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INSTITUTE OF LABORATORY ANIMAL RESOURCES

FINAL REPORT

DOROTHY D. GREENHOUSE

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13. ABSTRACT (Maximum 200 words) <p>The Institute of Laboratory Animal Resources (ILAR) is a component of the Commission on Life Sciences (CLS), National Research Council (NRC). The NRC is the operating arm of the National Academy of Sciences (NAS), a private, nonprofit organization that was created in 1863 by congressional charter to serve as an official advisor to the federal government on questions of science and technology. Partial support for ILAR has been provided for many years from the Department of the Army to enable ILAR to fulfill its mission.</p> <p>Founded in 1952, ILAR has become recognized nationally and internationally as a leader in developing and making available to the biomedical and laboratory animal science communities guidelines for animal care, breeding, and use; descriptions of animal models for human diseases and physiological processes; and reports on specific issues of scientific and humane use of laboratory animals. ILAR's mission is to help improve the availability, quality, care, and humane and scientifically valid use of laboratory animals.</p>				
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**INSTITUTE OF LABORATORY ANIMAL RESOURCES
COMMISSION ON LIFE SCIENCES
NATIONAL RESEARCH COUNCIL
NATIONAL ACADEMY OF SCIENCES**

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CORE PROGRAMS

Contracts and grants from government agencies and private organizations support ILAR's core program (consisting of general office operations; the activities of Council; operation of an animal models genetic stocks information program; and publication of a quarterly journal, *ILAR News*) and special projects. The following programs were administered under core support during the five years of this grant.

ILAR Council

In 1987, Council and the CLS reviewed ILAR's contributions to federal agencies and the scientific community and made the following recommendations: a) to publish reports more quickly; b) to focus on providing information on *alternatives* to mammalian animals for

research; c) to provide recommendations on the psychological well-being of nonhuman primates; d) to establish guidelines for reduction of pain and distress in laboratory animals; and e) to change *ILAR News'* format, content, and targeted audience. These are discussed in detail below.

Council serves four principal functions: 1) to provide program direction and strategic planning; 2) to oversee the information programs, which consist of the Animal Models and Genetic Stocks Information Program (AMGSIP) and the quarterly journal *ILAR News*; 3) to oversee special projects, and 4) to direct ILAR's participation as the U.S. national member in the International Council of Laboratory Animal Sciences (ICLAS). Periodically, Council meets with other scientists and funding agency administrators to discuss areas in which ILAR might provide useful advice. ILAR's strategic planning encompasses all of the above. Council occasionally employs core funds to undertake specific NRC-approved projects.

*Precollege Education. Principles and Guidelines for the Use of Animals in Precollege Education*¹ provides guidelines for the use of animals in school and science fair projects and for animal care consistent with the maturity of students and knowledge of faculty advisors. Their development was part of an ongoing program of the CLS to promote quality precollege science education. *Fulfilling the Promise: Biology Education in the Nation's Schools*² was the second report arising from this program. *Promise* addresses numerous problems in K-12 science education, but it does not discuss the use of animals in education. Feeling strongly that animals play an important role in biology education, Council initiated a study on *The Use of Animals in Precollege Education*, in collaboration with the CLS's Board on Biology (described below). As part of the background for this project, Council and the CLS convened three workshops.

Conservation of Animal Resources. Another task undertaken by Council was to promote cost-effective ways to preserve valuable animal resources. As was pointed out in ILAR's report *Important Laboratory Animal Resources: Selection Criteria and Funding Mechanisms for their Preservation*³, there is no centralized framework for decision making and management of animal resources, and funding for these resources is unstable. Animal resources are usually funded as part of a research program. If the research loses support, or if an investigator retires or dies, an important animal model might be lost. To advance efforts in this area, Council initiated a series of contacts with National Institutes of Health (NIH) officials regarding the funding and preservation of important animal models. In addition, members of Council attended NIH strategic planning seminars in San Antonio, St. Louis, and Atlanta to stress the importance of infrastructure to biomedical research, including enhanced funding for the development and support of biological models and materials.

International Council for Laboratory Animal Sciences (ICLAS). In 1988 at the request of the federal Interagency Research Animal Committee, ILAR became the United States member of ICLAS. ICLAS is an international body of scientists seeking improvement

of animal models of disease and strongly advocates the training of laboratory animal scientists in the care and use of laboratory animals. The Chairman of ILAR Council is the U.S. member of ICLAS, a member of the Board of Directors, and Chairman of the ICLAS Commission on Quality Standardization. A three-member subcommittee of Council directs ILAR initiatives. As a result of ILAR's report on the Definition, Nomenclature, and Conservation of Rat Strains¹⁹, which is almost finalized, the ILAR Chairman presented a proposal to the ICLAS Governing Board to establish an *ICLAS International Committee on Standardized Genetic Nomenclature for Rats*. ILAR's establishment of this type of committee within ICLAS has been a high priority in order to facilitate the improvement of the quality of animal models internationally. (See Addenda #2, p. 18).

*Science Medicine and Animals*⁴. Following release of the report, The Use of Animals in Biomedical Research⁵ in 1988, the President of the NAS appointed a committee to develop a popularized, condensed version of this report that would convey the committee's conviction of the importance of animals to the progress of biomedical research. The Chairman of ILAR was appointed to this committee and Council reviewed several drafts of the report.

Staff

During the period of this award, the current ILAR Director and four new staff members were appointed to replace those who retired or resigned. ILAR is staffed by a director, a senior program officer, two program assistants, a senior project assistant, and a secretary. In addition to convening and supporting NRC-appointed committees, the staff supports all meetings and workshops of Council and Council project initiatives. Staff also runs the AMGSIP and compiles, edits, and publishes *ILAR News* (see Addenda #3, p. 27, for staff responsibilities and the curriculum vitae of the professional staff).

Animal Models and Genetic Stocks Information Program. A principal program supported by core funding is the AMGSIP, which provides information to laboratory animal scientists and other biomedical scientists, administrators, and the public on a variety of issues related to the source and use of animals in research and education.

A major component of the AMGSIP is a computer data base listing holders of animal models. Prior to 1989, the data base contained only U.S. and Canadian commercial sources for laboratory animals. Subsequently, it has been expanded to include investigator-held colonies, resulting in a data base of considerably greater size and importance. In the future, foreign sources of animals will be incorporated. Information in the data base is periodically published as Animals for Research--A Directory of Sources⁶, a reference guide used by investigators throughout the United States to locate sources of rodents, rabbits, dogs, cats, nonhuman primates, domestic farm animals, other vertebrates, invertebrates, and biological resource materials for research. Staff has

begun work on the eleventh edition of Animals for Research and is collaborating with the Jackson Laboratory and the Oak Ridge National Laboratory to make the data base available on-line. Another part of the data base is the list of international laboratory codes, which is maintained by ILAR at the request of the *International Committee on Standardized Genetic Nomenclature for Mice*. These codes are essential for proper nomenclature of mice and other laboratory rodents. This activity is an important part of ILAR's efforts to promote the use of standardized nomenclature.

The number of telephone calls and letters of inquiry received has increased annually, totaling approximately 1700 in 1991. The majority of these were requests for sources of animals, information on appropriate animal models, material on animal welfare, and information on laboratory animal facilities. About one-third of the inquiries were requests for ILAR committee reports concerning care, use, and nomenclature of laboratory animals. In addition to inquiries about animal models, ILAR has received an increasing number of questions from college and high school students. These students frequently request information on the use of animals in biomedical research and testing, and many want information on the issues of dissection and animal use in schools. While ILAR has standardized packages for students, many of the calls are time consuming and require patience and understanding by staff.

Additionally, numerous calls were received from investigators, veterinarians, and administrative officers of academic and research institutions regarding requirements under the 1985 revision of the Guide for the Care and Use of Laboratory Animals (Guide)⁷, the newly enacted Public Health Service (PHS) Policy on Humane Care and Use of Laboratory Animals⁸, and the Animal Welfare Regulations⁹. As ILAR periodically updates the Guide, telephone calls relating to its interpretation or implementation are of particular interest and are carefully tracked. The next revision is under development and those inquiries and comments will be carefully reviewed by the Guide-revision committee.

On occasion, answers were provided to members of Congress and their staff on the use of animals in research, and meetings were held with them to discuss their specific interests, frequently relating to animal rights activities. ILAR, and its committee members are an authoritative resource for information and advice on issues of high visibility.

ILAR News. ILAR staff publishes the quarterly journal *ILAR News*, which is circulated free of charge to more than 4,800 individuals and libraries, worldwide. In addition to investigators, veterinarians, and technicians, circulation is targeted to reach each institutional official and institutional animal care and use committee (IACUC) member identified on the PHS Assurances of Compliance with PHS Policy on Humane Care and Use of Laboratory Animals.

In response to the recommendations of Council and the CLS in 1988, ILAR made significant changes in *ILAR News*, which included establishment of an editorial panel, hiring an editor, and changes in format, content, and targeted readership. These changes were implemented in order to serve basic and molecular biologists and to address issues of alternatives and education of scientists, technicians, and students. Frequently, *ILAR News* contains inserts which are individually authored documents or reports from ILAR committees. This provides a cost-effective vehicle for disseminating information. Readership has doubled and the journal's enhancement and prestige continues to improve. All articles are now peer-reviewed, and commentaries are solicited on controversial issues to provide a forum for the exchange of ideas. Four major sections were developed:

1. *Perspectives and Commentary* contains lead articles on a broad range of topics--including alternatives, animal care, humane concerns, and use of animals in research, testing, and education. These articles are followed by a commentary consisting of invited opinions or rebuttals.
2. *State of the Art* contains peer-reviewed articles on new animal models, refinements, or alternatives and includes consideration of both the strengths and the weaknesses of these approaches.
3. *In the News* contains items on new models, changes in nomenclature, future meetings, educational programs, workshop reports, and other relevant announcements. *ILAR News* provides information on new books and notes that lists of reference material are available free from ILAR or for sale by the National Academy Press.
4. *Letters* contains selected correspondences from *ILAR News* readers who have a particular insight or experience or a differing opinion on a previous *Perspectives* piece or other issue.

In addition, a new regular feature called *Issues for Institutional Animal Care and Use Committees* has been added. *ILAR News* is well-liked and serves as a principal means for disseminating information on laboratory animals that is not available elsewhere. It contains information on appropriate animal models, and articles on strategies to reduce or avoid painful procedures in animals.

It is becoming more frequently utilized as a method by which federal agencies and private organizations communicate with their audience. The Departments of Agriculture and Health and Human Services and the American Association for Accreditation of Laboratory Animal Care published articles in 1991-92 addressing the most troublesome issues as they perceived them. A collaborative agreement was completed in 1989 with the National Library of Medicine and the National Toxicology Program to publish an annual bibliography of alternatives to the use of animals in testing.

During the period of this report, fifteen issues have been published including three special issues: Special Issues on Animal Models in Biomedical Research¹⁰, New Rat Models of Obesity and Type II Diabetes¹¹, and Pain in Animals and Humans¹². In addition to book reviews, meeting announcements and important events, *ILAR News* also published: seven *Special Reports*, six *Issues for IACUC's*, nine *State of the Art* manuscripts, seven *Guidelines*, one *Commentary*, and six *Perspectives on Animal Use* (see Addenda #4, p. 41, for ILAR News Index for 1988 - 1991.)

SPECIAL PROJECTS

Many of ILAR's activities involve coordinating and supporting the work of committees appointed by the NRC to prepare special reports. During the five year period of this award, ILAR:

- appointed ten report committees and convened more than 30 committee meetings;
- published seven reports and have three nearing completion;
- secured funding for two committees to begin work in 1992;
- obtained NRC approval (and funding commitment) for three committee reports;
- convened three advisory committees; and
- held three workshops in conjunction with meetings of Council.

Each report requires approximately 18-24 months from appointment of the committee to publication of the report. Each committee meets three to four times during its tenure; staff works closely with committee chairmen to convene committees, develop working papers, meld the members' contributions into a cohesive report, conduct literature reviews, edit the report, and coordinate the peer review and publication.

Reports Completed During this Award Period

Principles and Guidelines for the Use of Animals in Precollege Education¹. This a brochure from ILAR Council for guidance for precollege biology teachers, science fair coordinators, and students on the use of animals in education.

Immunodeficient Rodents: A Guide to Their Immunobiology, Husbandry, and Use¹³. This is a comprehensive report on immunodeficient rodents intended to assist investigators in selecting appropriate models for immunologic research.

Education and Training in the Care and Use of Laboratory Animals: A Guide for Developing Institutional Programs¹⁴. This is a comprehensive annotated syllabus of

recommendations for the structure and content of U.S. Department of Agriculture (USDA) and PHS required educational and training programs for investigators and research technicians.

Important Laboratory Animal Resources: Selection Criteria and Funding Mechanisms for their Preservation³. This report contains a discussion of losses of valuable genetic resources and unique animal models and their impact on national biomedical programs. It recommends the establishment of a national oversight body to make decisions about preservation of unique animal models and biological resources.

Infectious Diseases of Mice and Rats¹⁵. This is a comprehensive textbook of infectious diseases of mice and rats and their potentially complicating effects on research. It is intended to be used as a reference work for students, investigators, and veterinarians who have a serious interest in the topic.

Companion Guide for Infectious Diseases of Mice and Rats¹⁶. This report updates the 1971 report of the same name and serves as a practical guide for investigators. It relates symptoms of disease in mice and rats to their probable causes. It is an abbreviated outline which serves as a companion to Infectious Diseases of Mice and Rats.

Recognition and Alleviation of Pain and Distress in Laboratory Animals¹⁷. This report was requested during heightened public interest in animal welfare surrounding the promulgation of revised Animal Welfare Regulations. Subsequent discussions with representatives from federal agencies, humane associations, academic institutions, and private organizations, recommended that this report should be developed as a method of communicating a deep ethical conviction that pain and distress in research animals must be avoided whenever possible. It was felt that every effort must be made to recognize and alleviate pain and distress, both for the animal's well-being and to avoid the effects of stress on the validity of research data. The report presents a detailed discussion of pain and distress in laboratory animals. Chapters are organized to address sources of distress as either pain or non-pain (environmentally or psychologically) induced. It provides species-typical discussions of signs of pain and distress with extensive recommendations for pharmacologic and non-pharmacologic control. Tables provide dosages of anesthetics, neuroleptanalgesics, analgesics, opioid agonists, agonist-antagonists, antagonists, nonsteroidal anti-inflammatory drugs and tranquilizers for laboratory animal species. The final chapter discusses the use of euthanasia as a humane option of last resort for preventing or alleviating pain or distress and presents techniques to reduce stress in animals and in those who must euthanize them.

Reports Nearing Completion to be Published in 1992

Standardized Nomenclature for Transgenic Animals¹⁸. As part of a larger anticipated *Committee on Transgenic Animals*, an advisory committee with expertise in biotechnology, genetic nomenclature, comparative medicine, genetics, and medical ethics was convened to

prioritize the initiatives to be undertaken by this committee. The advisory committee recommended that because no standardized nomenclature exists by which to identify the large number of transgenic animals currently being utilized; because there are no guidelines for managing animals that may be difficult to maintain and breed, have the potential for transmitting diseases to humans, or might have an adverse impact on the environment if inadvertently released; and because there are no effective mechanisms for ensuring the preservation of valuable transgenic models, the development of a nomenclature should be the first goal. The nearly completed Standardized Nomenclature for Transgenic Animals¹⁸ resulted from this committee's recommendations. It will provide an internationally endorsed recommendation for a system of nomenclature for transgenes. Upon publication, approximately 10,000 unique transgenic animals will be subject to the new designations. The report will be widely distributed and published in scientific newsletters, journals, and in *ILAR News*.

Definition, Nomenclature, and Conservation of Rat Strains¹⁹. In November 1989, several Japanese and American scientists met at the Division of Research Services, NIH, as a part of a "U.S.-Japan Non Energy Agreement" to discuss areas of mutual interest in the use of genetically defined rats. In January 1990, as a follow-up to this meeting, another group of scientists met in Honolulu, Hawaii to identify problems associated with the use of genetically defined rats and to suggest ways in which these problems might be addressed. The group requested that ILAR/NRC appoint a committee, which in turn should organize and hold an international workshop to address the following five areas:

1. **Standardized Nomenclature.** Although rat geneticists have generally accepted that the rules for mouse nomenclature should also be applied to rats, many scientists who develop rat models do not know the rules or do not follow them. This has led to significant problems, particularly with nomenclature of inbred rat strains. A committee on rat nomenclature similar to the *International Committee on Standardized Genetic Nomenclature for Mice* exists on paper; however the committee has never met.
2. **Genetic Definition.** In recent years, great strides have been made in the development of genetic monitoring techniques. However, there are no internationally accepted criteria for deciding the appropriate techniques for testing in rats and the frequency with which testing should be done.
3. **Criteria for Disbursing Strains.** Questions continually arise about the rights and responsibilities of scientists who develop a strain regarding sharing animals with other investigators or providing breeding stock to a commercial company.
4. **Conservation Criteria.** Resources for maintaining colonies of genetically unique animals are shrinking at an alarming rate in many parts of the world. Criteria are urgently needed for determining which strains should be conserved and in what form (for example, as living animals, as frozen embryos).

5. **Communication of Information.** The communication of information on rat genetics is a long-standing problem. Geneticists obtain information from a journal entitled *Rat News Letter*, but a mechanism for transmitting this knowledge to the general scientific community is lacking. An efficient mechanism is needed for providing scientists in other fields with essential genetic information on rats.

The Committee on Rat Nomenclature was appointed in July 1991 and is composed of knowledgeable scientists from the U.S., Japan, and Europe. The task of the committee is to:

- encourage the use of standardized nomenclature for rats;
- resolve problems that have arisen because of the inappropriate use of nomenclature;
- ensure high genetic quality through genetic monitoring;
- encourage sharing of unique strains by investigators;
- ensure continued availability of unique strains through appropriate conservation measures; and
- develop a strategy for establishing communication between rat geneticists and rat users outside the field of genetics in order to advance research using genetically defined rats.

The report, Definition, Nomenclature, and Conservation of Rat Strains¹⁹ is expected to be published in the fall 1992 *ILAR News*.

Laboratory Animal Series: Dogs²⁰. This report will update the 1973 document and provide technical guidance on management of laboratory dogs. It will provide current guidelines for the management of laboratory dog colonies and address the requirement in the Animal Welfare Regulations that dogs must be "exercised." As part of ILAR's Laboratory Animal Management Series, it serves as a species-specific supplement to the Guide, upon which the policies of the Department of Defense and other federal agencies are based regarding the care and use of laboratory animals.

In an effort to address the recommendations of Council and the CLS for decreasing the length of time required to complete reports, ILAR negotiated with this committee to complete the report during one meeting. It required that staff prepare much of the background material and, together with the chairman, select authors for specific portions and initiate first drafts prior to the meeting. Each author was asked to revise the material provided, or develop new material, and return it to staff. Staff combined these reports into one report and sent them back to members. Although not in final form by the time of the meeting, each member was well versed on the details of the project. This new concept of an intensive, one meeting committee-model is now feasible for *revision* of reports. The actual cost for this project will be less than half of the approved budget.

Special Projects Recently Initiated

Psychological Well-being of Nonhuman Primates. In 1988, an advisory committee was convened. The committee was composed of experts in nonhuman primate behavior, primate ecology, laboratory animal medicine, commercial primate breeding and importation, and stress. Consultants to the committee included a member of the Scientific Advisory Committee of the American Humane Association, the Chairman of the Agricultural Committee of the House of Representatives, and a director of a regional primate research center. Recommendation from this committee, as well as those from ILAR Council, the Commission on Life Sciences, and the Governing Board of the NRC culminated in the statement of work for this report and the charge to the committee.

This study was requested by the Departments of Health and Human Services and Agriculture to address the requirements imposed by the 1985 Animal Welfare Act amendment to "provide a physical environment suitable to ensure the psychological well-being of nonhuman primates." Research, testing, and educational institutions that use nonhuman primates are required to develop a program to address this requirement. Federal animal welfare inspectors will evaluate plans for compliance. This report will provide both users and inspectors with recommendations by which the well-being of nonhuman primates can be assessed. It will also focus on how programs to enhance their well being can be developed. The report will not suggest simplifying the complexity of the behavioral and physical needs of almost 50 species of nonhuman primates used in research. Rather, it will strive to create an appreciation of the richness of the cognitive, perceptive, and behavioral abilities among the species and how these might be utilized for enriching their environment.

Laboratory Animal Management Series: Rodents. This is a report by the *ILAR Committee on Rodents* which will be published in fall 1992 by the National Academy Press, Washington, D.C. This report will update the 1977 document on the same subject²¹, including an update of the 1976 ILAR document Long-Term Holding of Laboratory Rodents²². It will provide technical guidance on management of rodents used in research. As part of ILAR's Laboratory Animal Management Series, it serves as a species-specific supplement to the Guide, upon which the policies of the Department of Defense and other federal agencies regarding the care and use of laboratory animals are based.

Projects with NRC Approval But Which Lack Full Funding

Occupational Safety and Health of Persons working with Research Animals. To be published by the National Academy Press, Washington, D.C. This report was requested by the federal Interagency Research Animal Committee, composed of members from the Department of Defense and other agencies that use animals in research. A proposal was prepared and submitted to the NIH in May, 1990. Funding is pending. The appointed committee will review existing programs, interview committee consultants, utilize state-of-the-art information, and hold workshops. A partial listing of issues to be addressed includes

immunization schedules for employees working in diverse environments; considerations of environmental hazards found in laboratory animal facilities; chemicals, air, accidents, and safe working practices, with suggestions for assessing hazards and minimizing risks; allergies to animals; frequency and duration of storage of blood samples taken from employees, based on job type and species handled; informing employees about potential industrial, environmental, and biological hazards; special precautions and considerations of zoonoses, including simian B-virus, hepatitis, tuberculosis, Q-fever, and others; human health considerations of experimentally induced biohazard, such as transgenic mice carrying the human AIDS virus; and radioisotopes, when used for diagnosis or research in animals. The report will be valuable for institutional employee-health units; agencies responsible to the public for environmental quality; laboratory animal program directors; investigators interested in zoonoses and environmental health, and people working in laboratory animal facilities.

Guide for the Care and Use of Laboratory Animals (Guide). Just prior to the publication of the most recent edition of the Guide, the Health Research Extension Act of 1985 (P.L. 99-158) was passed, requiring that the secretary of the Department of Health and Human Services, through the director of NIH, to establish guidelines for the proper care and treatment of animals used in biomedical and behavioral research. Thus, legal status was imparted to the PHS Policy on Humane Care and Use of Laboratory Animals⁸, which in turn requires that institutions use the Guide "as a basis for developing and implementing an institutional program for activities involving animals" (PHS Policy, p.3). In addition, following amendment of the Animal Welfare Act by the Food Security Act of 1985 (P.L. 99-198), the USDA, which administers the Act, revised the Animal Welfare Regulations⁹ (AWRs) in consultation with NIH and in conformity with the PHS Policy. These changes in the law present challenges both to scientists who use laboratory animals and to the animal care services at research institutions. The Guide has always strived to provide professional recommendations for *optimal* standards, whereas the Animal Welfare Act is necessarily limited to providing minimal standards. These new laws and regulations may make it necessary to revise and change the format of the Guide. For example, the AWRs have modified some cage sizes and defined some new responsibilities of animal care and use committees, institutional veterinarians, and investigators. Also, in the near future, the USDA intends to regulate the use of farm animals used in research, testing, and education, and many scientists believe that the section on farm animals in the Guide should be greatly expanded. Rats and mice, too, are expected to be included in the AWRs, which may necessitate a greater consideration of them in the Guide or in supplements to the Guide. ILAR has received a number of comments concerning the 1985 Guide and suggestions for changes in future editions. The usual concerns between editions, such as cage sizes for various species, take on special importance because of increased concern among some elements of the public. This increased concern may be another reason for revising the Guide.

In November 1991, ILAR Council convened a committee comprised of members of the ILAR Council, biomedical and laboratory animal scientists, and government officials to

evaluate the current status of the Guide and recommend whether it should be revised, and to provide initial guidance for the revision if that was recommended. Specifically, the advisory committee was asked to address:

- Do the events described above provide cause to revise the Guide at this time?
- Considering that the Guide is now referenced in law, is a different approach to its preparation required?
- What new or additional material must be considered given recent regulatory changes and scientific and public concerns?

The committee recommended immediate revision, with scope limited to ensure compliance with federal law and certain other changes as may be necessary to keep it current with the state of the art. It also stressed that the Guide and the Laboratory Animal Management documents should be better coordinated to ensure that users are aware that the LAM reports, not the Guide, are the primary source of species-specific guidance. In response to this recommendation, ILAR staff held discussions with the NIH and other agencies and expressions of support were readily provided. In discussions with the National Academy Press it was agreed that the Laboratory Animal Management documents would be renamed the Laboratory Animal Management Series. The priority for revision of each report in this series is under review and three reports (Rodents, and Dogs) are being prepared.

Based on the recommendations of an NRC-funded advisory committee in November 1991, ILAR will soon initiate the revision of the widely used 1985 fifth edition⁷. The principal reason for revision is that the current report was published seven years ago and to achieve compliance with the changes in the Animal Welfare Regulations. The NRC appointed committee will hold regional workshops to gather information from interested participants. As in the past, the committee will not entertain recommendations for revision which are not in conformity with changes in the law or which do not follow the state-of-the-art as published in peer-reviewed scientific articles.

The Use of Animals for Educational Purposes. The use of animals as a component of biology education at all levels has become controversial, and a number of converging forces are making animal use increasingly difficult. Many teachers are choosing to avoid the issue by not using animals. Participants in Council discussions pointed out that there has never been a thoughtful treatise on whether using animals provides a valuable educational experience for students, and if so, what the appropriate uses of animals are.

Workshops were held by the CLS and ILAR with science teachers and administrators to discuss their perceptions of the problems in science education. These K-12 teachers and science coordinators were selected by virtue of their innovative science programs and active involvement in addressing problems in science education. At each workshop, these

participants made the following three general recommendations: provide a scientific rationale for the use of animals for each grade; provide a workbook of grade-specific field trips and laboratory studies using animals; and provide grade-specific science literacy goals to be used by teachers in deciding what areas of science should be covered. Following these workshops and additional discussions within the NRC, ILAR and the CLS' Board on Biology formulated a collaborative study on the value of animal use in precollege education.

To be published by the National Academy Press, Washington, D.C, this report will be an obvious extension to ILAR's Principles and Guidelines for the Use of Animals In Precollege Education (Principles)¹. The committee's charge will be to produce three reports: 1) First will be a review of available data on how students learn scientific concepts and an elaboration of how the use of animals is a relevant educational experience for students; it will also examine the educational costs and benefits of using animals in classroom activities at the K-12 levels, and, finally it will describe both appropriate and inappropriate use of animals based on age-specific exposure to animals at the precollege level; 2) The second report will contain an abbreviated and popularized lay version of the first report for teachers and parents; and 3) The third report will be a laboratory manual for grade-specific projects (and field trips) in which animals are principal components.

PUBLICATIONS

1. **Principles and Guidelines for the Use of Animals in Precollege Education.** 1989. A report from the ILAR Council. *ILAR News* 31(4):A1-A3.
2. **National Research Council.** 1990. *Fulfilling the Promise: Biology Education in the Nation's Schools.* A report of the Board on Biology Committee on High-School Biology Education. Washington, D.C.: National Academy Press. 152 pp.
3. **Important Laboratory Animal Resources: Selection Criteria and Funding Mechanisms for their Preservation.** 1990. A report of the Institute of Laboratory Animal Resources Committee on Preservation of Laboratory Animal Resources. *ILAR News* 32(4):A1-A32.
4. **Science, Medicine, and Animals.** 1991. Prepared for the Councils of the National Academy of Sciences and the Institute of Medicine by the Committee on the Use of Animals in Research. Washington, D.C.: National Academy Press. 30 pp.
5. **Use of Animals in Biomedical and Behavioral Research.** 1988. Commission on Life Sciences Committee on the Use of Laboratory Animals in Biomedical and Behavioral Research. Washington, D.C.: National Academy Press. 102 pp.
6. **Institute of Laboratory Animal Resources.** 1979. *Animals for Research—A Directory of Sources*, 10th ed. Washington, D.C.: National Academy of Sciences. 141 pp.
7. **National Research Council.** 1985. *Guide for the Care and Use of Laboratory Animals.* A report of the Institute of Laboratory Animal Resources Committee on Care and Use of Laboratory Animals. NIH Pub. No. 86-23. Washington, D.C.: U.S. Department of Health and Human Services. 83 pp.
8. **Public Health Service Policy on Humane Care and Use of Laboratory Animals.** 1986. Office for Protection from Research Risks, National Institutes of Health. Bethesda, MD.
9. **Animal Welfare Regulations.** Title 9CFR.
10. **Institute of Laboratory Animal Resources.** 1990. *ILAR News* 32(2):1-16.
11. **Institute of Laboratory Animal Resources.** 1990. *ILAR News* 32(3):1-44.
12. **Institute of Laboratory Animal Resources.** 1991. *ILAR News* 33(1-2):1-41.

13. **Immunodeficient Rodents: A Guide to Their Immunobiology, Husbandry, and Use.** 1989. A report from the committee on Immunologically Compromised Rodents. Washington, D.C.: National Academy Press. 246 pp.
14. **Education and Training in the Care and Use of Laboratory Animals: A Guide for Developing Institutional Programs.** 1991. A report of the Institute of Laboratory Animal Resources Committee on Educational Programs in Laboratory Animal Science. Washington, D.C.: National Academy Press. 139 pp.
15. **Infectious Diseases of Mice and Rats.** 1991. A report of the Institute of Laboratory Animal Resources Committee on Infectious Diseases of Mice and Rats. Washington, D.C.: National Academy Press. 397 pp.
16. **Companion Guide for Infectious Diseases of Mice and Rats.** 1991. A report of the Institute of Laboratory Animal Resources Committee on Infectious Diseases of Mice and Rats. Washington, D.C.: National Academy Press. 95 pp.
17. **Recognition and Alleviation of Pain and Distress in Laboratory Animals.** 1992. A report of the Institute of Laboratory Animal Resources Committee on Pain and Distress in Laboratory Animals. Washington, D.C.: National Academy Press. 137 pp.
18. **Standardized Nomenclature for Transgenic Animals.** A report by The Committee on Transgenic Nomenclature. *ILAR News* 34:(4) 1992 (anticipated).
19. **Definition, Nomenclature, and Conservation of Rat Strains.** A report by The Committee on Rat Nomenclature. *ILAR News* 34:(4) (anticipated).
20. **Dogs: Standards and Guidelines for the Breeding, Care, and Management of Laboratory Animals.** Institute of Laboratory Animal Resources Subcommittee on Dog and Cat Standards, Committee on Standards. 1973. Washington D.C.: Institute of Laboratory Animal Resources. 48 pp.
21. **Laboratory Animal Management: Rodents.** 1977. Institute of Laboratory Animal Resources Committee on Rodents. Washington D.C.: Institute of Laboratory Animal Resources. 15 pp.
22. **Long-Term Holding of Laboratory Rodents.** 1976. Institute of Laboratory Animal Resources Committee on Long-Term Holding of Laboratory Rodents. Washington D.C.: Institute of Laboratory Animal Resources. 25 pp.

ILAR COUNCIL MEMBERS

June 25, 1992

STEVEN P. PAKES, D.V.M., Ph.D.
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Division of Comparative Medicine
University of Texas Southwestern
Medical Center
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Medicine)

JUNE R. APRILLE, Ph.D.
Professor
Department of Biology
Tufts University
(Physiology, Biochemistry)

MELVIN W. BALK, D.V.M., M.S.
Senior Vice President and
Scientific Director
Charles River Laboratories
(Laboratory Animal Medicine)

J. DERRELL CLARK, D.V.M., D.Sc.
Director, Animal Resources
College of Veterinary Medicine
University of Georgia
(Laboratory Animal Medicine)

LESTER CRAWFORD, D.V.M., Ph.D.
Executive Vice President
of Scientific Affairs
National Food Processors Association
(Antibiotic Toxicology)

• NEAL FIRST, Ph.D.
Professor
Department of Animal Science
University of Wisconsin
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THOMAS J. GILL III, M.D.
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University of Pittsburgh
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ALAN M. GOLDBERG, Ph.D.
Associate Dean for Research
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(Pharmacology)

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Professor Emeritus, School of Medicine
University of Southern California
(Ethics)

JOHN L. VANDEBERG, Ph.D.

Chairman
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Southwest Foundation for Biomedical
Research
(Biochemical Genetics, Mammalogy)

• NAS Member

**ANNUAL REPORT OF ACTIVITIES
IN THE
INTERNATIONAL COUNCIL FOR LABORATORY ANIMAL SCIENCE**

**Presented to the
Interagency Research Animal Committee
March 25, 1992**

**Thomas L. Wolfle, Director
Institute of Laboratory Animal Resources
Commission on Life Sciences
National Research Council
National Academy of Sciences**

**Annual report of Activities in the
INTERNATIONAL COUNCIL FOR LABORATORY ANIMAL SCIENCE
for 1991**

**Presented to the
Interagency Research Animal Committee
March 25, 1992**

**by
Thomas L. Wolfe, Director
Institute of Laboratory Animal Resources**

HISTORY

In late 1987, the Interagency Research Animal Committee (IRAC) agreed to provide support to the Institute of Laboratory Animal Resources, National Research Council, National Academy of Sciences for the purpose of holding the U.S. national membership in ICLAS. IRAC participating agencies have provided funding for the years 1988 - 1992. As a condition of IRAC support, ILAR was asked to pay annual dues (\$6,400) for the United States and serve as the holder of the U.S. national membership, a function it has served in previous years. Under the provisions of this award, United States dues have been paid for the years 1988, 1989, 1990, 1991 and 1992. Steven P. Pakes, D.V.M., Ph.D., Chairman of ILAR Council, is the U.S. National Member of ICLAS.

STATEMENT OF TASK

ILAR will:

- **Serve as the U.S. national member of ICLAS, which is concerned with the care and use of laboratory animals worldwide;**
- **Encourage the education, training, and development of laboratory animal science and the exchange of information between countries for the betterment of animal care;**
- **Help developing countries improve laboratory animal care and the infrastructure of biomedical research;**

- Seek to ensure that national policies of various countries do not become restrictive to the trade of products, developed by animal research in other countries; and
- Monitor laboratory animal availability, use, importation and exportation.

The United States Agenda in ICLAS

The ILAR Council (Attachment 1) developed a U.S. agenda in ICLAS, which was approved by the ILAR Council on January 10, 1989, by IRAC on February 22, 1989, by the Governing Board of the National Research Council on March 6, 1989, and by the Governing Board of ICLAS on April 24, 1990. The framework of the agenda provides guidance to ILAR for its interactions with ICLAS. It is hoped that this mechanism will enhance the quality of laboratory animal care internationally.

ACTIVITY SINCE LAST REPORT

- A. During initial discussions with IRAC about sponsorship, ILAR was told that a desired outcome of U.S. membership in ICLAS would be the restructuring of the ICLAS Governing Board and programs so ICLAS could become more effective in assisting the development of laboratory animal and biomedical science in developing countries. Toward this goal ILAR has hosted two meetings of the ICLAS Governing Board in the United States at which time these goals have been discussed. At the latter of these meetings in October 1991, ILAR supported two new members of the Governing Board, Drs. Steven Pakes and Tatsuji Nomura of Japan. Both were elected. In addition, Dr. Jerry Van Hoosier (University of Washington) was elected Vice President and appointed to the Education Committee. The ICLAS Governing Board is now in a good position to consider the educational goals expressed by IRAC.

Subsequent to the October meeting of the ICLAS Governing Board, in cooperation with scientists from Germany, England, Japan, and the United States, ILAR developed a proposal to be considered by the ICLAS Governing Board at its May 1992 meeting. This proposal is a result of a current ILAR study in which international participants are establishing a standardized nomenclature for rats. The purpose of this proposal is to establish an international nomenclature for strains of rats and to foster the exchange of information about their use in science (Attachment 2).

- B. Since 1988, ILAR has worked with ICLAS and the American Association of Laboratory Animal Science (AALAS) to have a combined scientific meeting. This meeting was held on October 20-24, 1991, in Buffalo, New York. ILAR's chairman and U.S. member of ICLAS, Steven Pakes, and incoming AALAS President, Jerry Van Hoosier, served as cochairmen of the ICLAS scientific sessions. In order to encourage participation at this

meeting by young Latin American scientists and veterinarians, funding in the amount of \$4000 was provided to ILAR by ICLAS for the competitive awarding of travel scholarships. ILAR was able to double the amount of these awards through a matching grant from the Pan American Health Organization. ILAR sent notices of these scholarships to the ICLAS national members in each country of Central and South America, as well as to the Caribbean, and Mexico and published notices in newsletters. Young scientists from Mexico, Peru, and Brazil were selected and presented papers on their work. Following the meeting, each wrote letters to PAHO, ICLAS, and AALAS expressing their appreciation. It is hoped that these travel awards will be continued as a method of encouraging capable young scientists from developing countries to attend scientific meetings of ICLAS and to give them a forum for presenting their work to international meetings of their peers. Over 4,000 attended the combined ICLAS/AALAS meeting setting an attendance record for laboratory animal science meetings in this country (and presumably the world).

CURRENT ACTIVITIES

- A. *ILAR News* continues to be a major instrument by which issues in comparative medicine and laboratory animal science are communicated to international audiences. This quarterly publication addresses topics of interest to animal care and use committees, investigators, and veterinarians. It has been published for 30 years through the combined efforts of ILAR staff and part-time consultant editors. Because of its growing importance, ILAR Council has established an editorial track of excellence designed to achieve peer-review status and bibliographic referencing of the newsletter. Steps toward this goal were the creation of an editorial review panel and the hiring of a full-time editor/writer, Ms. Mara Aimone. Articles, whether solicited or submitted, are peer-reviewed by the editorial panel and outside reviewers. In many cases, other scientists are invited to comment on an article to provide another perspective. *ILAR News* mailing list exceeds 4,700, including 700 subscribers in foreign countries.
- B. ICLAS provides an excellent instrument through which developing countries gain access to educational materials in the biomedical, behavioral, and laboratory animal sciences. Animal facility managers in these countries express a growing need for guidance in all facets of their animal care and use programs. ILAR works directly with ICLAS and with the Pan American Health Organization (PAHO), which assists ILAR on ICLAS-related programs important for biomedical research, testing, education, and public health in Central and South America and the Caribbean, to ensure that reports are made available to this audience. These reports include the following:
- Infectious Disease of Mice and Rats and the Companion Guide to Infectious Diseases of Mice and Rats. 1991. Washington, D.C.: National Academy Press.

- Education and Training in the Care and Use of Laboratory Animals: A Guide for Developing Institutional Programs. 1991. Washington, D.C.: National Academy Press.
 - Important Laboratory Animal Resources: Selection Criteria and Funding Mechanisms for their Preservation. 1991. Washington, D.C.: National Academy Press.
 - Translated into Spanish in 1990 by NIH/OPRR, the 1985 edition of the ILAR/NIH Guide for Care and Use of Laboratory Animals remains in demand in Spanish-speaking countries.
- C. Two reports initiated in 1991 on the scientific nomenclature of rodent strains are nearing completion: Definition, Nomenclature, and Conservation of Rat Strains, and Laboratory Animal Management: Transgenic Nomenclature. Accurate nomenclature is important for identifying animals when reporting research results and for preserving valuable stocks. For most types of genetically defined mice, there is a standardized nomenclature that is well understood and internationally accepted. However, this is not the case for transgenic mice of which there are more than 10,000 unique strains. Further, although scientists using other laboratory rodent species have adopted the rules for mice, they have been less than conscientious in applying those rules when producing new strains. Each of these reports was developed and validated in the laboratory by prominent scientists in the U.S., Europe, and Japan. When published this summer, they are expected to gain broad international support.
- D. Two other reports recently undertaken are addressing the husbandry and use of dogs in biomedicine and the psychological well-being of nonhuman primates. Laboratory Animal Management: Dogs will revise and expand an earlier report. It will provide guidelines for the care of laboratory dogs, strategies for "exercise" and well-being, and contain a considerable discussion on the special husbandry requirements of various dog-models of disease. Psychological Well-being of Nonhuman Primates will address the cognitive abilities and behaviors of different species of nonhuman primates and describe strategies by which to assess and provide for their well-being. These topics are expected to interest a broad international audience.

ACTIVITIES BEING INITIATED IN 1992

- A. In November 1991, ILAR appointed a committee to decide if the Guide for the Care and Use of Laboratory Animals should be revised. Following recommendations of this committee, the National Research Council has begun the process of appointing a revision committee. In its recommendations, the committee (composed of representatives from NIH/NCRR, NCI, OPRR, USDA/APHIS, AAALAC, academic institutions, ILAR Council, and the Commission on Life Sciences) recommended that

the revision address changes mandated by new regulations and that changes in cage size not be made without compelling scientific evidence. Other issues to be addressed will be the likely addition to the Animal Welfare Regulations of agricultural animals used in biomedical research. As a related issue, the committee recommended that ILAR's outdated Laboratory Animal Management documents be revised and published in a format that clearly identifies them as supplements to the Guide. The Guide is the most widely distributed document produced by the NRC, having twice been translated into Spanish. This version is expected to be equally well received and correspondence has already been initiated to consider its translation into Spanish and Russian. It is anticipated that the 7th revised edition will be released in 1993.

- B. In 1990, IRAC requested that ILAR prepare a comprehensive report on Occupational Safety and Health of Personnel Working in Research Animal Facilities. It is anticipated that funding for this effort will be received in mid-1992. This report will provide a much needed assimilation of federal requirements and institutional policies and establish comprehensive recommendations for the development of occupational safety and health programs for institutions using animals in research, testing, and education.

INTERNATIONAL REPRESENTATION

At the request of the Secretary General of ICLAS, the ILAR director represented ICLAS at the XLIII Meeting of the Regional Committee of the WHO for the Americas, held in Washington, D.C. on September 23-28, 1991. Portions of this meeting on the revitalization of the Pan American Zoonoses Center (CEPANZO), on the establishment of a Pan American Institute for Food Protection and Zoonoses, and on the status of Cholera in the Americas were summarized and sent to the ICLAS Secretariat.

PROPOSAL FOR THE INTERNATIONAL COUNCIL ON LABORATORY ANIMAL SCIENCE (ICLAS)

ICLAS COMMITTEE ON STANDARDIZED GENETIC NOMENCLATURE FOR RATS

Drs. Tatsuji Nomura, Kazuo Moriwaki, and Steven P. Pakes will propose the establishment of this committee to the ICLAS Governing Board in May 1992. Thereafter, the International Committee on Standardized Genetic Nomenclature for Rats can use the ICLAS designation.

PURPOSE

To set criteria for the definition and nomenclature of strains of rats and to exchange information about the use of the rat for studying physiological processes or as a model of human diseases in such fields as genetics, organ transplantation, reproduction, behavior, drug development, and cancer.

FUNCTIONS

The functions of the committee should be as follows:

1. To encourage the genetic characterization and monitoring of stocks and strains used in biomedical research by developing a set of recommendations, including practical techniques, both for genetic and phenotypic characterization and for monitoring of rat strains.
2. To implement suitable genetic nomenclature systems for the rat, taking into account existing nomenclature used in humans, mice, and other relevant species. Registries should be established in appropriate laboratories to maintain laboratory registration codes; inbred strain, gene, transgenic strain, and outbred stock names and characteristics; genetic maps; DNA probes and primers useful for the rat; chromosome polymorphisms and anomalies; and rat-human and rat-mouse homologies. The goal should be for each developer of a rat model to contact the relevant registry before naming the model and to assist in keeping the registries up-to-date by contributing appropriate new findings.
3. To encourage the conservation of rat genetic resources by recommending a set of criteria for determining which resources should be conserved and by what means (e.g., cryopreservation) and by promoting systematic, national efforts to conserve valuable genetic resources. It should support continued research and development on the cryopreservation of rat embryos, gametes, and ovaries and should explore other methods of conserving genetic resources.

4. To assume the responsibility for disseminating information on rat genetics to all appropriate scientific disciplines by publishing new genetic information in journals appropriate to the field of interest, by encouraging journal editors to require the use of standardized nomenclature in submitted manuscripts, and by establishing registries with electronic databases whose information is widely available to scientists. *Rat News Letter* should remain the official organ of the committee.

The committee should establish appropriate subcommittees to address specific issues in using genetically defined rats. It should also work to establish national committees under the auspices of an appropriate national association to pursue the aims of the parent committee (e.g., a Japanese nomenclature committee might be established by the Japanese Association for Laboratory Animal Science [JALAS]).

OPERATIONS

It is proposed that the main office of the committee be located at the ICLAS Monitoring Center at the Central Institute for Experimental Animals (CLEA) in Japan, which will handle financial matters. The committee should meet every 2 years in conjunction with the International Workshop on Alloantigenic Systems in the Rat. Interim contact among members can be maintained by Fax or during international meetings at which several members are present.

PROPOSED MEMBERS

Michael F. W. Festing, Ph.D., Medical Research Council Toxicology Unit, Woodmansterne Road, Carshalton, Surrey SM5 4EF, UK (*Genetic characterization and cataloging of strains*)

Thomas J. Gill III, M.D., University of Pittsburgh School of Medicine, Pittsburgh, PA 15261 (*immunogenetics, reproductive genetics, cancer genetics*)

Dorothy D. Greenhouse, Ph.D., Institute of Laboratory Animal Resources, National Research Council, 2101 Constitution Avenue, NW, Washington, DC 20418 (*organizing and maintaining data on rat strains*)

Eberhard Günther, Dr. med., Division of Immunogenetics, University of Göttingen, Gosslerstrasse 12d, 3400 Göttingen, Germany (*immunogenetics*).

Heinz W. Kunz, Ph.D., Department of Pathology, University of Pittsburgh School of Medicine, Pittsburgh, PA 15261 (*immunogenetics and development and characterization of rat strains*)

Göran Levan, Ph.D., Department of Genetics, University of Gothenburg, S-400 33, Gothenburg, Sweden (*cytogenetics and gene mapping*)

Arthur A. Like, M.D., Department of Pathology, University of Massachusetts School of Medicine, 55 Lake Avenue, North, Worcester, MA 01655 (*development, characterization and distribution of important disease model: BB rat, diabetes*)

Kazuo Moriwaki, Ph.D., Department of Cell Genetics, National Institute of Genetics,

Mishima Shizuoka-Ken 411, Japan (*mouse genetics*)
Takashi Natori, M.D., Ph.D., PALM Institute, N29 W4 2-1-215, Sapporo 001, Japan
(*development and characterization of rat strains*)
Tatsuji Nomura, M.D., Central Institute for Experimental Animals, 1430 Nogawa, Miyamae
Kawasaki 213, Japan (*preservation, monitoring and distribution of inbred strains*)
Viktor Stolc, Ph.D., Department of Pathology, University of Pittsburgh School of Medicine,
Pittsburgh, PA 15261 (*biochemical genetics*)

Secretary: Hideki Katoh, Ph.D., Central Institute for Experimental Animals, 1430 Nogawa,
Miyamae Kawasaki 213, Japan

ILAR STAFF

The ILAR staff and their responsibilities include:

Thomas L. Wolfe, ILAR Director. Staff officer for:

- Precollege Principles
- Pain and Distress
- Occupational Safety and Health
- Guide for Care and Use of Laboratory Animals
- Well-being of Nonhuman Primates

Dorothy D. Greenhouse, Senior Program Officer. Staff officer for:

- Immunodeficient Rodents
- Infectious Diseases of Mice and Rats (2 vols)
- Education and Training in the Care and Use of Laboratory Animals
- Laboratory Animal Management: Dogs
- Laboratory Animal Management: Rodents
- Laboratory Animal Management: Nomenclature of Transgenic Animals
- Important Laboratory Animal Resources: Selection Criteria and Funding Mechanisms for their Preservation
- Definition, Nomenclature, and Conservation of Rat Strains

Mara Aimone, Assistant Editor/Research Assistant

- Manages *ILAR News*
- Manages the AMGS data base

Amanda Hull, Research Assistant

- Manages committee appointments, correspondence with project committees, committee reports, project reviews, and publication

Bobbi Kahlow, Senior Project Assistant

- Edits proposals, annual reports and final reports
- Coordinates preparation of proposals internally and externally
- Prepares budgets
- Manages all grants, contracts and ILAR finances

Carol Rozmiarek, Secretary

- Council correspondent
- ILAR Librarian

The curricula vitae of the professional staff are provided.

CURRICULUM VITAE

THOMAS L. WOLFLE, D.V.M., Ph.D.

EDUCATION

Bachelor of Science, Texas A & M University, 1957

Doctor of Veterinary Medicine, Texas A & M University, 1961

Masters of Arts in Psychology, University of California, Los Angeles, 1968

Doctor of Philosophy in Physiological Psychology/Animal Behavior, UCLA, 1970

Dissertation Motivational and Emotional Properties of the Midbrain Central Grey Matter

WORK EXPERIENCE

April 1988 to Present

Director, Institute of Laboratory Animal Resources, Commission on Life Sciences, National Research Council, National Academy of Sciences

Direct the programs of ILAR;

Science policy management;

Laboratory animal medicine;

Primateology (Sources, use, propagation, and conservation);

Laboratory animal behavior;

Impact and implementation of federal animal welfare laws;

Facility programs to implement guidelines and laws;

Communicating with public and precollege students and teachers on the contribution of animals in research and education, and humane use of animals.

April 1975 - March 1988

Commissioned Officer (Captain, O-6), Public Health Service, National Institutes of Health, Bethesda, Maryland

Director, Interagency Research Animal Committee

Deputy Director, NIH Office of Animal Care and Use

Executive Secretary, NIH Animal Care and Use Committee

Officer in Charge of the NIH foxhound colony

NIH Animal Behaviorist

September 1961 - March 1975

Commissioned Officer, U.S. Air Force

Primate colony management (macaques, chimpanzees), rhesus breeding colony
Chief, Flight Environments Branch (human factors, animals models of flight environments
Behavioral toxicology (chemical, heat, hypoxia, vibration, radiation (gamma, proton, microwave)
Support of NASA's rhesus and chimpanzee programs

MEMBERSHIPS

American Veterinary Medical Association (House of Delegates, 1989 - present)
American College of Laboratory Animal Medicine (Diplomat 1966 -)
American Society of Laboratory Animal Practitioners (Liaison to AVMA House of Delegates, 1989 - present)
American Association for Laboratory Animal Science (1962 to present)
American Association of Veterinary Ethologists (President 1980 -1983)
District of Columbia Veterinary Medical Association
National Capital Area Branch of AALAS
Association of Primate Veterinarians
American Society of Primatologists (Member, conservation committee 1988 - Present)

AWARDS

Who's Who in Texas, 1973
American Men and Women of Science, 1976 -
U.S. Air Force Commendation Medal, 1972
U.S. Air Force Outstanding Unit Award, 1963
U.S. Public Health Service Commendation Medal, 1983
U.S. Public Health Service Outstanding Service Medal, 1988
Ph.D. with Distinction, UCLA, 1970

PRESENTATIONS

Over two hundred presentations to state, national and international forums on topics of military medicine, laboratory animal medicine, animal behavior, environmental enrichment and design for dogs and nonhuman primates, recognition and alleviation of pain and stress in laboratory animals, the role of technicians in the care of laboratory animals, and trends in the use of animals in research.

PUBLICATIONS

- Wolfe, T.L., F.H. Kriewaldt, and R.J. Young. The use of the punch card filing system for record maintenance of a laboratory animal colony. *Lab. Anim. Care* 14 (4)268-274, 1964.
- Dalrymple, G.V., J.J. Ghidoni, H.L. Kundel, T.L. Wolfe, and I.R. Lindsay. Edema - A Delayed Complication of Total-Body 32 Mev Proton Irradiation. SAM-TR-65-57. September, 1965.
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- Wolfe, T.L., G.D. Whitney, and P.Y. Batson. 1968. The Effect of Monomethylhydrazine with and without Pyridoxine on Operant Behavior of Primates. *Aerospace Medicine* 139(12)1283-1286.
- Braun, P.G., T.L. Wolfe, and J.A. Chisum. A Footrest-Leg Exercise for Long-Term Restraint Studies with Primates. 1968. *J. Exp. Anal. Beh.* 11(1)69-70.
- Wolfe, T.L. 1970. The Motivational Properties of Electrical Stimulation in Dorsal Tegmentum of the Rat. University of California, Los Angeles, Ph.D. Thesis. Universal Microfilms 71-9263.
- Wolfe, T.L. D.J. Mayer, B. Carder, and J. Liebeskind. 1971. Motivational Effects of Electrical Stimulation in Dorsal Tegmentum of the Rat. *Physiol. Behav.* 7569-574.
- Mayer, D.J., T.L. Wolfe, H. Akil, B. Carder, and J.C. Liebeskind. 1971. Analgesia from electrical stimulation in brainstem of the rat. *Science* 1741351-1354.
- Wolfe, T.L., J. Mitchell, J. Frazer, and S. Allen. 1976. Effects of Low Level Microwave Exposure Upon Continuous Psychomotor Performance, USAF, SAM Technical Report.
- Bowles, C., R.D. Alsaker, and T.L. Wolfe. 1979. Studies of Pelger Huet Anomaly in Foxhounds. *Am. J. Pathol.* 96237-246.
- Wildt, D.E., E.J. Baas, P.K. Chakroborty, T.L. Wolfe, and A.P. Stewart. 1982. Influence of Inbreeding on Reproductive Performance, Ejaculate Quality and Testicular Volume in the Dog. *Theriogenology* 17(4)445-452.
- Wolfe, T.L. and J. C. Liebeskind. 1983. Stimulation-produced analgesia A review. Pp. 107-115 in *Animal Pain Perception and Alleviation*, R.L. Kitchell and H. H. Erickson, eds. Bethesda, Md. American Physiological Society.

- Wolfe, T.L. 1983. Nonhuman primates in research Trends in conservation, importation, production and use in the United States. *Lab Anim.* 12(3)19-27.
- Wolfe, T.L. 1985. *Laboratory Animal Technicians Their Role in Stress Reduction and Human-Companion Animal Bonding.* In Symposium on the Human-Animal Bond, The Veterinary Clinics of North America Small Animal Practice, J. Quackenbush and V.L. Voith, eds. 15(2), March.
- Wolfe, T.L. 1987. Control of stress using non-drug approaches. *J. Am. Vet. Med. Assoc.* 191(10)1219-1221.
- Wolfe, T.L. *The Behavior of People Around Animals.* 1989. Pp. 1-2 in *Behavior and Well-being of Laboratory Animals.* D. Stark, ed. Monograph Series I, American Association for Laboratory Animal Science Cordova, TN.
- Wolfe, T.L. *Policy, Program, and People The Three P's to Well-being.* 1990. Pp. 41-47 in *Canine Research Environment,* Scientists Center for Animal Welfare, Bethesda, MD.
- Wolfe, T.L. *Nonhuman Primate Well-being An Issue of Science or Politics?* 1990. Proceedings of a conference on June 23, 1989 on *The Well-being of Nonhuman Primates in Research.* Scientists Center for Animal Welfare Washington, DC.
- Wolfe, T.L. *Dog Socialization.* 1991. Pp 43-45 in *Proceedings of Animal Care and Use Policy Issues in the 1990's.* NIHOPRR/OACU Conference held on November 16-17, 1989. National Institutes of Health Bethesda. 79 pp.
- Wolfe, T. *Psychological Well-being The Billion-Dollar Solution.* Pp. 119-128 in *Through the Looking Glass Issues of Psychological Well-being in Captive Nonhuman Primates.* M. A. Novak and A. J. Petto, eds. American Psychological Association Washington, D.C. 285 p.
- Wolfe, T. *Canine Management Interpretation of the Animal Welfare Regulations and Public Health Policy on Requirements for Exercise.* 1991. Presentations to USDA/NIH Conferences in Tulsa, OK (March 27), San Francisco (April 10, 1991), St. Louis (May 2), and Washington, D.C. (June 6).
- Wolfe, T. 1991. *Ask the Animals! Application of Performance Based Standards to Adequate Veterinary Care.* Presentation to 23rd Annual Laboratory Animal Medicine conference (CONMED), University of St. Louis.
- Johnson, D., M. Morin, and T. Wolfe. *Laws, Regulations, and Policies Affecting the Care and Use of Nonhuman Primates.* In *Nonhuman Primates in Biomedical Research.* C. Abee, R. Hendrickson, and T. Bennett, eds. Academic Press In press.

Erwin, J., C. Southwick, B. Blood, and T. Wolfle. Conservation and Replacement. In *Primates in Medicine*. C. Abee, R. Hendrickson, and T. Bennett, eds. Academic Press
In press.

Blood, B., T. Wolfle, and R. Whitney, Jr. 1992. Planning and Development of the Chimpanzee Breeding and Research Program. In *Chimpanzee Conservation and Public Health Environments for the Future*. J. Ervin and J. Landon, eds. Diagon/Bioqual Rockville, Md.

CONSULTANT

Pharmaceutical companies for development of habitat design and socialization of dogs and nonhuman primates;

U.S. Department of Agriculture for presentations to animal welfare inspectors of problems encountered in transportation of nonhuman primates, and implementation of Animal Welfare Regulations;

Architectural firms for information on habitat design(s) effected by changes in federal law, and for interpretation of the species typical needs of dogs and nonhuman primates as they effect habitat design;

To professional associations for discussions of issues of science policy, federal laws, and animal welfare/rights organizations as they effect care and use of laboratory animals.

INTERESTS

Science policy; laboratory animal medicine; animal behavior; environmental enrichment (well-being) of dogs and nonhuman primates; pain and stress; trends in the use of animals in research; sources, conservation, and care of nonhuman primates; and science education at the elementary and high school level.

CURRICULUM VITAE

DOROTHY DASE GREENHOUSE, Ph.D.

EDUCATION

Ph.D. (Physiology) 1973, Medical College of Virginia, Virginia Commonwealth University, Richmond, Virginia
M.S. (Biological Sciences) 1967, Rutgers-The State University, Newark, New Jersey
B.A. (Zoology) 1962, Smith College, Northampton, Massachusetts

WORK EXPERIENCE

August 1977-Present

Institute of Laboratory Animal Resources

Commission on Life Sciences, National Academy of Sciences, National Research Council
Staff Officer, August 1977-September 1985;

Senior Program Officer, October 1985-Present;

Acting Director, May 1987-March 1988.

In addition to the specific functions listed below, prepare and edit proposals for obtaining core support and special-project funding, with assistance from other ILAR staff.

January 1992-Present

Staff officer for Committee on Dogs. Provide support for committee meetings. Will assist the committee in preparing its report.

July 1991-Present

Staff officer for Committee on Rat Nomenclature. Provide support for committee meetings. Assisted the committee with the organization of a workshop entitled *Definition, Nomenclature, and Conservation of Rat Strains* and will assist in the preparation of the committee report.

June 1991-Present

Staff officer for Committee on Transgenic Nomenclature. Provide support for committee meetings. Will assist the committee in preparing its report.

August 1990-Present

Staff advisor/editor of *ILAR News*. Supervise an assistant editor in soliciting, compiling, and editing articles and other material for ILAR's quarterly journal.

October 1988-January 1991

Staff officer for Committee on Educational Programs in Laboratory Animal Science. Provided staff support for committee meetings and assisted the committee to write and edit

the committee report *Education and Training in the Care and Use of Laboratory Animals A Guide for Developing Institutional Programs*. The report was published in 1991 by the National Academy Press.

May 1987-March 1988

Acting director. In addition to running the ILAR office, wrote proposals and obtained funding for a committee report on the recognition and alleviation of pain in laboratory animals and for committee preparation of an annotated syllabus designed for courses in the care and appropriate use of laboratory animals to be given to investigators and research technicians. In addition, funding was obtained to support ILAR as the U.S. National Member in the International Council on Laboratory Animal Science.

September 1985-October 1990

Staff Officer for Committee on Preservation of Laboratory Animal Resources. Organized a large meeting at which the committee gathered information from members of the scientific community who maintain genetically unique animal colonies and from government representatives involved in funding these resources. The committee report, *Important Laboratory Animal Resources Selection Criteria and Funding Mechanisms for Their Preservation*, was published in the Fall 1990 *ILAR News*.

August 1985-June 1986

Assisted the Committee for a National Survey of Laboratory Animal Use, Facilities, and Resources in preparing and editing the report of its pilot study.

April 1985-Present Assign laboratory registration codes used by scientists in designating inbred and other genetically defined rodents. These codes are maintained for the International Committee on Standardized Genetic Nomenclature for Mice.

September 1984-April 1985

Assisted authoring committee in drafting and editing the *Guide for the Care and Use of Laboratory Animals*. Compliance with this document is required for all institutions receiving Public Health Service funding.

July 1984-September 1989

Staff officer for Committee on Immunologically Compromised Rodents. Provided staff support for committee meetings and worked with the committee chairman to compile and edit the committee report *Immunodeficient Rodents A Guide to Their Immunobiology, Husbandry, and Use*. The report was published in 1989 by the National Academy Press.

April 1983-May 1991

Staff officer for Committee on Infectious Diseases of Mice and Rats. Provided staff and editorial support for the committee report. Abstracted the committee's report to provide a brief review of the information relevant to investigators' needs. Both the long report, entitled *Infectious Diseases of Mice and Rats* (April 1991), and the shorter *Companion Guide*

to *Infectious Diseases of Mice and Rats* (May 1991) published by the National Academy Press.

September 1977-Present

Supervise ILAR's Animal Models and Genetic Stocks Information Program. Answer many of the more than 700 requests received each year from biomedical researchers and other users of laboratory animals, federal agency personnel, and the public. The information provided sources of both commonly and less frequently used species for laboratory investigation; appropriate animal models for the study of biological and pathological phenomena; breeding techniques, husbandry, disease prevention, and general care and treatment of animals; and preparation for professional and nonprofessional careers in laboratory animal science. With the assistance of computer specialists within the NRC, developed a data base containing information on sources of research animals for sale by breeders or held in individual investigator colonies.

March 1980-January 1988

Editor of *ILAR News*. Solicited, compiled, and edited articles and other material for ILAR's quarterly journal.

March 1980-January 15, 1989

Staff officer for Committee on Animal Models and Genetic Stocks. Provided staff support for this standing committee and wrote meeting summaries. Prepared action items for studies recommended by the committee and wrote proposals for those approved by the CLS and NRC. In January 1989, this committee was incorporated into the ILAR Council.

August 1977-April 1980

Staff officer for Committee on Animal Models for Research on Aging. Provided staff support for the committee and its five subcommittees. Worked with the committee and subcommittee chairmen to compile and edit the 587-page report. Organized two workshops in which approximately 48 participants prepared material for a section entitled "Comparative Models of Selected Problems of the Human Elderly."

May 1973-July 1977

New York State Department of Mental Hygiene, Research Institute on Alcoholism, Buffalo. Research Scientist, May 1973-April 1974; Senior Research Scientist, May 1974-July 1977; Postdoctoral Fellow, December 1974-November 1976. Continued doctoral research in developing a technique for isolating and recording from muscle spindles in the rat and studied the effects of alcohol administration on this sensory organ.

June 1962-January 1967

Schering Corporation, Bloomfield, New Jersey. Assistant Pharmacologist. Worked in the drug discovery program, central nervous system section. Screened new compounds and assisted in developing new screening techniques.

PROFESSIONAL SOCIETIES

Society of Sigma Xi

AWARDS

Recipient of 1988 CLS Staff Award

Nominated for 1988 NRC Professional Staff Award

NIH Postdoctoral Fellowship (December 1974-November 1976)

NDEA Predoctoral Fellowship (September 1969-June 1970)

A.D. Williams Predoctoral Fellowship (September 1967-June 1969)

PUBLICATIONS

Greenhouse, D. D., M. F. W. Festing, S. Hasan, and A. L. Cohen. 1990. Catalogue of inbred strains of rats. Pp. 410-480 in *Genetic Monitoring of Inbred Strains of Rats. A Manual on Colony Management, Basic Monitoring Techniques, and Genetic Variants of the Laboratory Rat*, H. J. Hedrich, ed. Stuttgart Gustav Fischer Verlag.

Greenhouse, D. D., C. T. Hanson, and O. E. Michaelis. 1990. Development of fatty and corpulent rat strains. *ILAR News* 32(3)2-4.

Greenhouse, D. D., O. E. Michaelis IV, and S. A. McCune. 1990. Development of corpulent rat strains. Pp. 375-377 in *Frontiers in Diabetes Research Lessons from Animal Diabetes III*, E. Shafrir, ed. London Smith-Gordon.

Greenhouse, D. D. 1989. Subline codes for holders and producers. Pp. 843-856 in *Genetic Variants and Strains of the Laboratory Mouse*, 2nd ed., M. F. Lyon and A. G. Searle, eds. Oxford Oxford University Press.

Greenhouse, D. D., O. E. Michaelis IV, and R. G. Peterson. 1988. The development of fatty and corpulent rat strains. Pp. 3-6 in *New Models of Genetically Obese Rats for Studies in Diabetes, Heart Disease, and Complications of Obesity*, C. T. Hansen and O. E. Michaelis IV, eds. Proceedings of a National Institutes of Health Workshop held June 18-19, 1987, in Bethesda, Md. Bethesda, Md. Division of Research Services, Veterinary Resources Branch, National Institutes of Health.

Fine, J., F. W. Quimby, and D. D. Greenhouse. 1986. Annotated bibliography on uncommonly used laboratory animals Mammals. *ILAR News* 29(4)1A-40A.

Greenhouse, D. D., ed. 1984. Holders of inbred and mutant mice in the United States; including the rules of standardized nomenclature of inbred strains gene loci, and

biochemical variants. *ILAR News* 27(2)1A-30A.

Greenhouse, D. D. 1980. Trends in primate imports into the United States 1979. *ILAR News* 23(2-3)27.

Greenhouse, D. D., and A. L. Cohen, eds. 1980. Supplement to animals for research—a directory of sources, 10 ed. *ILAR News* 24(1)S1-S41.

Greenhouse, D. D., and A. L. Cohen, eds. 1979. *Animals for Research—A Directory of Sources*, 10th ed. Washington, D.C. National Academy Press. 141 pp.

Greenhouse, D. D., and D. D. Greenhouse. 1977. *Illustrated Lectures on Neurophysiology*. Book 1. New York AV/MD.

Greenhouse, D. D., and A. J. Szumski. 1972. A technique for studying the effect of ethanol on the isolated rat muscle spindle. *Fed. Proc.* 31370 (abstr.).

Greenhouse, D. D., R. I. Taber, and D. D. Greenhouse. 1969. Mechanism of action of antihistamines in laboratory antidepressant tests. *Int. J. Neuropharmacol.* 8353-360.

Greenhouse, D. D., R. I. Taber, D. D. Greenhouse, J. K. Rendell, and S. Irwin. 1969. Agonist and antagonist interactions of opioids and acetic acid-induced abdominal stretching in mice. *J. Pharmacol. Exp. Ther.* 16929-38.

Greenhouse, D. D., R. I. Taber, and D. D. Greenhouse. 1968. A new type of drug enhancement: increased maximum response to cumulative noradrenaline in the isolated rat vas deferens. *Br. J. Pharmacol. Chemother.* 33171-176.

Greenhouse, D. D., R. I. Taber, and D. D. Greenhouse. 1968. Mechanisms of action of antihistamines for antagonism of tetrabenazine-induced ptosis. *Pharmacologist* 10169 (abstr.).

Greenhouse, D. D., R. I. Taber, D. D. Greenhouse, and S. Irwin. 1965. Interactions between narcotic analgesics, antagonists and other drugs on chemically-induced writhing in mice. *Pharmacologist* 7(2)164 (abstr.).

Greenhouse, D. D., R. I. Taber, D. D. Greenhouse, and S. Irwin. 1964. Inhibition of phenyl-quinone-induced writhing by narcotic antagonists. *Nature* 204189-190.

LOQUITUM

Living Concepts in the Ethics of Animal Experimentation. Presented at Smith College, Northampton, Massachusetts, April 17, 1987.

CURRICULUM VITAE

MARA LAVELLE AIMONE

EDUCATION

B.A. Washington University, St. Louis, Missouri, 1989

Major: French. Other coursework included Biology and Environmental Biology.

WORK EXPERIENCE

Spring 1991 - present

Assistant Editor/Senior Program Assistant, Institute of Laboratory Animal Science
Commission on Life Sciences, National Academy of Sciences, National Research Council
Assist with editing and publication of *ILAR News*;
Maintain animal models database;
Respond to animal models inquiries by telephone and mail;
Maintain *ILAR News* mailing list.

1989-1990

Reporter, Memorial Press Group, Plymouth, Massachusetts

Responsible for following municipal beat for *The Carver Reporter*, including budget, health, elections, education and feature stories;
Wrote education and feature stories for *The Duxbury Reporter*;
Wrote feature and arts pieces for *The Old Colony Memorial*;
Developed excellent sources in towns;
Received several in-house editorial awards.

1988

Publications Intern, Automobiles Peugeot, Paris, France

Completed 5 month internship in the Marketing Department of Automobiles Peugeot;
Assisted in all facets of production of four color newsletter for worldwide distribution;
Supervised production of English version of newsletter;
Prepared for internship with four months intensive study at European Business School in Paris (courses included marketing, international finance, and French commercial law).

Summer 1983

Laboratory Assistant, Georgetown University Nephrology Lab,
Was among four students nominated to apply for American Red Cross Fellowship.
After several months of courses and a competitive exam, was awarded a two month

internship at Georgetown University nephrology lab.
Responsible for removing rat livers, and testing for presence of certain chemicals. Assisted with other chemical assays, performed data entry.
Wrote report of internship at end of summer.

SKILLS

Editing and writing;
Research and analysis;
Extremely proficient in WordPerfect 5.0 and 5.1;
Proficient in Paradox;
Fluent in French, familiar with Spanish.

CURRICULUM VITAE

AMANDA ELIZABETH HULL

EDUCATION

Bachelor of Science, Villanova University, 1990
Major Psychology; Minor Sociology

WORK EXPERIENCE

1991 - present

Senior Program Assistant, Institute of Laboratory Animal Resources
Commission on Life Sciences, National Research Council, National Academy of Sciences

Assist Staff Officer in all phases of committee activities;
Maintain correspondence with committee members;
Plan, organize and attend all committee meetings;
Assist in the development, review, and publication of document.

1990 - 1991

Project Secretary, Institute of Laboratory Animal Resources

Maintain general correspondence;
Arrange meetings and travel plans for all ILAR Council functions;
Coordinate all telecommunication functions;
Compose minutes of meetings;
Manage a busy office.

1990

Sales Assistant, T.H. Mandy's, Inc.

Assisted customers with clothing selection;
Organized and modeled in seasonal fashion shows.

1989

Student Assistant, Villanova University Psychology Department

Conducted animal experiments;
Entered data into database on IBM computer.

ILAR NEWS

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SPECIAL REPORTS

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30	1	W	88	Third International Registry of Animal Models of Thrombosis and Hemorrhagic Diseases.
31	1	W	89	Alternatives to the Use of Live
32	1	W	90	Vertebrates in Biomedical Research
33	3	S	91	and Testing: An Annotated Bibliography
31	4	F	89	A Medical Ethics Primer. J. W. Robb.
32	1	W	90	A Statistical approach for Calculating the Minimum Number of Animals Needed for Research. H. N. Erb.
32	3	S	90	Canadian Council for Animal Care: Its Role. H.C. Rowsell.
32	4	F	90	Important Laboratory Animal Resources: Selection Criteria and Funding Mechanisms for Their Preservation. ILAR Committee on Preservation of Laboratory Animal Resources.
33	4	F	91	Recommendations for the Care of Amphibians and Reptiles in Academic Institutions. F. A. Pough.

ISSUES FOR IACUCs

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32	4	F	90	Review Standards for Animal Research: A Closer Look. R. Dresser.
33	1/2	W/Sp	91	AAALAC Accreditation: Declining Trends in Deficiencies. A. E. New.
33	1/2	W/Sp	91	USDA Responds to Questions from Institutional Animal Care and Use Committees. REAC staff.
33	1/2	W/Sp	91	IACUCs: Who should serve? J. Mench & R. Stricklin.
33	1/2	W/Sp	91	Prolonged Water Deprivation: A Case Study. F. B. Orlans.
33	4	F	91	The Public Health Service Responds to Commonly Asked Questions. OPRR staff.

STATE OF THE ART ARTICLES

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30	3	S	88	Transgenic Animals. J. Gordon.
30	4	F	88	The Spontaneously Hypercholesterolemic Pig as an Animal Model for Human Atherosclerosis. A. Attie & M. Prescott.
31	1	W	89	The Squirrel Monkey in Biomedical Research. C. Abee.
31	2	Sp	89	Why Field Biologists Mark Free Ranging Vertebrates for Scientific Study. T. Gavin & C. Haas.
32	1	W	90	Semen Collection Evaluation and Cryopreservation in Exotic Animal Species in Maximizing Reproduction Potential. B. Durrant.
33	3	S	91	Establishment and Preservation of Inbred Strains of Rats for General Purpose Use. S. Potkay & T. Nomura.
33	3	S	91	RT1A (MHC), RT2, and RT3 (Blood Group) Specificities of 44 Inbred and Congenic Rat Strains from the NIH Genetic Resource Colony ¹⁵ H. Kunz.
33	4	F	91	The Dcb:BHE Rat--A Model for Non-Insulin-Dependent, Nonobese Diabetes Mellitus. C. Berdanier.
33	4	F	91	Nuclear Transplantation and Embryo Cloning in Mammals. R. Prather.

SPECIAL ISSUES

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Animal Models in Biomedical Research

Modeling in Biomedical Research: An Assessment of Current and Potential Approaches. An NIH Conference.

The Contributions of Nonhuman Primates to Understanding Coronary Artery Atherosclerosis in Humans. T. Clarkson & S. Klumpp.

Biological Specimens Other than Intact Living Vertebrate Animals Available for Biomedical Research. K. Kenny & F. Quimby.

32 3 S 90

New Rat Models of Obesity and Type II Diabetes

Development of Fatty and Corpulent Rat Strains. D. Greenhouse, C. Hansen, & O. Michaelis.

Zucker (*fa/fa*) Rat. R. Kava, M. Greenwood, & P. Johnson.

Wistar Diabetic Fatty Rat. R. Kava, R. Peterson, D. West, & M. Greenwood.

WKY Fatty Rat as a Model of Obesity and Non-insulin-dependent Diabetes Mellitus. R. Peterson, L. Little, & M. Neel.

Zucker Diabetic Fatty Rat as a Model for Non-insulin-dependent Diabetes Mellitus. R. Peterson, W. Shaw, M. Neel, L. Little, J. Eichberg.

The Spontaneous Hypertensive/NIH Corpulent Rat: A New Rodent Model for the Study of Non-insulin-dependent Diabetes Mellitus and Its Complications. O. Michaelis & C. Hansen.

SPECIAL ISSUES (cont.)

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SHHG/Mcc-*cp* Rat: Model of Obesity, Non-insulin-dependent Diabetes, and Congestive Heart Failure. S. McCune, P. Baker, H. Stills.

Jcr:LA-corpulent Rat: A Strain with Spontaneous Vascular and Myocardial Disease. J. Russell & D. Koeslag.

Characteristics of Thermogenesis, Obesity, and Longevity in the LA/N-*cp* Rat. O. Tulp.

33 1/2 W/Sp 91

Pain in Animals and Humans

Behavioral Assessment of Pain: Non-Verbal Measures in Animals and Humans. F. Keefe, R. Fillingim, & D. Williams.

The Assessment of Pain in the Burned Child and Associated Studies in the Laboratory Rat. P. Osgood.

Pain in the Neonate: The Effects of Anesthesia. P. Davis.

A Question of Pain in Invertebrates. J. Smith.

GUIDELINES

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30	3	S	88	The Indiana University Axolotl Colony's Short Guide to the Care and Feeding for Axolotls. S. Duhon.
30	3	S	88	An Economical, Balanced Diet for Xenopus. D. Able.
30	3	S	88	Guidelines for Prevention of Herpesvirus Simiae (B-virus) Infection in Monkey Handlers. LAS Reprint.
30	4	F	88	Guidelines for Surveillance, Prevention, and Control of Hantaan Virus Infection in Laboratory Animal Colonies. (Reprint).
31	3	S	89	ILAR Principles and Guidelines for The Use of Animals in Precollege Education. ILAR Council.
31	3	S	89	UKCCCR Guidelines for the Welfare of Animals in Experimental Neoplasia. P. Workman et al. Commentary by P. Tomasovic and K. Gray.
31	4	S	89	World Veterinary Association Policy Statement on Animal Welfare, Well-being, and Ethology. E. Mayer, Chairman.

COMMENTARY

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**Animals as Beneficiaries of Biomedical Research
Originally Intended for Humans. F. Loew.**

PERSPECTIVES ON ANIMAL USE

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31	1	W	89	Refinement of Monoclonal Antibody Production and Animal Well-being. M. McGill & A. Rowan. Commentary by K. Kenny.
31	2	Sp	89	Environmental Enrichment for Laboratory Animals. B. Beaver. Commentaries by E. Segal and J. Spinelli.
31	2	Sp	89	Attitudes Toward Animal Research. G. Gallup & J. Beckstead. Commentary by J. Tannenbaum.
31	3	S	89	Psychological Well-being of Primates in Captivity. J. Mench & R. Stricklin.
31	4	F	89	Biological Effects of Blood Loss: Implications for Sampling Volumes. M. McGill & A. Rowan. Commentary by H. R. Adams.