12-17, 1996, San Diego, CA. *Information*: Russel Martin, Xerox PARC, 3333 Coyote Hill Road, Palo Alto, CA 94304; Tel: 415-812-4538; Fax: 415-812-4605; e-mail: ramartin@parc.xerox.com
- Biomechanics and Neural Control of Movement IX: Neural-Mechanical Control: Interaction Between Neural Circuits and Biomechanics, June 1-6, 1996, Mt. Sterling, OH *Information*: Engineering Foundation, 345 E. 47th Street, New York, NY 10017. Tel: 212-705-7836; fax: 212-705-7441; email: engfnd@aol.com.
- Course: Critical Issues in Tumor Microcirculation, Angiogenesis, and Metastasis: Biological Significance and Clinical Relevance, June 3-7, 1996, Boston, MA. Information: Carol Lyons, Administrator, Radiation Oncology, Mass. General Hospital, Boston, MA 02114. Tel: 617-726-4083; fax: 617-726-4172.
- 5th International Expert Forum on Immunotherapy and Gene Therapy, June 4-7, 1996, Jerusalem, Israel. Information: Kenes, 29 Hamered Street, Tel Aviv 68125, PO Box 50006, Tel Aviv 61500, Israel. Tel: 972-3-5 14 00 04; fax: 972-3-5 14 00 44; e-mail: EFIT96@Kenes.ccmail.compuserve.com.
- 12th International Symposium on Flavins and Flavoproteins, June 30-July 6, 1996, Calgary, Canada. *Information*: Kenneth J. Stevenson, Department of Biological Sciences, University of Calgary, Calgary T2N 1N4, Alberta, Canada. Fax: 403-284-4184.
- 4th IUBMB Conference: The Life and Death of the Cell, July 14-17, 1996, Edinburgh, Scotland. Information: The Conference Assistant IUBMB 1996, The Biochemical Society, 59 Portland Place, London W1N 3AJ. Tel: 0171 580 5530; fax: 0171 637 7626; e-mail: meetings@biochemsoc.org.uk.
- Overtraining and Overreaching in Sport: Physiological, Psychological, and Biomedical Considerations, July 14-17, 1996, Memphis, TN *Information:* Laura Wilhelm. Tel.:800-747-4457; Int. Tel.: 217-351-5076.
- Bioartificial Organs: Science and Technology, July 21-26, 1996, Nashville, TN. *Information*: Barbara Hickernell, Engineering Foundation Conferences, 345 E. 47th Street, New York, NY 10017. Tel: 212-705-7836; fax: 212-705-7441; e-mail: engfnd@aol.com.
- VI World Conference on Clinical Pharmacology and Therapeutics and VI Congress of the Interamerican Society for Clinical Pharmacology and Therapeutics, August 4-10, 1996, Buenos Aires, Argentina. *Information*: CPT96 and ISCPT VI, Marcelo T. de Alvear 1980, 1122 Buenos Aires, Argentina. Tel: 54-1-81-6650; fax: 54-1-814-2733.
- Advances in Tissue Engineering, August 5-9, 1996, Houston, TX. Information: Rice University School of Continuing Studies, 6100 Main Street, Houston, TX 77005-1892. Tel: 713-520-6022; fax 713-285-5213; e-mail: scs@rice.edu.