

well thought out Act, brought into being as a result of extensive deliberation with all interested and informed parties, including the more responsible animal welfare representatives and the entire scientific community, which has not, to date, really been consulted. A new Act must be seen to exert real control while effecting no damage to legitimate scientific research. Such constraint will require a balancing trick of some considerable skill."

MEETINGS and ANNOUNCEMENTS



MEETING REPORTS

Charles River Symposium

The Fourth Charles River International Symposium, entitled "Defining the Laboratory Animal and its Environment: Setting the Parameters," was held October 29-31, 1979 in Danvers, Massachusetts. This was the first of the international meetings sponsored by the Charles River Foundation to be held in North America, and in these times, it was not surprising that relatively few participants came from overseas. However, the topic of the meeting was most appropriate for American laboratory

animal scientists in view of current concern over the effects of new federal regulations on production, housing and use of laboratory animals in biomedical programs. According to remarks by some of the organizers, the meeting's objectives included communication of state-of-the-art knowledge in various aspects of quality control as well as the stimulation of further research to determine whether current practices are, in fact, optimal for the animals.

The presentations covered a wide range of subjects, including production, transport, microbial contamination, quarantine, nutrition, housing, cage standards, and the effects of noise, lighting and chemical contaminants on the animals. At the end of the first two days, the audience was left with the impression that housing and maintenance of laboratory rodents involved so many confounding variables that it was difficult to see the possibility of duplicating, and hence verifying, any results at all. On the final day, Dr. W. Jean Dodds (New York State Department of Health, Albany) attempted to restore some perspective by questioning whether aseptic environments of porcelain, stainless steel and finely filtered air are indeed in the best interests of the animal and of good research. She did not imply that the answer was no, but did highlight the fact, which was by then obvious, that we still have a very hazy idea of what constitutes an optimal environment for the animal and the researcher.

During the discussion of temperature and ventilation standards, Professor Emerson Besch (University of Florida, Gainesville) described the shaky foundations on which these standards are built. The foundations consist largely of the results of few studies by a researcher named Runkle (later extrapolated by Munkle!) on removal of odors from rooms in which animals are housed. Most current practices are based on modifica-

tions on these early data as required by idiosyncratic needs, and have now become entrenched through habit and tradition.

The problem of inappropriate regulation (with special reference to transport) was addressed in detail by Mr. James Foster, founder of and guiding light behind the newly formed Research Animal Alliance. He argued that transport of small laboratory animals has been profoundly and adversely affected by government regulations which have indirectly led to a growing unwillingness on the part of airlines to ship animals. The fact that the International Air Transport Association and the United States Department of Agriculture have different standards further complicates matters. Foster stated that no one would argue with a policy which ensured the shipping of animals under the best possible set of standards, but that a lack of sound data has created the present controversy over temperature and ventilation.

Apart from stressing the need for better data, Mr. Foster also called upon laboratory animal scientists to work openly and aggressively with the bodies which regulate laboratory animal commerce and use as well as with those public interest groups which monitor the activities of the suppliers.

While better information is an absolute prerequisite to better regulation, the human element plays the most important role in determining the quality of laboratory animal health and care. A paper entitled "The Human Factor," by Dr. H. Dieter Brede of the Federal Republic of Germany, enlarged on this point, calling attention to the paralyzing breadth of factors facing laboratory animal scientists in modern facilities. The speed of technical innovation and the rapidly multiplying number of health and hygiene concerns could overwhelm the remarkable but still limited adaptability of human beings,

resulting in irrational decisions with unfortunate consequences for both the animals and subsequent research projects.

Animals in Education

Educators, researchers and representatives of several animal welfare organizations participated in a conference September 27-28, 1979 in Washington, D.C. on the Use of Animals in High School Biology Classes and Science Fairs, sponsored by the Institute for the Study of Animal Problems and the Myrin Institute for Adult Education. The conference was organized in response to mounting concern over the present status of interventive animal experimentation in high schools and science fairs. Most states (excluding California, Connecticut, Illinois, Maine, Massachusetts and Pennsylvania) allow painful experimentation on vertebrates in secondary science classes. In addition, the rules of the International Science and Engineering Fair (ISEF), the competition which indirectly determines the conduct of science fairs at all levels in the U.S., have been cited for their laxity in the area of animal experimentation. The 1980 ISEF rules state that animal research using "anesthetics, drugs, thermal procedures, physical stress, organisms pathogenic to man or other vertebrates, ionizing radiation, carcinogens, or surgical procedures" may be undertaken with the direct supervision of a qualified individual (1980 ISEF Rules, p. 13, #4). According to conference participant Dr. F. Barbara Orlans (National Institutes of Health), these procedures demand a degree of sophistication not present at the high school level, and further, that the rules have proven inadequate in providing students with close professional assistance. She reported that in a 1972 study of eight science fairs, two-thirds of the projects using warm-blooded animals involved "infliction of pain or lingering death." This situa-

tion contrasts starkly with the current state of science fair projects in Canada. Dr. Harry C. Rowsell, Executive Director of the Canadian Council on Animal Care, outlined the regulations which have governed Canadian science fairs since 1975. In essence, the regulations prohibit experiments on vertebrate animals, but do allow "observations of normal living patterns of wild animals in the free living state or in zoological parks, gardens or aquaria" as well as "observations of normal living patterns of pets, fish or domestic animals." (Youth Science Foundation Regulations for Animal Experimentation in Science Fairs, 1975).

Although the speakers and audience generally agreed that live animals can enhance the educational process and therefore should be used in the schools, the question of what these uses should entail generated considerable discussion.

Diverging philosophies on how to most effectively engender intellectual curiosity and a desire to pursue the sciences formed the kernel of the debate. Dr. Thurman Grafton, Executive Director of the National Society for Medical Research and Chairman of the ISEF Scientific Review Committee, argued that any extensive limitation on the use of live animals either in biology classes or at science fairs would stifle gifted students and possibly divert them from seeking careers in biology and medicine. Grafton also contended that the current permissive rules on live animal use in science fairs provide a freedom of choice which no more obligates a student to embark on a project involving significant manipulation of animals than a liberal abortion law obligates a woman to terminate her pregnancy.

Dr. George Russell (Adelphi University) identified the pedagogical problem of too much abstract knowledge and not enough direct acquaintance with phenomena (e.g., the stu-

dent who can describe the genetics of Down's Syndrome but cannot recognize an afflicted individual). However, he also voiced concern over the ethical dilemma created by attempting to justify interventive experiments which cause suffering to other forms of life on the basis of the imperative to learn. Dr. Russell questioned Dr. Grafton's point on the relevance of animal experimentation to promoting student interest in the health sciences, and suggested that working in health care settings would do far more to foster a veneration for life and a commitment to its preservation. Finally, Dr. Russell asked educators to consider the possible negative psychological effects (desensitization, rationalization) on students who participate in painful animal experiments.

Several other speakers explored how developments in the history of science have influenced the ways in which animals, particularly vertebrates, are used in secondary biology education. Dr. Peter Kelly (Southampton University, UK) connected the traditional British 'ornamental' approach to the study of organisms to the zoological type system of Thomas Henry Huxley. The emphasis on laboratory display of living and dead representatives of various phyla has given way recently to more dynamic studies of behavior, ecology and genetics. Dr. Kelly stressed that although the study of live animals continues to be a significant part of British secondary science education, most activity is geared toward the descriptive rather than the experimental.

Dr. Frank Loew (Johns Hopkins University) presented a less sanguine view of attitudes in the U.S. The current predominance of biological research at the cellular and molecular levels indicates, said Dr. Loew, that scientists have lost "the naturalist approach to the study of plant and animal life...We always want to exert

control." The nonorganismic approach to research has obviously produced advances, but its effectiveness is predicated upon specialized training which cannot be provided in the average high school. As Dr. Russell said, "The advances in physiology and medicine through the use of animal experimentation, for example, have been very substantial indeed, but the question here concerns pedagogy, not research. No single experiment in high school advances human knowledge in the slightest."

An obvious question remains: If interventive procedures causing pain, suffering and death to animals are prohibited, what will take their place? Most of the conference participants who advocated noninterventive animal studies in the school had specific recommendations for humane alternatives. These alternatives, which ranged from the use of human cell tissue cultures to study human genetics to observation of animals in their natural states, are all motivated by the conviction that "humaneness supersedes curiosity," a phrase attributed by Dr. Orleans to Harvard professor of medicine Henry Beecher. However, curiosity need not be entirely squelched by limiting the amount of animal experimentation in high school and tightening the rules governing science fairs. Out of the sometimes strident arguments that enlivened the conference came a synthesis in the form of an agreement by Dr. Grafton and Mr. E.G. Sherburne Jr., Director of Science Services, the sponsors of the ISEF, to amend the 1981 International Science and Engineering Fair Rules to read that *no studies involving significant manipulation of the animal or its environment shall be permitted outside a registered research facility or equivalent agricultural institute*. This new rule would ensure that such projects would be a part of ongoing research within the confines of an institution, thus eliminating the possibility of im-

properly conducted home experiments.

The conference produced its share of mixed opinions on a controversial subject, but one basic belief united all the participants: the pursuit of knowledge about biological processes should be guided by educators skilled in the delicate task of nurturing curiosity and at the same time, inculcating a respect for life.

Proceedings of the conference will be published by the Institute for the Study of Animal Problems in Spring, 1980.

ISAP Pain Symposium

The Institute for the Study of Animal Problems (ISAP) held its first symposium on November 7, 1979 in conjunction with The Humane Society of the United States' annual conference in Orlando, Florida. The symposium, entitled "Pain, Stress and Suffering: Definition, Quantitation and Application to Animal Welfare Issues," grew out of discussions within ISAP over the past eighteen months on the complex and sometimes nebulous question of pain in animals. Pain is usually conceived of as a highly subjective experience. To the extent that humans can 'know' each other's minds (*i.e.* through language), they can directly communicate the presence of pain. However, human attempts to understand the subjective experiences of nonhumans depend primarily on observation of nonverbal behavior, intuition, and sophisticated physiological testing. The symposium brought together speakers from Great Britain and the United States to grapple with the problem of what constitutes suffering to animals that clearly feel, but do not share our vocabulary of pain.

In the morning session, Professor A. Iggo (Edinburgh University) focused on the central question of whether pain can be quantified. He argued that since no scientific grounds exist for anthropomorphizing

sensory states in other animals, assumptions must be made and their validity tested in scientific studies. Several such studies in electrophysiology recently indicated that all mammals have similar cutaneous receptors and thus similar underlying sensory mechanisms. However, it has also been shown that in man, the frontal lobes of brain play a role in the *perception* of pain (as distinct from the sensory registration of pain). Professor Iggo illustrated this distinction in a story about several human patients who suffered chronic, intractable pain. After undergoing frontal lobotomies for unrelated reasons, they reported that the pain was still present, but was no longer important. It is therefore plausible, in Professor Iggo's view, to base assumptions on the perception of pain on the relative development of the frontal lobes of different species. Although other animals may possess essentially the same subcortical machinery for expressing reflex reactions, their cerebral cortical responses to pain may be significantly different. The distinction between sensation and perception does not, however, resolve the question of whether responses differ in kind or only in degree.

The second presentation by Professor T.H. Friend (Texas A & M University) dealt with the problems of recognizing and quantifying stress. Professor Friend defined an animal as being stressed "if abnormal or extreme adjustments in its behavior or physiology occur in response to its environment." He mentioned the often overlooked fact that stress can be pleasant (as in the case of extreme elation) as well as unpleasant, and that the lack of stimulation resulting from isolation of individual animals can be as stressful as the reverse situation of overcrowding. After asserting that the complete absence of stress is neither possible nor ideal, Professor Friend described behavioral and physiological methods for quantifying

stress in large food animals. Behavioral methods include noting the absence of normal or presence of specific abnormal behavior; allowing the animal to choose among several environments (preference tests); quantifying a particular behavior and then equating its frequency of occurrence with varying degrees of stress; and making subjective judgments based on direct observation of an animal's appearance and activity. All of these methods have basically the same drawback: how can one be sure that an observed behavior is an indicator of stress? Physiological test methods can relieve this uncertainty to a degree. For example, heightened adrenal cortex activity as measured by blood corticosteroid levels would indicate stress. However, physiological tests can also yield erroneous results. Blood corticosteroid levels may not *always* reflect increased adrenal activity under stress, due to adaptive mechanisms which speed up metabolic rates, thus keeping the levels within the normal range. Professor Friend recommended an integrated approach in which behavioral observations are supported with physiological data. He illustrated this approach with a discussion of his own recent studies in dairy cow husbandry (see *ISAP Bulletin 1(7):7*, 1979).

Dr. Michael W. Fox, Director of the Institute for the Study of Animal Problems, followed Professor Friend with a presentation on animal awareness of suffering. He stated that although suffering occurs in 'natural' forms, such as starvation in the wild and the predator-prey relationship, it is the scientist's task to evaluate the suffering created by human intervention, whether in the form of trapping, bullfights, rodeo, etc., or the more subtle and complicated practices of intensive farming and animal experimentation. Dr. Fox brought attention to the limits of the scientific method in assessing animal suffering and called for a more intuitive and em-

pathetic understanding of an animal's physical and psychological requirements for well-being. Dr. Fox also suggested that the apparent inability of animals to foresee a future end to suffering or to rationalize its benefits may render them more sensitive than humans to the experience.

Dr. Bernard Rollin (Colorado State University) expanded on some of the ethical questions raised by Dr. Fox and offered a philosophical analysis of the various assumptions which underlie man's treatment of other animals. Dr. Rollin argued, primarily through analogies, that the differences which exist between humans and other animals are not morally relevant and therefore cannot be used to justify the treatment of animals as property or beings without a nature (*telos*). Until a creature is developed which is devoid of any needs except those which directly serve a human purpose (e.g. a 'chicken' which plucks, dismembers and fries itself), it is morally necessary to put realistic constraints on the use of animals for human benefit. Dr. Rollin recommended two principles applying to the use of laboratory animals which he believes should be codified as law: the utilitarian principle and the rights principle. Enforcement of the utilitarian principle would eliminate those experiments in which the proposed benefits would fail to outweigh the suffering of the animal. If an experiment is deemed acceptable, the rights principle would ensure that the procedure be designed to maximize fulfillment of the animal's needs and nature regardless of the cost. Although Dr. Rollin acknowledged that many researchers would view these constraints as an intolerable burden, he attributed this attitude to a pervasive but incorrect view of science. Recalling past major scientific advances, Dr. Rollin maintained that science consists not solely of observation, experimentation, or the gathering of facts, but also of

thought, imagination and insight. The constraints suggested would thus promote better science through better experimental design and the use of animals as models only after careful theoretical consideration.

The afternoon presentations provided a look at the application of theories on pain, stress and suffering to particular animal welfare issues. Dr. Roger Ewbank (Director, Universities Federation for Animal Welfare, U.K.) discussed optimal environmental conditions for farm animals. He noted the value of preference tests in assessing the welfare implications of various husbandry systems, but added that for the present, direct behavioral observation is most reliable. Observation, however, must be accompanied by a thorough understanding of the behavioral signs of health as well as those of stress.

Dr. Thomas Wolfle (National Institutes of Health) devoted the majority of his presentation to a review of the NIH guidelines for laboratory animal care. Relatively little is known about what constitutes optimal conditions for laboratory animals. [See Charles River Symposium]. Dr. Wolfle cautioned against equating 'natural' with 'optimal', pointing out that ancestral conditions can be undesirable for highly inbred laboratory species. Instead, Dr. Wolfle advocated a sort of acculturation process in which the naive animal is exposed in early life to the sensations and stimuli it is likely to experience later. This early training enables the animal to develop adaptive responses to future stressful situations. Identification of ethological needs and incorporation of features which meet those needs into the laboratory environment also reduce fear and concomitant distress.

Since scientific enquiry into animal sentience is a relatively recent development, any exchange of views and information is, by nature, heuristic. Although the symposium

may not have produced tangible results, the fact that it took place attests to scientists' growing interest and willingness to share knowledge in an effort to better understand this facet of animal welfare.

Selected papers presented at the symposium will appear in future issues of the *Journal*. The complete proceedings will be published according to interest and demand.

FORTHCOMING MEETINGS

Association for the Study of Animal Behavior: "The Ethics of Animal Experimentation," March 20, 1980, Durham, England. Contact Dr. R.F. Drewett, Dept. of Psychology, University of Durham, Durham, Northumberland, UK.

British Small Animal Veterinary Association: 1980 Congress, April 11-13, 1980, Cunard International Hotel, London. Contact BSAVA Registration Office, 5 St. George's Terrace, Cheltenham, Glos. GL50 3PT, UK.

American Society of Primatologists: Third Annual Meeting, June 3-5, 1980, Wake Forest University, Winston-Salem, North Carolina. Contact Dr. David M. Taub, Dept. of Comparative Medicine, Bowman Gray School of Medicine, Wake Forest University, Winston-Salem, NC 27103 for local registration, and Dr. Douglas M. Bowden, Regional Primate Research Center SJ-50, University of Washington, Seattle, WA 98195 for enquiries on program content.

ANNOUNCEMENTS

Ethics and Animals

The Society for the Study of Ethics and Animals has been established in Blacksburg, Virginia to provide a forum for the discussion of

ethical questions on the treatment of animals.

The Society held its first meeting in New York City December 27-30, 1979, coinciding with the annual convention of the Eastern Division of the American Philosophical Association. Papers and a panel discussion focused on the ethical relevance of ape language research.

Publication of a quarterly bulletin is scheduled to begin in early 1980. The bulletin will cover news in the field, report on a broad spectrum of courses and programs involving ethics and animals, and present reviews of philosophical and scientific publications. For more information, contact Professor Harlan B. Miller, SSEA, Dept. of Philosophy and Religion, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061 USA.

International Contest

In view of the necessity to form a scientific basis for up-to-date animal protection, the FELIX WANKEL RESEARCH AWARD FOR ANIMAL PROTECTION has been established, DM 50,000 being available annually for the distribution of prizes.

The purpose of the award is to express appreciation of the work of persons who have made outstanding contributions to animal welfare on a scientific subject and from whose research immediate benefit to animals has resulted. The papers may be from any branch of science, as well as the arts. Contributions in search of alternative methods to the use of laboratory animals will be of particular interest.

Conditions of entry:

- 1) Persons from any country who are concerned in their research work with experimental and theoretical problems of animal welfare and related subjects are entitled to participate in this contest. A short summary of essential results in German should be en-

closed with the entry.

- 2) Entries should reflect knowledge gained in the scientist's own research work.
- 3) Entries should be submitted, in triplicate if possible, by the 31st of December to the office of the "Felix Wankel Research Award for Animal Protection."
- 4) The entries are examined and evaluated by the Board of Trustees of the animal welfare research award. The decision of the Board of Trustees is final.
- 5) Awards will be granted up to a maximum amount of DM 50,000.
- 6) The right of publication of the prize-winning entries which have hitherto not been published will be transferred to the donor of the award.
- 7) On submitting entries, the authors accept the aforementioned conditions of entry as binding.

Further information may be obtained from the office of:

FELIX WANKEL RESEARCH AWARD FOR ANIMAL PROTECTION

Attn. Dir. H.-J. Weichert
Orlindestr. 6/83
D-8000 Munich 81
Fed. Rep. of Germany

A list of previous prize winners, the amounts of their awards and the topics of their papers follows. [Papers of special interest will be discussed in subsequent issues of the *Journal*.]

Previous recipients of the Felix Wankel Award:

1973
Dr. P. Bachmann (Munich) DM 6000
The use of cell cultures in pathogenic virus research

Dr. P. Weigert (Munich) DM 4000
The influence of exhaust gases on enzyme activity in rat and mouse serum

Dr. H. Schulze (Munich) DM 4000
Food production and animal welfare

Dr. H. H. Sambras (Munich) DM 6000
Compassionate attitudes toward cattle

1974
Dr. P. Loeffler, Dr. D. Marx (Hohenheim) DM 6000
Raising piglets in cages

Dr. G.M. Teutsch (Karlsruhe) DM 6000
Sociology and ethics of the human-animal relationship

Dr. G. Wennrich (Celle) DM 6000
Behavior of hens in henhouses

1975
Ms. S. Kobler (Unterpfaffenhofen) DM 2000
The animal as object and living thing

Dr. D. Schulz (Berlin) DM 2000
Pain perception in fish; humane killing of eels

1976
Dr. A.B. Parkes (Cardiff) DM 5000
Lymphocyte metabolism as a model of human and mammalian cell metabolism

Dr. G. Riese, Ms. G. Klee (Munich) DM 5000
Calf behavior under different husbandry conditions

Dr. H. Studer (Bern) DM 5000
Sow behavior under different housing systems

Dr. H. Brummer (Geissen) DM 3000
Various papers in veterinary medicine

Dr. C. Ring (Munich), Dr. H.M. Blendl (Grub) DM 3000
Transport standards for pigs going to slaughter

Dr. G.V. Sherbet, Dr. M.S. Lakshmi (London) DM 3000
An *in vitro* assay for malignancy for use in cancer research and clinical management

1977
Dr. B. Ames (Berkeley) DM 15,000
A salmonella/mammalian-microsome mutagenicity test for detecting carcinogens and mutagens

Dr. G. van Putten (Zeist) DM 15,000
Seven papers on pig and calf behavior

Dr. H. Marquardt (Hamburg) DM 5000
In vitro chemical oncogenesis

Dr. U. Schnitzer (Karlsruhe), Dr. P. Kammer (Bern) DM 5000
Evaluation of stalls according to resting behavior of dairy cows

Dr. K. Bonath (Essen) DM 2000
Narcosis in reptiles, amphibians and fish

Dr. E. Kazmaier (Munich) DM 2000
The present status of animal welfare in cattle husbandry

Dr. H. Petry (Munich) DM 2000
Magnetic marking of fish

Dr. A. Steiger (Hinterkappelen) DM 2000
Influence of husbandry systems on health and productivity of pigs

1978
Dr. H. Kraus (Mettman) DM 2000
Comparison of hens housed on soil floors and in battery cages

Dr. G. Steger (Nürnberg) DM 2000
Should companion animals be protected species?

Dr. H. Steinel (Munich) DM 3000
Social behavior of calves

Dr. D. Manz (Frankfurt) DM 3000
An oral rabies vaccine for the red fox

Dr. G. Muntau-Leitner (Munich) DM 3000
Involvement of the veterinarian in animal welfare

Dr. G. Martin (Stuttgart) DM 5000
The welfare of hens in battery cages; battery cages and the German Animal Welfare Act



BOOK REVIEWS

ANIMAL EXPERIMENTATION IN INSTITUTES OF SCIENTIFIC LEARNING DURING 1977 (Dierproeven bij de instellingen van wetenschappelijk

onderwijs in 1977) [Government Publishing Office, Gravenhage, The Netherlands, 1978, 8 Guilders/\$4.00, Dutch] is a report containing the results of a survey of the use of laboratory animals in thirteen institutions of higher learning. Approximately 425,000 animals were used during the course of 1977, of which 380,000 were rats and mice. However, these overall statistics conceal a great deal of interesting and detailed information on animal experimentation which can be found elsewhere in the report. For example, one table presents data on the use of animals in the medical facility at Leiden University over the last fifteen years: 82,000 animals were used in 1962; 79,000 in 1967; 77,000 in 1970; and 63,000 in 1977. The gradual fall in these figures should certainly encourage those promoting alternative techniques and campaigning for a reduction in the number of animals designated for experimentation.

Most of the data is in tabular form, but extensive footnotes furnish useful information on the types of research going on in the various disciplines (38 research sections listed for Utrecht University), the person(s) responsible for animal care, and registration requirements for animal experiments.

This report will prove most helpful to anyone who is interested in the details of basic biomedical research and who has a sufficient command of the Dutch language.

A.N. Rowan

INTENSIVE HUSBANDRY OF LIVESTOCK FROM ETHICAL, LEGAL AND ETHOLOGICAL PERSPECTIVES

edited by D.W. Folsch (Birkhauser Verlag, Basel [Boston], 1979, \$18.00, German with English, French and Italian abstracts) is the eighth volume in the Birkhauser Animal Management: Ecology, Ethology and Health series. It contains the opinions and recom-