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ARGONNE NATIONAL LABORATORY

Laboratory Animal Science

A Review of the Literature

January

February

March

1966

LABORATORY ANIMAL
INFORMATION CENTER

Biological and Medical
Research Division

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ANL-7300, 1st Edition
Biology and Medicine
(TID-4500)
AEC Research and
Development Report

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue
Argonne, Illinois 60439

COST PRICES

H.C. \$ 3.00, MN .50

LABORATORY ANIMAL SCIENCE
A Review of the Literature for January,
February, and March 1966

Abstracts 1-123

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June 1966

Operated by The University of Chicago
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Contract W-31-109-eng-38
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INTRODUCTION

This publication provides a concise summary of information about laboratory animal medicine and technology appearing in the current literature. While several abstracting journals are available that, together, present information on this subject, none is directed specifically at laboratory animal management, technology or medicine. The increase in interest in laboratory animal medicine throughout the world and the recent, rapid developments in this field have created a need for a current and comprehensive review such as this. Laboratory animals are the basis of most academically, industrially and federally-supported biomedical research programs. Nowhere is the demand for superior laboratory animal management more acute than it is in radiobiology. The insults to which irradiated animals are exposed and the degree of "control" that is necessary to provide reliable results, at times in the presence of nearly complete loss of immune response to even the most casual infections, often makes good animal management the difference between the success or failure of radiobiologic research programs.

For over 20 years, the Argonne National Laboratory has had sophisticated programs of animal management and research in laboratory animal medicine. Such programs demand a continuous awareness of the current developments in the field. Consequently, while developing these programs, Argonne's animal scientists have been reviewing the world literature seeking the latest information on the production and care of the various laboratory species, new uses for the usual species, and the development of new techniques and equipment.

The Laboratory's scientists have always made the fruits of their efforts available to all who might benefit from them by answering technical inquiries and requests for lists of literature citations, and through the publication of literature reviews and knowledge developed from their research. This publication is a continuation of this policy and is aimed at improving the dissemination of the available information on laboratory animal medicine to all institutions performing AEC-sponsored work and to all others who find such information of value.

To develop this report, 155 journals were reviewed. These included all periodicals, regardless of language, where articles on laboratory animal science are published. During the period of this report, 272 issues were received. They contained approximately 4,000 articles of which 123 are related to laboratory animal science. These 123 articles were abstracted, collated and indexed to form the basis of this publication. -- R. J. Flynn.

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JOURNALS AND ISSUES REVIEWED

<u>Journal</u>	<u>Vol.</u>	<u>Year</u>	<u>Number(s)</u>	<u>Issue(s)</u>
<i>Acta Endocrinology</i>	51	1966	1, 2, 3	Jan., Feb., March
<i>Aerospace Medicine</i>	37	1966	1, 2, 3	Jan., Feb., March
<i>American Journal of Clinical Pathology</i>	45	1966	1, 2, 3	Jan., Feb., March
<i>American Journal of Medicine</i>	40	1966	1, 2, 3	Jan., Feb., March
<i>American Journal of the Medical Sciences</i>	251	1966	1, 2, 3	Jan., Feb., March
<i>American Journal of Pathology</i>	48	1966	1, 2, 3	Jan., Feb., March
<i>American Journal of Physiology</i>	210	1966	1, 2, 3	Jan., Feb., March
<i>American Journal of Veterinary Research</i>	27	1966	116, 117	Jan., March
<i>American Midland Naturalist</i>	75	1966	1	Jan.
<i>American Naturalist</i>	100	1966	910	Jan./Feb.
<i>American Zoologist</i>	6	1966	1	Feb.
<i>Annales de l'Institut Pasteur</i>	110	1966	1, 2	Jan., Feb.
<i>Annals of Internal Medicine</i>	64	1966	1, 2, 3	Jan., Feb., March
<i>Annals of Surgery</i>	163	1966	1, 2, 3	Jan., Feb., March
<i>Applied Microbiology</i>	14	1966	1, 2	Jan., March
<i>Archives of Environmental Health</i>	12	1966	1, 2, 3	Jan., Feb., March
<i>Archives of Internal Medicine</i>	117	1966	1, 2, 3	Jan., Feb., March
<i>Archives of Pathology</i>	81	1966	1, 2, 3	Jan., Feb., March
<i>Archives of Surgery</i>	92	1966	1, 2, 3	Jan., Feb., March
<i>Australian Journal of Experimental Biology and Medical Science</i>	44	1966	1	Feb.
<i>Behaviour</i>	26	1966	1/2	
<i>Biological Bulletin</i>	130	1966	1	Feb.
<i>Blood</i>	27	1966	1, 2, 3	Jan., Feb., March
<i>British Journal of Experimental Pathology</i>	47	1966	1	Feb.
<i>British Medical Journal</i>	1966	1966	5478, 5479, 5480, 5481, 5482 5483, 5484, 5485, 5486 5487, 5488	Jan. 1, 8, 15, 22, 29 Feb. 5, 12, 19, 26 March 5, 12
<i>British Veterinary Journal</i>	122	1966	1, 2	Jan., Feb.
<i>Bulletin of the Wildlife Disease Association</i>	2	1966	1	Jan.
<i>Canadian Journal of Comparative Medicine and Veterinary Science</i>	30	1966	1, 2	Jan., Feb.
<i>Canadian Journal of Microbiology</i>	12	1966	1	Feb.
<i>Canadian Journal of Physiology and Pharmacology</i>	44	1966	1, 2	Jan., March
<i>Canadian Journal of Zoology</i>	44	1966	1, 2	Jan., March
<i>Canadian Veterinary Journal</i>	7	1966	1, 2	Jan., Feb.
<i>Cancer</i>	19	1966	1, 2, 3	Jan., Feb., March
<i>Cancer Research</i>	26	1966	1, 2, 3	Jan., Feb. (2 parts), March (2 parts)
<i>Circulation</i>	33	1966	1, 2, 3	Jan., Feb., March
<i>Clinical and Experimental Immunology</i>	1	1966	1	Jan.
<i>Comptes Rendus des Seances de la Societe de Biologie et de ses Filiales</i>	159	1966	7, 8/9	
<i>Developmental Biology</i>	13	1966	1	Feb.

<u>Journal</u>	<u>Vol.</u>	<u>Year</u>	<u>Number(s)</u>	<u>Issue(s)</u>
<i>Ecology</i>	47	1966	1	Winter
<i>Endocrinology</i>	78	1966	1, 2, 3	Jan., Feb., March
<i>European Journal of Cancer</i>	2	1966	1	Feb.
<i>Experientia</i>	22	1966	1, 2	Jan., Feb.
<i>Experimental and Molecular Pathology</i>	5	1966	1	Feb.
<i>Experimental Parasitology</i>	18	1966	1	Feb.
<i>Federation Proceedings</i>	25	1966	1	Jan./Feb. (2 parts)
<i>Fertility and Sterility</i>	17	1966	1, 2	Jan./Feb., March/April
<i>Folia Primatologica</i>	4	1966	1, 2, 3	
<i>Gastroenterology</i>	50	1966	1, 2, 3	Jan., Feb., March
<i>General and Comparative Endocrinology</i>	6	1966	1	Feb.
<i>Genetical Research</i>	7	1966	1	Feb.
<i>Genetics</i>	53	1966	1, 2, 3	Jan., Feb., March
<i>Geriatrics</i>	21	1966	1, 2, 3	Jan., Feb., March
<i>Immunology</i>	10	1966	1, 2, 3	Jan., Feb., March
<i>International Journal of Cancer</i>	1	1966	1	Jan.
<i>International Journal of Radiation Biology</i>	10	1966	1, 2	
<i>Journal of the American Medical Association</i>	195	1966	1, 2, 3, 4, 5 6, 7, 8, 9 10, 11, 12, 13	Jan. 3, 10, 17, 24, 31 Feb. 7, 14, 21, 28 March 7, 14, 21, 28
<i>Journal of the American Veterinary Medical Association</i>	148	1966	1, 2, 3, 4 5, 6	Jan. 1, 15, Feb. 1, 15, March 1, 15
<i>Journal of Applied Physiology</i>	21	1966	1, 2	Jan., March
<i>Journal of Atherosclerosis Research</i>	6	1966	1	Jan./Feb.
<i>Journal of Bacteriology</i>	91	1966	1, 2, 3	Jan., Feb., March
<i>Journal of Comparative Pathology</i>	76	1966	1	Jan.
<i>Journal of Comparative and Physiological Psychology</i>	61	1966	1	Feb.
<i>Journal of the Experimental Analysis of Behavior</i>	9	1966	1, 2	Jan., March
<i>Journal of Experimental Medicine</i>	123	1966	1, 2, 3	Jan., Feb., March
<i>Journal of General Physiology</i>	49	1966	3, 4	Jan., March
<i>Journal of Gerontology</i>	21	1966	1	Jan.
<i>Journal of Heredity</i>	57	1966	1	Jan./Feb.
<i>Journal of Immunology</i>	96	1966	1, 2	Jan., Feb.
<i>Journal of Infectious Diseases</i>	116	1966	1	Feb.
<i>Journal of the Institute of Animal Technicians</i>	17	1966	1	March
<i>Journal of Investigative Dermatology</i>	46	1966	1, 2	Jan., Feb.
<i>Journal of Laboratory and Clinical Medicine</i>	67	1966	1, 2, 3	Jan., Feb., March
<i>Journal of Mammology</i>	47	1966	1	Feb.
<i>Journal of Morphology</i>	118	1966	1	Jan.
<i>Journal of the National Cancer Institute</i>	36	1966	1, 2, 3	Jan., Feb., March
<i>Journal of Neurophysiology</i>	29	1966	1, 2	Jan., March
<i>Journal of Nutrition</i>	88	1966	1, 2	Jan., Feb.
<i>Journal of Parasitology</i>	52	1966	1	Feb.
<i>Journal of Pharmacology and Experimental Therapeutics</i>	151	1966	1, 2, 3	Jan., Feb., March

<u>Journal</u>	<u>Vol.</u>	<u>Year</u>	<u>Number(s)</u>	<u>Issue(s)</u>
<i>Journal of the Royal Microscopical Society</i>	85	1966	1	
<i>Journal of Small Animal Practice</i>	7	1966	1	Jan.
<i>Journal of Zoology</i>	147	1966	4	Jan.
<i>Laboratory Animal Care</i>	16	1966	1	Feb.
<i>Laboratory Practice</i>	15	1966	1, 2	Jan., Feb.
<i>Lancet</i>	1966-I	1966	7427, 7428, 7429, 7430, 7431 7432, 7433, 7434, 7435 7436, 7437, 7438, 7439	Jan. 1, 8, 15, 22, 29 Feb. 5, 12, 19, 26 March 5, 12, 19, 26
<i>Life Sciences</i>	5	1966	1/2, 3/4	Jan., Feb.
<i>Medical and Biological Engineering</i>	4	1966	1	Jan.
<i>Metabolism, Clinical and Experimental</i>	15	1966	1, 2, 3	Jan., Feb., March
<i>Mutation Research</i>	3	1966	1	Feb.
<i>Mycologia</i>	58	1966	1	Jan./Feb.
<i>Nature</i>	209	1966	5018, 5019, 5020, 5021, 5022 5023, 5024, 5025, 5026 5027, 5028, 5029, 5030	Jan. 1, 8, 15, 22, 29 Feb. 5, 12, 19, 26 March 5, 12, 19, 26
<i>Parasitology</i>	56	1966	1	Feb.
<i>Pathologia Veterinaria</i>	3	1966	1, 2	Jan., March
<i>Physiological Zoology</i>	39	1966	1	Jan.
<i>Proceedings of the National Academy of Science of the United States of America</i>	55	1966	1, 2, 3	Jan., Feb., March
<i>Proceedings of the Society for Experimental Biology and Medicine</i>	121	1966	1, 2	Jan., Feb.
<i>Quarterly Journal of Experimental Physiology</i>	51	1966	1	Jan.
<i>Radiation Research</i>	27	1966	1, 2, 3	Jan., Feb., March
<i>Scandinavian Journal of Haematology</i>	3	1966	1	
<i>Science</i>	151	1966	3706, 3707, 3708, 3709 3710, 3711, 3712, 3713 3714, 3715, 3716, 3717	Jan. 7, 14, 21, 28 Feb. 4, 11, 18, 25 March 4, 11, 18, 25
<i>Surgery</i>	59	1966	1, 2, 3	Jan., Feb., March
<i>Toxicology and Applied Pharmacology</i>	8	1966	1, 2	Jan., March
<i>Transplantation</i>	4	1966	1, 2	Jan., March
<i>Veterinary Bulletin (The Commonwealth Bureau of Animal Health)</i>	36	1966	1, 2	Jan., Feb.
<i>Veterinary Medicine</i>	61	1966	1, 2, 3	Jan., Feb., March
<i>Veterinary Record</i>	78	1966	1, 2, 3, 4, 5 6, 7, 8, 9 10	Jan., 1, 8, 15, 22, 29 Feb. 5, 12, 19, 26 March 5
<i>Virology</i>	28	1966	1, 2, 3	Jan., Feb., March
<i>Zeitschrift für Zellforschung und mikroskopische Anatomie</i>	70	1966	1, 2 3	Jan. 14, 26 Feb. 8

CARE, MANAGEMENT; NUTRITION, ENVIRONMENT; FACILITIES, EQUIPMENT

1. McKelvie, D. H. (School of Veterinary Medicine, University of California, Davis, California 95616) and A. C. Andersen. 1966. *Production and care of laboratory beagles*. J. Inst. Animal Tech. 17: 25-33.

A system of operating a large-scale life-span study on beagles has been developed over several years of experience. The procedures described have proved to be both efficient and relatively economical when all factors are considered in the particular needs of the program. Climatic and other environmental factors, as well as specific experimental procedures, may necessitate alteration of some of the procedures. The basic methodology, however, has proved valuable in the production and maintenance of a long-term beagle colony. -- *Authors' summary*.

2. Vice, T. E. (Southwest Foundation for Research and Education, San Antonio, Texas), H. A. Britton, I. A. Ratner, and S. S. Kalter. 1966. *Care and raising of newborn baboons*. Lab. Animal Care 16: 12-22.

Twenty-one newborn baboons were successfully isolated from their mothers at birth and raised in a nursery. Two species of baboons were included in this study, *Papio papio* and *Papio cynocephalus*. Since 1958, 105 births occurred in all months of the year with a peaking in August, September, and October. Ten *P. papio* infants had a birth weight range of 539-737 g and a crown-rump length of 18-21 cm, while 11 *P. cynocephalus* infants had a birth weight range of 539-1077 g and crown-rump length of 19-25 cm. The 21 normal infants studied had a mean heart rate of 189 ± 31 beats per minute and a respiratory rate of 88 ± 27 per minute.

This study showed that the infant baboon has a higher caloric requirement than the standard 13 cal/30 cc Similac formula affords and that better results were obtained from a 26 cal/30 cc concentration of Similac. Analysis of baboon breast milk during the first 20 days following parturition showed a high butterfat content of 7.2-18.4%.

Better results were obtained when the incubator or environmental temperature or both were maintained between 88-92 F (31.1-33.3 C) than between 80-85 F (26.7-29.9 C). Rectal body temperature averaged 97.8 F (37.0 C) at this temperature whereas it averaged 95.1 F (35.5 C) when the environmental temperature was maintained at 80-85 F. -- *Authors' summary modified*.

3. Kahn, S. G. (Squibb Institute for Medical Research, New Brunswick, New Jersey 08903). 1966. *Small laboratory animal feeding technique*. Lab. Animal Care 16: 80-81.

A procedure is described in which semipurified diets are prepared in gel form, thus making them more acceptable to small animals. Recommendations are given for the handling, storage, and feeding of these diets. This type of preparation permits the accurate determination of food consumed by the experimental animals. -- *Author's summary modified*.

4. Waibel, P. E. (University of Minnesota, St. Paul, Minnesota), B. S. Rao, K. E. Dunkelgod, F. J. Siccardi, and B. S. Pomeroy. 1966. *A chemically defined liquid diet for the chick*. J. Nutr. 88: 131-136.

A chemically defined liquid diet has been developed which allowed 6.0 g gain/chick/day when fed *ad libitum* during the first week of life. It was fed at a concentration of 1 g solids/5 ml solution. Similar performance was achieved when the diet was fed in the solid form. The liquid diet produced sustained growth (8.9 g/day) for three weeks, and an earlier modification produced growth (11.8 g/day) for seven weeks. -- *Authors' summary*.

5. Friedman, L. (Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). 1966. *Nutritional status and biological response*. Federation Proc. 25: 137-144.

The author reviews several aspects of nutrition and emphasizes the importance of the basal diet in determining the response of an animal to an experimental treatment. He points out that the effect of fasting for different periods of time before taking measurements is not always considered in the experimental design. He also describes the effect of diet on body composition, protein metabolism, miscellaneous functions, disease (including cancer) and on the biological response to various toxic agents. --
R. J. Flynn.

6. Tamimie, H. S. (Galesburg State Research Hospital, Galesburg, Illinois 61401). 1966. *The effect of potassium permanganate on the daily water and feed consumption of rabbits (a pilot study)*. Vet. Med. 61: 48-50.

A pilot study was performed to determine the effects of adding potassium permanganate to the drinking water as a digestive disorder preventive. Four mature, nongravid New Zealand female rabbits were given drinking water containing 1 ppm of the drug for three weeks. A control group of four similar rabbits was given untreated water. The group given the treated water had an unexpected, marked increase in food consumption and a decrease in water intake. No defects were noted in the treated group, and there were no significant differences in weight between treated and untreated animals when the study was concluded. -- C. M. Poole.

7. Kibler, H. H. (University of Missouri, Columbia, Missouri 65202) and H. D. Johnson. 1966. *Temperature and longevity in male rats*. J. Gerontol. 21: 52-56.

Two groups of male Holtzman rats living at 28 C (thermoneutral temperature) and 34 C (this temperature caused 1.3 C rise in rectal temperature) were each subdivided into low and high body temperature groups at each of seven ages. A fifth group living at 28 C was fed an amount of diet restricted to that of the thermally stressed 34 C group.

The *ad libitum* fed groups in the 34 C room lived 59 days longer than the *ad libitum* group in the 28 C room. The restricted diet group (28 C) lived 138 days longer than the *ad libitum* fed group at the same environmental temperature. The 28 C restricted diet group lived 80 days longer than the 34 C group, which had the same average food intake. The 28 C subgroup with the lower rectal temperature did not live significantly longer than the 28 C subgroup with the higher rectal temperature. The 34 C subgroup with the lower rectal temperature at 85 days lived 101 days longer than the 34 C subgroup with the higher rectal temperature.

The results indicate that voluntary restriction of food intake and ability to maintain a low body temperature in a hot environment when young tended to lengthen the life-span of male rats. Free access to food, however, in a thermoneutral environment (28 C) tended to shorten life-span. Voluntary reduction in food consumption by thermally stressed rats living in a 34 C room increased their life-span more than the heat stress shortened it. However, the amount of increase in rectal temperature of the thermally stressed rats at 85 days of age was an index of decreased longevity. -- *Authors' summary modified.*

8. Forsyth, I. A. (National Institute for Research in Dairying, Shinfield, Reading, England), P. N. O'Donoghue, and S. C. Watson. 1966. *Caging of pigeons for experimental use.* J. Inst. Animal Tech. 17: 22-24.

Consideration was given to economy in capital cost and maintenance, a need for 30 to 60 birds, the desirability of standard conditions and limited floor space. It was found that these were best satisfied by caging the birds individually in a modified galvanized steel, chicken battery. The modified battery consists of four tiers, each divided into 18 individual units 15 x 15 x 12 in. Each unit has a separate food hopper but one watering device is shared by two birds. -- *C. M. Poole.*

GENETICS; SPECIAL STRAINS; SPECIFIC INHERITED CHARACTERISTICS

9. Green, E. L. (The Jackson Laboratory, Bar Harbor, Maine 04609). 1966. *The Jackson Laboratory: a center for mammalian genetics in the United States*. J. Heredity 57: 3-12.

The history and organization of The Jackson Laboratory and detailed descriptions of its current research, training, and production programs are given. The genetics of certain strains raised at the Laboratory are also discussed in detail, and much background information concerning them is provided. -- R. W. Camden.

10. Grüneberg, H. (University College, London, England). 1966. *The case for somatic crossing over in the mouse*. Genet. Res. 7: 58-75.

Many mutations are not noticed until long after they have arisen. However, the history of origin of dominants with regular manifestation and that of sex-linked genes is often well authenticated. As most of these reports show nothing out of the ordinary, little notice has been taken of a minority of mutations which have happened under rather odd circumstances. This is partly due to the fact that the mutant genes in question have subsequently behaved in a perfectly normal manner, and that individual instances are usually open to various interpretations between which a decision cannot be made after the event. However, a rather consistent pattern is beginning to emerge now that a series of such instances is available for scrutiny. A review is given of published accounts of mosaics in mice and other rodents, of mutations, and of certain unexplained events. The cumulative weight of evidence makes a strong case for the existence of somatic crossing over in the laboratory rodents. -- *Author's summary modified.*

11. Wood, J. D. (Defence Research Medical Laboratories, P. O. Box 62, Station K., Toronto, Ontario, Canada). 1966. *Development of a strain of rats with greater than normal susceptibility to oxygen poisoning*. Can. J. Physiol. Pharmacol. 44: 259-265.

Male and female rats of the Wistar strain were exposed to oxygen at high pressure (OHP) once per week for three weeks. Based on the incidence and severity of the convulsions observed, animals were selected which were considered the most susceptible and the most resistant to oxygen poisoning. The animals were mated and the offspring exposed to OHP. The rats from susceptible parents were more than normally susceptible to oxygen poisoning as gauged by time until onset of convulsions, incidence and severity of convulsions, and mortality. The animals from resistant parents were no more tolerant of OHP than were the randomly selected rats of the parent generation. Similar results were observed with a third generation of rats obtained by mating second generation susceptible and resistant animals respectively. -- *Author's summary.*

12. Dubois, E. L. (University of Southern California School of Medicine, Los Angeles, California 90033), E. Horowitz, H. B. Demopoulos, and R. Teplitz. 1966. *NZB/NZW mice as a model of systemic lupus erythematosus*. J. Am. Med. Assoc. 195: 285-289.

Studies are reported that confirm the spontaneous occurrence of systemic lupus erythematosus in a hybrid strain of mice. The signs and lesions produced closely resemble those observed in the analogous disease in man. It is suggested that investigations using this model may provide a better understanding of the etiology, pathogenesis, and treatment of the disease in man. -- R. J. Flynn.

SPECIES AND STRAIN CHARACTERISTICS: ANATOMIC, PHYSIOLOGIC

13. Ragan, H. A. (Pacific Northwest Laboratory, Battelle Memorial Institute, Richland, Washington 99352), V. G. Horstman, R. O. McClellan, and L. K. Bustad. 1966. *Application of miniature goats in ruminant research.* Am. J. Vet. Res. 27: 161-165.

The African miniature goat, because of its small size (mature weight about 24 kg) and tractable disposition, was investigated for use as a representative ruminant in metabolic studies. Certain anatomic and physiologic characteristics were determined and compared with those described for larger ruminants. In addition, a preliminary study, using radioiodine (^{131}I), was made to determine the efficacy of the use of the miniature goat in lactation studies. Adult females were given 0.15 μc of ^{131}I daily prior to parturition and until their offspring were three and one-half months old. The ^{131}I concentrations of thyroid glands, blood, and milk were determined and compared with those of dairy cattle and sheep. This preliminary study indicated that the African miniature goat may be useful in certain aspects of ruminant research. -- *Authors' summary modified.*

14. Kraehenbuhl, J. P. (Institut de Biochimie de l'Université de Lausanne, Lausanne, Switzerland), E. Gloor, and B. Blanc. 1966. *Morphologie comparée de la muqueuse intestinale de deux espèces animales aux possibilités d'absorption protéique néonatale différentes (Comparative morphology of the intestinal mucosa of two species and the possibility of differences in neonatal protein absorption).* Z. Zellforsch. Mikroskop. Anat. 70: 209-219.

The morphologic features of intestinal epithelium have been studied by light and electron microscopy in two species; in the rat, which is able to absorb proteins such as antibodies, and in the rabbit, which does not present any transfer upon oral administration of antibodies. The structure of intestinal absorptive cells of the fetus at term and of the newborn from the first day up to the 20th day of life showed a marked evolution. In the fetal cells the apical quarter of the space between the nucleus and the terminal web presents a well-developed smooth endoplasmic reticulum. This reticulum is progressively replaced from the first days of life by large numerous vacuoles which diminish in size and number from the tenth day until they disappear on the 20th day. At that time the cells appear as in the adult. This evolution, as well as other described structural features of the absorptive cells, is similar in the two species, despite functional differences in neonatal protein absorption. -- *Authors' summary.*

15. King, T. K. C. (The Queen's University of Belfast, Belfast, Northern Ireland). 1966. *Mechanical properties of the lungs in the rat.* J. Appl. Physiol. 21: 259-264.

A study of the mechanical properties of the lungs in specific-pathogen-free (SPF) rats and ordinary (non-SPF) rats has been carried out using anesthetized animals. Pulmonary compliance was measured under static conditions; the measured pulmonary resistance was that offered by the airway and tissues

during flow. In the SPF rats, the mean pulmonary compliance was 0.25 ml/cm H₂O (SD = 0.04) and the mean pulmonary resistance in tracheostomized animals was 0.14 cm H₂O/ml per sec (SD = 0.04). Upper airway resistance was estimated to be 53% of the total pulmonary flow resistance. For the purposes of comparison between the SPF and non-SPF groups, the animals were arbitrarily divided into two subgroups (young and old) using 12 months as the dividing line. Pulmonary resistance was compared in tracheostomized animals because upper airway resistance accounts for a large part of the total resistance and changes in resistance in the lower airways would not be easily detected if total resistances were compared. It was found that old non-SPF animals had significantly higher pulmonary resistances than the SPF as well as the young non-SPF rats. -- *Author's summary.*

16. Nakao, K. (Albert Einstein College of Medicine, New York, New York 10061), P. Mao, J. Ghidoni, and A. Angrist. 1966. *An electron microscopic study of the aging process in the rat heart valve.* J. Gerontol. 21: 72-85.

Electron microscopic examination of the heart valves of rats (aged ten days to three years) indicated a gradual increase in the number of unit collagen fibrils with age. In addition, the arrangements of these fibrils was more compact and parallel and there was a greater number and denser packing of fine fibrils in old than in young animals. The elastic fibers seemed to be composed of three subunits: (1) an amorphous, electron-light central core, (2) an intermediate zone of moderate electron density, and (3) an outermost sheath of fine fibrils. With increasing age the number of elastic fibers increased, the central core became narrow and the two outer layers thickened. Sections from old rats frequently contained aggregates and zones of fine filamentous structures in close relation to the fine fibrils. It was suggested that these morphological changes may be correlated with the gross thickening, elongation and distortions often observed in valves from senile organisms. -- *Authors' summary.*

17. Bentley, P. J. (Duke University, Durham, North Carolina 27706) and K. Schmidt-Neilsen. 1966. *Cutaneous water loss in reptiles.* Science 151: 1517-1519.

Cutaneous and respiratory evaporation were compared in five species of reptiles at 23 C. There seemed to be a clear correlation between water loss and aridity of the animal's habitat, total evaporation from the desert lizard *Sauromalus obesus* being about 5% of that from the crocodilian *Caiman sclerops*. Cutaneous evaporation was the major avenue of water loss in all animals examined. This is contrary to the common belief that reptilian skin is practically impermeable to water. -- *Authors' summary.*

18. Butler, H. (University of Saskatchewan, Saskatoon, Saskatchewan, Canada). 1966. *Observations on the menstrual cycle of the Grivet monkey (Cercopithecus aethiops aethiops) in the Sudan*. Folia Primatologica 4: 194-205.

The menstrual cycles of seven female Grivet monkeys (*Cercopithecus aethiops aethiops*) of unknown age were observed for over a year. During this period they were kept isolated in a roomy cage and inspected daily, for external signs of uterine bleeding. The menstrual flow was very obvious and lasted for three to four days. The animals observed had long and irregular menstrual cycles (24 to 149 days) and this was most probably due to the immaturity of the animals. There is no true sexual skin. Mid-cycle bleeding was observed once. Changes in vaginal cytology did not appear to be definite enough to enable ovulation to be detected. Two animals had polymenorrhea and menorrhagia associated with undiagnosed ovarian and uterine pathology. -- Author's summary modified.

19. Brower, J. E. (Syracuse University, Syracuse, New York 13210) and T. J. Cade. 1966. *Ecology and physiology of Napaeozapus insignis (Miller) and other woodland mice*. Ecology 47: 46-63.

The distribution and ecology of the woodland jumping mouse, *Napaeozapus insignis*, were studied in the light of its behavior in the field, and by comparison with other species of small rodents. Field work comprised habitat studies, behavioral studies of competition between species, and the effect of weather conditions on activity. Laboratory work involved studies of water consumption and loss, metabolism, thermoregulation, and a comparison of metabolic patterns of several rodent species. -- E. F. Staffeldt.

20. Narang, G. D. (University of Missouri, Columbia, Missouri 65202) and C. W. Turner. 1966. *Effect of advancing age on thyroid hormone secretion rate of female rats*. Proc. Soc. Exptl. Biol. Med. 121: 203-205.

The thyroid hormone secretion rate of 27 female rats was estimated at the ages of 25, 55, 85 and 115 days. A marked reduction (42.1%) occurs from weaning time until about four months of age. The reduction in rate at 55, 85 and 115 days of age was respectively 19.7, 9.8 and 20% from that of the previous month. -- Authors' summary modified.

21. Schmukler, M. (National Heart Institute, National Institutes of Health, Bethesda, Maryland 20014) and C. H. Barrows. 1966. *Age differences in lactic and malic dehydrogenases in the rat*. J. Gerontol. 21: 109-111.

Age changes in the activities of lactic dehydrogenase (LDH) and malic dehydrogenase (MDH) have been observed in the rotifer. The present study was an investigation of the effect of age on the activities of these enzymes in the rat. Activities were measured in liver, kidney, brain, skeletal muscle, and heart of four different age groups of female Wistar rats. Significant age-dependent increases associated with growth were observed in the MDH activities of liver and heart and in the LDH activity of heart. A senescent

decrement in LDH activity occurred in skeletal muscle. During early life, a significant age-dependent increase in the MDH-to-LDH ratio was observed in liver, whereas a decrease occurred in skeletal muscle. -- *Authors' summary modified.*

22. Williams, R. J. (Clayton Foundation Biochemical Institute, University of Texas, Austin, Texas 78712) and R. B. Pelton. 1966. *Individuality in nutrition: effects of vitamin A-deficient and other deficient diets on experimental animals.* Proc. Natl. Acad. Sci. U. S. 55: 126-134.

In a series of experiments it was determined that individual animals have highly distinctive nutritional needs. The implications of these findings for human nutrition are discussed. Group differences between animals of different strains appear substantial but usually less conspicuous than differences within each strain. The authors suggest that these interstrain differences may be expected to be paralleled by ethnic group differences in human populations. -- *R. J. Flynn.*

SPECIES AND STRAIN CHARACTERISTICS: CARDIOVASCULAR, HEMATOLOGIC

23. Maruffo, C. A. (Oregon Regional Primate Research Center, Beaverton, Oregon 97005) and M. R. Malinow. 1966. *Postnatal changes in the aorta of howler monkeys (Alouatta caraya)*. J. Gerontol. 21: 119-123.

The aortae in howler monkeys (*Alouatta caraya*) were weighed, and the regression equation relating aortic mass to body weight was calculated. Microscopic studies were performed in portions of the aortae which showed no gross atherosclerosis. It was observed that, with advancing age, there was an increase in thickness of the aortic wall accompanied by elastic changes and by a greater abundance of periodic acid Schiff-positive material. With few exceptions, microscopic lipids were found only in the intima of older monkeys. Not all constituents of the arterial wall changed progressively and in a parallel way throughout the life-span of the animal. -- *Authors' summary*.

24. Malinow, M. R. (Oregon Regional Primate Research Center, Beaverton, Oregon 97005). 1966. *An electrocardiographic study of Macaca mulatta*. Folia Primatologica 4: 51-65.

The electrocardiograms of 351 male and female nonmedicated *Macaca mulatta* were recorded, and values for normal parameters were established. There were no sexual differences and no changes related to the weight of the animals within the range studied. A shortening of the electrical systole with increased rates was demonstrated. High and peaked P waves in leads II, III, and VF were observed in one-third of the cases. Twenty-one animals showed changes in ventricular repolarization. Left or right bundle branch block was recorded in eight monkeys. In 25 cases, incomplete bundle branch block was probably present. Five monkeys exhibited ventricular premature contractions, leading on occasion to complex arrhythmias. -- *Author's summary modified*.

25. Malinow, M. R. (Oregon Regional Primate Research Center, Beaverton, Oregon 97005) and C. W. De Lannoy. 1966. *The electrocardiogram of Cynopithecus niger*. Folia Primatologica 4: 66-73.

Electrocardiograms obtained in 25 *Cynopithecus niger* are described and values for normal parameters are reported. Neither sex-related differences nor changes related to the weight of the animals were observed within the range studied. The occurrence of inverted or diphasic T waves in the precordial leads was usual. -- *Authors' summary modified*.

26. Michaelson, S. M. (School of Medicine and Dentistry, University of Rochester, Rochester, New York 14627), Kathleen Scheer, and Susanne Gilt. 1966. *The blood of the normal beagle*. J. Am. Vet. Med. Assoc. 148: 532-534.

Hematologic data were obtained from 114 male and female purebred beagles, six months to nine years of age; and serum chemistry determinations were made on 63. The hematologic values are comparable to those previously

reported. A statistically significant difference in percentage of lymphocytes and monocytes between males and females was noted, with the females having a higher lymphocyte and lower monocyte concentration. Among males there is no age regression for lymphocytes. For females, however, there is a negative correlation with age; as female dogs get older (up to three years), the lymphocyte concentration drops. The effect of age was also apparent in the packed cell volume and hemoglobin determinations.

The blood chemistry determinations showed no sex differences. Age differences were noted in the serum protein determinations and the transaminase levels when the six months to one year and the one-to-two-year age groups were compared. A difference in venous CO₂ content was also noted when the one- and three-year-old females were compared. -- C. M. Poole.

27. Moore, W., Jr. (Southeastern Radiological Health Laboratory, Public Health Service, Montgomery, Alabama). 1966. *Hemogram of the Chinese hamster*. Am. J. Vet. Res. 27: 608-610.

Blood was collected from 40 adult Chinese hamsters (*Cricetulus griseus*) via cardiac puncture. Complete hemograms were obtained using standard techniques. Mean values are given for erythrocytes, leukocytes, reticulocytes, hemoglobin, hematocrit, corpuscular volume, corpuscular hemoglobin and corpuscular hemoglobin concentration. An average differential leukocyte count is given, and the size range, morphologic and staining characteristics of the various cellular components are described. -- R. W. Camden.

28. Guthrie, D. R. (Virginia Polytechnic Institute, Blacksburg, Virginia 24060), H. S. Mosby, and J. C. Osborne. 1966. *Hematological values for the eastern gray squirrel* (*Sciurus carolinensis*). Can. J. Zool. 44: 323-327.

Hemoglobin concentration, hematocrit, erythrocyte diameter, and total and differential leukocyte counts were obtained from five male and seven female gray squirrels. Plasma glucose, corticosterone, and cholesterol concentrations were determined for the five males and for six of the females. The males showed significantly greater values for the hemoglobin and hematocrit. The average leukocyte count was lower than reported values for several other rodent species. Lymphocytes formed a greater percentage of the leukocytes than usually reported for rodent species. No sex-related differences were apparent with respect to the plasma concentration of glucose, corticosterone, and cholesterol. The gray squirrel appears to have a relatively high normal level of corticosterone and cholesterol. --

Authors' summary.

29. Garcia, F. G. (New England Regional Primate Research Center, Harvard Medical School, Boston, Massachusetts 02115) and R. D. Hunt. 1966. *The hemogram of the squirrel monkey* (*Saimiri sciureus*). Lab. Animal Care 16: 50-51.

Observations on the hematology of the laboratory squirrel monkey (*Saimiri sciureus*) are presented. The average values are: erythrocytes,

7,310,000/mm³; hemoglobin, 12.9 g %; hematocrit, 38.6%; mean cell volume, 53.1 μ^3 ; mean cell hemoglobin, 17.8 μg ; mean cell hemoglobin concentration, 33.6%; reticulocytes, 0.97/100 erythrocytes; sedimentation rate, 1.4 mm/hr; white blood cells, 10,400/mm³; differential leukocyte counts, neutrophils, 40.7%; band cells, 0.75%; lymphocytes, 48.6%; eosinophils, 6.2%; basophils, 0.2%; monocytes, 3.4%. -- *Authors' summary.*

30. Wiener, A. S. (New York University School of Medicine, New York, New York 10016), J. Moor-Jankowski, and E. B. Gordon. 1966. *Blood groups of apes and monkeys. VI. Further studies on the human blood group factors A, B, H, and Le in monkeys.* Folia Primatologica 4: 81-102.

Observations are described on the occurrence of A, B, H, and Lewis blood group substances among Old World monkeys of the species *Papio anubis*, *Papio cynocephalus*, *Mandrillus leucophaeus*, *Cynopithecus niger*, *Erythrocebus patas*, *Cercopithecus pygerythrus johnstoni*, *Macaca mulatta*, *Macaca irus*, *Macaca nemestrina*, *Macaca speciosa*, and New World monkeys of the species *Ateles marginatus*, *Ateles paniscus*, *Ateles fusciceps robustus*, *Ateles ater* (*Ateles paniscus chamek*), *Ateles cucullatus* (*Ateles geoffroyi grisescens*), *Cebus albifrons*, *Saimiri sciurea*, and various species of marmosets. The significance of the findings and their application in taxonomy are discussed. -- *Authors' summary.*

31. Jolly, C. J. (University College, London, England) and N. A. Barnicot. 1966. *Serum and red-cell protein variations of the Celebes black ape.* Folia Primatologica 4: 206-220.

Serum and red cell proteins in the Celebes black ape were determined by starch-gel electrophoresis. Variations in serum prealbumins, albumins, transferrins, haptoglobins and esterases are reported. Red cell hemolysates were analyzed for hemoglobin, carbonic anhydrase, and catalase. A high degree of variation was found among individuals. The results are compared with those for a number of species of the genera *Papio* and *Macaca*. -- D. V. Tolle.

32. Sealander, J. A. (Institute of Arctic Biology, University of Alaska, College, Alaska 99735). 1966. *Seasonal variations in hemoglobin and hematocrit values in the northern red-backed mouse, Clethrionomys rutilus dawsoni* (Merriam), in interior Alaska. Can. J. Zool. 44: 213-224.

Seasonal variations in hemoglobin and hematocrit values were determined in the northern red-backed mouse, *Clethrionomys rutilus dawsoni*, from July 1963 through August 1964 in the vicinity of College, Alaska. Hemoglobin concentrations and hematocrits did not show any significant seasonal variation. The relative constancy of the blood values was considered to be a reflection of the rather uniform thermal characteristics of the microenvironment inhabited by the mice. Mean corpuscular hemoglobin concentrations followed a cycle which varied inversely with the ambient macroenvironmental

temperature, while net body weights followed a seasonal cycle which was directly correlated with the ambient temperature of the macroenvironment. -- *Author's summary.*

33. Brodsky, I. (Hahnemann Medical College and Hospital, Philadelphia, Pennsylvania 19102), L. H. Dennis, S. B. Kahn, and L. W. Brady. 1966. *Normal mouse erythropoiesis. I. The role of the spleen in mouse erythropoiesis.* Cancer Res. 26: 198-201.

Erythropoiesis in normal Swiss Webster female mice was studied by routine hematologic parameters, ferrokinetics (^{59}Fe), the uptake into and release of ^{59}Fe from the spleen, and red blood cell survival (^{51}Cr). The data obtained indicate that, from the standpoint of erythropoiesis, the mouse spleen is analogous to bone marrow. Thus the spleen of the mouse can be used as an easily accessible and convenient experimental model for the study of erythropoiesis. -- *Authors' summary modified.*

SPECIES AND STRAIN CHARACTERISTICS: BEHAVIOR

34. Nováková, V. (Institute of Physiology, Czechoslovakian Academy of Sciences, Prague, Czechoslovakia). 1966. *Weaning of young rats: effect of time on behavior*. Science 151: 475-476.

Male rats were weaned on the 15th, 16th, 17th, 25th, and 30th day of postnatal life. The rate of elaboration of the conditioned reflex at eight months of age and the stability of the memory trace at 12 months were studied. Compared with rats weaned at 30 days of age, those weaned on day 15 elaborated the conditioned reflex much more slowly and the memory trace was less firm. Rats weaned on days 16 and 17 elaborated the conditioned reflex more quickly than rats weaned on day 15 but more slowly than those weaned on day 30. In all groups the memory trace showed the same stability and was significantly firmer than in rats weaned on day 15. The higher nervous activity of rats weaned at the age of 25 days more nearly resembles that of rats weaned at 15 days than of those weaned later. -- *Author's summary*.

35. Wiepkema, P. R. (Zoological Laboratory, University of Groningen, The Netherlands), L. De Ruiter, and J. Reddingius. 1966. *Circadian rhythms in the feeding behaviour of CBA mice*. Nature 209: 935-936.

Many vital processes have marked diurnal rhythms in natural circumstances; and in the laboratory, even under the most constant conditions possible, they still show cycles with a period approximating 24 hr ("circadian rhythms"). In this study, CBA mice, kept for two generations under continuous light and constant temperature (in individual cages where they could hear but not see one another) retained a marked circadian rhythm in their feeding behavior. Although there was some indication of interindividual synchronization, the peak periods of different individuals on the same day were often far apart. Since it appears virtually impossible to eradicate these circadian rhythms the authors suggest the keeping of research animals under conditions where at least the cycles of the different individuals are synchronized, that is, where there is a "natural" alternation of darkness and light. -- *R. J. Flynn*.

36. Campbell, B. A. (Princeton University, Princeton, New Jersey 08540), F. Smith, J. R. Misanin, and J. Jaynes. 1966. *Species differences in activity during hunger and thirst*. J. Comp. Physiol. Psychol. 61: 123-127.

Activity of satiated, food-deprived, and water-deprived chicks, guinea pigs, hamsters, and rabbits was compared using stabilimeter-type cages and running wheels. Each species showed consistent activity patterns for each deprivation condition, but these patterns were very different and sometimes opposite in different species and activity devices. -- *Authors' summary*.

37. Sorenson, M. W. (University of Missouri, Columbia, Missouri 65202) and C. H. Conaway. 1966. *Observations on the social behavior of tree shrews in captivity*. Folia Primatologica 4: 124-145.

The social behavior of five species of tree shrews in captivity was described and analyzed. Although each species displayed a linear dominance hierarchy, the degree of sociality varied among the species. The social structure of *Tupaia longipes* was strengthened by the formation of female-female consorts. Grooming frequently occurred, but it was rarely reciprocal. There was no evidence of permanent territoriality. Play and displacement activities were noted among young and adult animals. Apparently, certain play patterns of the young were essential in the establishment of dominance hierarchies and reproductive abilities. Imprinting occurred during the first weeks of hand-rearing and probably influenced play, agonistic, and reproductive behavior. -- *Authors' summary*.

38. Bernstein, I. S. (Yerkes Regional Primate Research Center, Emory University, Orange Park, Florida 32073) and L. G. Sharpe. 1966. *Social roles in a rhesus monkey group*. Behaviour 26: 91-104.

A group of 11 rhesus monkeys selected to approximate a small natural group were allowed to establish a social organization and to live with minimal disturbance in a specially designed compound. Observations were made on a variety of social and individual activities with some manipulation of feeding used to get at specific behavior patterns. Quantitative data on the frequency of activities for each member of the group were obtained. Individual animals were found to fall into subgroup classification in terms of activity patterns observed. This role differentiation was consistent despite minor modifications observed in some individuals. The subgroups corresponded in general to morphologic divisions of size and sex, but status also contributed to the differentiation of roles. The role of the dominant male was analyzed in detail and found to supercede that of simple preempting of incentives. Less elaborate analyses were made for other clearly differentiated roles in the group. -- *Authors' summary modified*.

39. Seay, B. (Wisconsin Regional Primate Center, The University of Wisconsin, Madison, Wisconsin 53706). 1966. *Maternal behavior in primiparous and multiparous rhesus monkeys*. Folia Primatologica 4: 146-168.

Two groups of four feral rhesus monkey mothers and their infants were observed for six months. Primiparous and multiparous mothers were strikingly similar in most measures of positive maternal behavior as were their infants in the basic infant-mother categories.

The peer-directed social behavior of the infants of the primiparous and multiparous mothers of the present experiment and of four surrogate-raised infants was considered with particular emphasis being given to the development of sex differences and sexual behavior. The similarity in the social behavior of surrogate- and mother-reared infants was attributed to multiple compensating bases for the development of social behavior in the rhesus monkey. -- *Author's summary*.

REPRODUCTION; PRODUCTION; SPECIFIC-PATHOGEN-FREE; GERMFREE

40. Lipscombe, C. (Laboratory Animals Centre, Carshalton, Surrey, England), J. Bleby, and G. Porter. 1966. *The effect of three methods of mating on reproduction in mice*. J. Inst. Animal Tech. 17: 1-5.

Noninbred mice were mated using monogamous pairs (one male and one female), trios (one male and two females), and polygamous groups (one male and three females). All were housed in metal cages which excluded practically all light. The average number of young produced per breeding female was highest with the monogamous matings and lowest in the polygamous groups. The average preweaning losses per female were in the opposite order with monogamous groups being lowest. Production per breeding cage, however, was highest in the polygamous groups and lowest in the monogamous matings. The average weaning weight of the young was practically identical in all groups so the total weight of young weaned per cage was related to the number weaned. The number of parities during the period involved was four for monogamous matings, three for trios, and two for polygamous groups. The low percentage of fertile matings at postpartum estrus was attributed in part to insufficient light in the cages. Reference is also made to the labor involved and the uncertainty of the age of the young in trios and polygamous groups. -- R. W. Camden.

41. Porter, G. (Laboratory Animals Centre, Carshalton, Surrey, England) and J. Bleby. 1966. *The effects of age at mating on reproduction in mice*. J. Inst. Animal Tech. 17: 16-19.

The effects of mating mice at five different ages, i.e., at weaning, 42, 84, 126, and 168 days old, on reproduction is discussed. The reproductive performance of mice mated at weaning and at 42 days was practically identical. Mating mice at weaning appeared to have a slightly adverse effect on the mothering ability of the females. Evidence suggests that the number of viable young produced is higher when the mice are mated at 42 days old than when mated at weaning. It is also shown that there is a high proportion of infertile matings and abortions and a low number of parities in mice mated at 84 days old and upwards. -- *Authors' summary modified.*

42. Plank, S. J. (Harvard School of Public Health, Boston, Massachusetts 02115) and R. Irwin. 1966. *Infertility of guinea pigs on sawdust bedding*. Lab. Animal Care 16: 9-11.

Two guinea pig breeding experiments were conducted using softwood sawdust and white pine shavings. Polygamous matings were used. It was found that there were significantly fewer conceptions when the animals were on sawdust bedding as compared to shavings. The exact mechanism of the fertility impairment was not established, but the authors suggest that sawdust particles adhering to the genital mucosa may have interfered with copulation. -- R. W. Camden.

43. Reading, A. J. (School of Hygiene and Public Health, the Johns Hopkins University, Baltimore, Maryland 21205). 1966. *Effects of parity and litter size on the birth weight of inbred mice*. J. Mammal. 47: 111-114.

Fifty-four litters of C57BL/6 mice born to mothers of various parities were weighed within 15 hr of birth, the litter sizes recorded and the mean weight per individual calculated. Regression curves of birth weight on litter size were drawn separately for infants born to primiparous and to multiparous mothers. The birth weights of the infants were found to be related to both the parity of their mothers and the size of their litters. Individuals born to mothers that had previously experienced parturition weighed significantly more at birth than those born to previously nulliparous mothers. Independently of maternal parity, individuals from smaller litters weighed significantly more at birth than those from larger litters. -- *Author's summary*.

44. Newton, N. (University Medical Center, Jackson, Mississippi 39216). 1966. *Parturient mice: effect of environment on labor*. Science 151: 1220-1221.

More first-born pups and greater numbers of pups were born in a familiar cage having a covered nesting box than in a glass bowl, when pregnant mice at term were alternated between contrasting environments. Current theories emphasize the influence on labor of mechanical and hormonal factors; these data suggest that environmental factors also may play a role. -- *Author's summary*.

45. Roth, Lorraine L. (Institute of Animal Behavior, Rutgers University, Newark, New Jersey 07102) and J. S. Rosenblatt. 1966. *Mammary glands of pregnant rats: development stimulated by licking*. Science 151: 1403-1404.

At the end of gestation, the mammary glands of pregnant rats that have been prevented from licking their ventral surfaces by neck collars are 50% less developed than those of control animals. Neither the burden nor the stress effect of the collar is an alternative explanation. A considerable proportion of mammary development during pregnancy is thus caused by the female's own licking. -- *Authors' summary*.

46. Casteel, D. A. (Illinois Natural History Survey, Urbana, Illinois 61803). 1966. *Nest building, parturition, and copulation in the cottontail rabbit*. Am. Midland Naturalist 75: 160-167.

Observations of individually marked cottontail rabbits (*Sylvilagus floridanus mearnsii*) confined in a large enclosure revealed three phases of nest-building activity: excavation, lining with vegetation, and lining with fur. No apparent correlation existed between nest size and litter size in 12 nests. Parturition is described for the first time. Hair from all parts of the body except the abdomen was used to line nests. The postparturient

female was serviced by an attendant male soon after leaving the nest; successful copulation chases lasting ten seconds to seven minutes were observed. Browsing is thought to be a displacement activity tending to reduce intra-specific strife. A relationship is suggested between nest building and the summer-to-winter molt. -- *Author's summary.*

47. Fletcher, W. S. (University of Oregon Medical School, Portland, Oregon 97201), A. L. Rogers, and L. F. Erickson. 1966. *The need for a large, standard laboratory dog.* Lab. Animal Care 16: 1-8.

The need for a large, standard laboratory dog for studies such as transplantation and open heart surgery is increasingly apparent. The "ideal" large laboratory dog should have the following characteristics: 1) genetic uniformity; 2) large litters; 3) early maturity; 4) stress resistance; 5) size, 50-70 pounds; 6) easy keeping; 7) gentleness; 8) trainability; 9) short hair; 10) short or curly tail; 11) quietness; 12) cage tolerance.

Previous work indicates that the Labrador retriever meets most of these specifications. This report describes an attempt to produce a standardized strain of Labrador retriever by inbreeding and selectively crossbreeding. Results to date, problems, and progress are discussed. -- *Authors' summary modified.*

48. Bindon, B. M. (Division of Animal Physiology, The Cunningham Laboratory, St. Lucia, Queensland, Australia) and D. R. Lamond. 1966. *Description of a mouse colony used for research in reproductive physiology.* J. Inst. Animal Tech. 17: 6-15.

A description of a mouse colony used for studies for reproduction is given. The colony is managed with the aim of reducing variation in certain reproductive characteristics. The fertility, gestation period, littering patterns, litter size, growth rate, puberty and length of the estrous cycle observed in this colony are described. -- *Authors' summary modified.*

49. Grotta, L. J. (University of Utah, Salt Lake City, Utah 84112), H. Denenberg, and M. X. Zarrow. 1966. *Normal versus caesarian delivery: effects upon survival probability, weaning weight, and open-field activity.* J. Comp. Physiol. Psychol. 61: 159-160.

Naturally born rats (N = 120) were compared with caesarean-delivered rats (N = 108) to test the hypothesis that the stimulation received during the normal birth process is of some functional significance. Some of the mothers used in the study had been handled in infancy and some had not. The percentage of offspring surviving through weaning, weaning weight, and open-field activity at weaning were evaluated. No significant difference was found between normally delivered and caesarean-delivered offspring. -- *Authors' summary.*

50. Fauve, R. M. (Institut Pasteur, Annexe de Garches, S.-et-O., France) and A. Delaunay. 1966. *Établissement d'une colonie pilote de souris N.C.S. (Establishment of a pilot colony of N.C.S. mice)*. Ann. Inst. Pasteur 110: 283-290.

The establishment and maintenance of a specific-pathogen-free colony of N.C.S. mice are described. In comparison with conventional mice, these animals are more resistant to irradiations, corticosteroids and endotoxin injections. Their resistance to bacterial infection is decreased. The value of these mice in experiments concerning latent infections and tissue culture is emphasized. -- *Authors' summary modified.*

51. Rohovsky, M. W. (The Ohio State University, Columbus, Ohio 43210), R. A. Griesemer, and L. G. Wolfe. 1966. *The germfree cat*. Lab. Animal Care 16: 52-59.

The techniques for raising germfree animals were successfully adapted to cats. Two hundred and fifty six cats including 217 germfree and 39 conventional littermate controls from 61 litters were studied. Two nutritional diseases which occurred only in germfree cats were prevented by adding vitamins and amino acids to the diet. Cats were maintained under germfree conditions up to 245 days. Histological variations in germfree cats included medial hypertrophy of the pulmonary arteries, a high lipid content in the renal tubules, and the presence of large numbers of peribronchial glands. -- *Authors' summary.*

52. Waxler, G. L. (College of Veterinary Medicine, Michigan State University, East Lansing, Michigan 48223), D. A. Schmidt, and C. K. Whitehair. 1966. *Technique for rearing gnotobiotic pigs*. Am. J. Vet. Res. 27: 300-307.

Techniques, equipment and diets for obtaining and rearing gnotobiotic pigs are described. The pigs were delivered by both hysterectomy and hysterotomy using either CO₂, chloroform or epidural anesthesia. They were fed a diet of autoclaved cows' milk supplemented with vitamins and minerals. Flexible film plastic isolators were used for surgical and rearing units. The pigs were raised to an age of 17 to 52 days in the presence of not more than two isolates of bacteria. In some cases they were bacteria-free. The highest percentage of live pigs was obtained by the combination of hysterotomy and epidural anesthesia. The authors emphasize the importance of obtaining the pigs near term and suggest the possible use of progesterone-like compounds to delay parturition. -- *R. W. Camden.*

INFECTIOUS DISEASES: VIRAL

53. Schneider, H. A. (Institute for Biomedical Research, American Medical Association, Chicago, Illinois 60610) and G. R. Collins. 1966. *Successful prevention of infantile diarrhea of mice during an epizootic by means of a new filter cage unopened from birth to weaning*. Lab. Animal Care 16: 60-71.

An epizootic of infantile diarrhea in a colony of mice afforded an opportunity to test the efficacy of a new, autoclavable, transparent, filter cage. After a pregnant mouse, near term, was admitted to the new cage the cover seal of fiberglass was not removed until the litter was weaned. Ninety pregnant females from the afflicted breeding colony were individually and serially assigned to three caging treatments of 30 each: (1) the closed, autoclaved filter cage; (2) the identical autoclaved cage minus filter blanket; and (3) a conventional, open-top cage. The mice were observed daily until weaning. The experiment took place in a breeding room housing 3000 mice experiencing the epizootic. No diarrhea whatever was detected in the unopened filter cages nor did any of the weaned mice (98% of the number born) in this group show signs of obstipation. In marked contrast, diarrhea ran rampant in the open cages, with litter attack rates of 44% in the new-cage-minus-filter groups, and 76% in the conventional-cage group. Mortality events in the litters in the open cages were successfully analyzed by use of statistics based on expansion of the negative binomial $(q-p)^{-k}$. --
Authors' summary modified.

54. Dmochowski, L. (The University of Texas M. D. Anderson Hospital and Tumor Institute, Houston, Texas 70725), L. Recher, T. Tanaka, T. Yumoto, J. A. Sykes, and L. Young. 1966. *Studies on the biologic relationship of some murine leukemia viruses*. Cancer Res. 26: 382-391.

Moloney and Passage A virus induced lymphatic leukemia in BALB/c and in AKR strain mice. Friend virus and Rauscher virus induced a high incidence of erythroid leukemia in mice of the same strains. Uninoculated BALB/c mice had a 0.1% incidence of spontaneous leukemia, and AKR mice an 83% incidence.

Glomerulonephritis was observed in AKR mice with advanced leukemia (but not in BALB/c mice) following inoculation of Friend or Rauscher virus. Differences in leukemia-inducing activity in BALB/c mice were noted between Passage A and Moloney virus and between Friend and Rauscher virus in BALB/c and AKR mice. Moloney, Friend, and Rauscher virus, after one passage in AKR mice, showed apparent decrease of leukemia-inducing activity in BALB/c mice.

Inoculation of BALB/c mice with Moloney virus, followed 24 hr later by Passage A virus, resulted in a lower incidence and a shorter latent period of lymphatic leukemia compared with leukemia induced by Moloney virus alone. BALB/c mice inoculated with Moloney virus, and 24 hr later with Rauscher virus, showed a lower incidence of Rauscher leukemia and a shorter latent period compared with mice inoculated with Rauscher virus alone. While only one animal developed Rauscher leukemia, 50% of the mice developed lymphatic leukemia.

Inoculation of BALB/c mice with Moloney virus followed by Friend virus induced Friend leukemia except in one animal which developed lymphatic leukemia. The incidence of Friend leukemia was lower than that induced with

Friend virus alone. Inoculation of BALB/c mice with Passage A virus, followed by Friend virus, induced a lower incidence of Friend leukemia than Friend virus alone. BALB/c mice inoculated with Passage A, followed by Rauscher virus, showed a similar incidence of Rauscher leukemia to that of mice inoculated with Rauscher virus alone.

The latent period of erythroid leukemia in BALB/c mice inoculated with Friend virus followed by Rauscher virus was shorter than that of similar leukemia induced by either virus. -- *Authors' summary.*

55. Lilly, F. (Sloan-Kettering Institute for Cancer Research, Cornell Graduate School of Medical Sciences, New York, New York 10021). 1966. *The inheritance of susceptibility to the Gross leukemia virus in mice.* Genetics 53: 529-539.

Susceptibility to the Gross leukemia virus in mice was studied in crosses of virus-resistant and virus-susceptible inbred strains. Two independent loci appear to determine virus susceptibility; one of these (Rgv-1) is closely linked to H-2 in the ninth linkage group, while the other (Rgv-2) segregates independently. -- *Author's summary.*

56. Finkel, Miriam P. (Experimental Radiation Pathology, Argonne National Laboratory, Argonne, Illinois 60439), Birute O. Biskis, and Patricia B. Jenkins. 1966. *Virus induction of osteosarcomas in mice.* Science 151: 698-701.

A virus extracted from an osteosarcoma of a mouse produces similar tumors when injected into newborn mice. The original tumor appeared spontaneously in an untreated CFl male. The time between inoculation with virus and detection of bone sarcoma has been as short as 23 days. -- *Authors' summary.*

57. Burch, G. E. (Tulane Medical School, New Orleans, Louisiana 70112), N. P. DePasquale, S. C. Sun, W. J. Mogabgab, and A. R. Hale. 1966. *Endocarditis in mice infected with Coxsackie virus B₄.* Science 151: 447-448.

Endocarditis is not generally regarded as a sequel or complication of viral infection in man or animals. In this study, 36 mice 12-20 days old were inoculated intraperitoneally with Coxsackie virus B₄. Histologic evidence of valvular endocarditis was found in 55% and mural endocarditis in 50% of the animals. The various valves and chambers implicated and the microscopic features of the lesions are given. Viral antigen was identified in the lesions by immunofluorescence. The authors point out that this virus also infects man and has a predilection for the heart. They suggest that it may be important to determine whether the group B Coxsackie viruses produce lesions in man similar to those they described in mice. -- *T. E. Fritz.*

58. Pollard, M. (Lobund Laboratory, University of Notre Dame, Notre Dame, Indiana 46556) and M. Kajima. 1966. *Leukemia in germfree rats*. Proc. Soc. Exptl. Biol. Med. 121: 585-589.

Since spontaneous leukemia occurs infrequently in rats and attempts to induce it by chemical and physical agents have had little success, three strains of germfree rats (Wistar, Fischer, and Sprague-Dawley) were studied to determine their leukemogenic potential. The methods used were those that have been successful in similar studies on mice. Electron microscopy of thymus, spleen and lymph nodes failed to reveal any definite evidence of virus-like particles, and four weekly doses of 400 R of total body X-irradiation failed to induce leukemia in any of the weaning rats. However, newborn germfree Sprague-Dawley rats inoculated with the Gross rat-adapted Passage A leukemia virus were found to be as susceptible to the virus as conventional rats, and virus-like particles were demonstrated in thymoma cells in the virus injected rats. They were indistinguishable from similarly-located particles in (a) the thymus glands of disease-free germfree mice, (b) in tissues from germfree mice with radiation-induced leukemia, and (c) in germfree mice which had been inoculated with Gross Passage A leukemia virus. -- T. E. Fritz.

59. Brailovsky, C. (Institut de Recherches Scientifiques sur le Cancer, Villejuif, France). 1966. *Recherches sur le virus K du rat (Parvovirus ratti)*. I. *Une méthode de titrage par plages et son application à l'étude du cycle de multiplication du virus*. (Research on the rat K virus [Parvovirus ratti]. I. A method of plaque titration and its application to the study of the multiplication of the virus.) Ann. Inst. Pasteur 110: 49-59.

A technique was devised for counting infectious particles of rat K virus (*Parvovirus ratti*) by the plaque method using rat embryonic fibroblasts. The plaques are counted on the fifth day after virus inoculation. This procedure permits very precise determination of the remarkable resistance of the virus to ultrasonic and thermic inactivation and, during a single cycle, the length of the eclipse period (six hours) and the end point of multiplication (24 hr). -- Author's summary.

60. Hunt, R. D. (New England Regional Primate Research Center, Harvard Medical School, Boston, Massachusetts 02115) and L. V. Melendez. 1966. *Spontaneous herpes-T infection in the owl monkey (Aotus trivirgatus)*. Pathol. Vet. 3: 1-26.

Herpes-T virus, a recently described agent which produces a systemic, fatal infection in marmosets, a group of New World primates, has been isolated from the white-lipped tamarin (*Tamarinus nigricollis*) and the cotton-topped marmoset (*Oedipomidas oedipus*). It has been shown that it can exist as a latent infection in the squirrel monkey (*Saimiri sciureus*). The gross and microscopic pathology in six owl monkeys which died in a spontaneous outbreak of herpes-T infection is described. The lesions were similar to those occurring with herpes infections in other animal species and included focal necrosis of the skin, buccal mucosa, esophagus, intestine, nasal mucosa,

larynx, trachea, lung, liver, spleen, lymph nodes, adrenal and bone marrow. Inclusion bodies, typical of herpes infection, were present in mesenchymal and epithelial cells. A virus isolated from five of the six monkeys was identified by in vitro serum neutralization as herpes-T. -- T. E. Fritz.

61. Potkay, S. (National Institutes of Health, Bethesda, Maryland 20014), J. R. Ganaway, Nancy G. Rogers, and R. Kinard. 1966. *An epizootic of measles in a colony of rhesus monkeys*. Am. J. Vet. Res. 27: 331-334.

A naturally occurring epizootic of measles infection in rhesus monkeys (*Macaca mulatta*) is described. The clinical signs, maculopapular skin rash, conjunctivitis, facial edema and erythema are like those reported with experimentally induced measles in monkeys. Koplik spots were not observed. Diagnosis was confirmed by serologic findings in paired serum samples from sick and convalescent monkeys. The interfering effects of a measles epizootic on tuberculin testing programs are discussed. It is suggested that tuberculin testing be postponed until monkeys are recovered from measles. -- Authors' summary modified.

62. Wolf, K. E. (Eastern Fish Disease Laboratory, Leetown, Kearneysville, West Virginia 25430), M. Gravell, and R. G. Malsberger. 1966. *Lymphocystis virus: isolation and propagation in centrarchid fish cell lines*. Science 151: 1004-1005.

A virus from fish with lymphocystis disease was isolated in fish cell cultures. Eleven serial transfers were made and the pathognomonic lymphocystis cells were produced in vitro in each transfer. Fish inoculated with sixth and ninth passage material developed the disease, and virus was reisolated from them. -- Authors' summary.

INFECTIOUS DISEASES: BACTERIAL, MYCOTIC

63. Gollender, M. (Indiana University, Bloomington, Indiana 47005). 1966. *A treatment for chronic respiratory disease (snuffles) in the rat.* J. Exptl. Anal. Behavior 9: 40.

Chloramphenicol (0.1 cc/100 g of body weight of a 25% solution given intramuscularly every 6-8 hr for 2-3 days) controlled chronic respiratory disease in rats. Large doses of penicillin and oxytetracycline were without effect. -- P. C. Brennan.

64. Muraschi, Thelma F. (Division of Laboratories and Research, New York State Department of Health, Albany, New York), J. K. Miller, V. N. Tompkins, and Dorothy M. Bolles. 1966. *β -Hemolytic gram-negative hemophilic bacillus isolated from the genitalia of rabbits.* J. Bacteriol. 91: 356-366.

An unidentified β -hemolytic gram-negative hemophilic bacillus was encountered during experiments for recovery of *Listeria monocytogenes* from rabbits after vaginal instillation. Cultural, morphologic, biochemical, and serologic properties of the isolate were studied, and comparisons were made with members of the genus *Haemophilus* and *L. monocytogenes*. Identity of the microorganism was not established. -- Authors' summary.

65. Sinski, J. T. (Fort Detrick, Frederick, Maryland 21701) and W. L. Pannier. 1966. *Retest reaction in tuberculous monkeys.* Am. J. Vet. Res. 27: 606-608.

Six rhesus monkeys (*Macaca mulatta*) found tuberculin positive upon routine palpebral testing, were used in this study. Virginal tests and subsequent retests were made in the eyelid that was not used for the original determination. Observations were made at 15 min and 6, 24, and 48 hr. Retests were given one and three weeks after the virginal test. All tests consisted of intradermal, palpebral injections of 0.2 ml of a 1:10 dilution of veterinary-type old tuberculin.

The earliest virginal reactions were seen at 24 hr with five of the six monkeys showing positive reactions. All were positive at 48 hr. The first (1 week) retest produced a positive response in all monkeys at six hours. The majority of reactions at this time were not greater than the maximum virginal reactions. The second (3 weeks) retest produced results that were, in general, less than those observed in the first retest. In both retests there was a general tendency for the reaction to reach peak development at 24 hr. -- C. M. Poole.

66. Kent, T. H. (Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C. 20012). 1966. *Staphylococcal enterotoxin gastroenteritis in rhesus monkeys.* Am. J. Pathol. 48: 387-398.

In an attempt to simulate the conditions of human staphylococcal food poisoning, the sequential changes induced in rhesus monkeys by a single oral dose of purified enterotoxin B were studied.

Intragastric administration of purified staphylococcal enterotoxin B in rhesus monkeys produced an acute gastroenteritis, which was well developed by two hours, reached a maximum at four to eight hours and rapidly regressed to a state approaching normal by 72 hr. Gastritis was most severe in the antral and fundic mucosa and was less severe in the area of the stomach containing parietal cells. The lesion in the small intestine was of decreasing severity from jejunum to ileum. In the jejunum there was severe epithelial damage with distended villi and crypts extending nearly to the surface. The ileum exhibited much less epithelial damage and only mild alteration in villus architecture.

After daily intragastric doses of enterotoxin, six of 15 monkeys developed severe antral gastritis and superficial gastritis with focal deep extension in the gastric body mucosa. About one-third of the monkeys given daily doses of enterotoxin had a mild enteritis characterized by crypt lengthening and a slight increase in inflammatory cell infiltration. -- *Author's summary modified.*

67. Watson, W. A. (Veterinary Investigation Centre, Ministry of Agriculture, Fisheries and Foods, Leeds, Yorkshire, England) and F. I. Watson. 1966. *An outbreak of Salmonella dublin infection in chinchillas.* Vet. Record 78: 15-17.

An outbreak of *Salmonella dublin* infection in a herd of chinchillas is described. Eighteen out of 42 animals died. *S. dublin* was isolated from the viscera of three and from fecal samples from five others. The authors suggest that a purchased animal may have been responsible for the introduction of the infection. -- *Authors' summary modified.*

68. LaPlante, E. S. (West Virginia University School of Medicine, Morgantown, West Virginia 26506) and R. G. Burrell. 1966. *Bacterial endocarditis in opossums.* Bull. Wildlife Dis. Assoc. 2: 10-12.

In a colony of 60 opossums studied for periods of up to seven months, necropsies were conducted on ten animals which died unexpectedly. Three had bacterial endocarditis, one had pyelonephritis, three had peritonitis due to a perforated intestine, and no diagnosis was made in the remaining three. Since the incidence of bacterial endocarditis appeared unusually high, this disease was studied in greater detail. In one case, examined within an hour following death, the heart contained an extensive verrucous lesion which involved the mitral valve. Material from this lesion disclosed *Streptococcus viridans*. The pathology of the other two animals was similar. Because of the high incidence of bacterial endocarditis in the animals examined, the authors suggest that the opossum might serve as an experimental model for the study of this condition. -- R. J. Flynn.

69. Sauer, R. M. (School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pennsylvania 19104). 1966. *Cutaneous mucormycosis (phycomycosis) in a squirrel (Sciurus carolinensis)*. Am. J. Vet. Res. 27: 380-383.

A semitamed North American gray squirrel, *Sciurus carolinensis*, died suddenly. During the four-week period prior to death, the owner had noticed the progressive development of multiple cutaneous "tumors." Diagnosis of generalized cutaneous mucormycosis was based on the histologic tissue reaction to characteristic organisms. The possibility existed that the fungal lesion was superimposed on the virus-induced lesion of squirrel fibroma. --
Author's summary modified.

70. Geraci, J. R. (New York Aquarium, New York Zoological Society, Brooklyn, New York), R. M. Sauer, and W. Medway. 1966. *Erysipelas in dolphins*. Am. J. Vet. Res. 27: 597-606.

In an epizootic of erysipelas septicemia in four captive bottle-nosed dolphins maintained in simulated sea water, case histories, clinical examinations and, in one case, the results of blood studies, were of little diagnostic value. The diagnosis was established on the bases of histopathologic examination and isolation of *Erysipelothrix insidiosa* organisms from specimens collected at necropsy. The pathogenicity of the organisms was confirmed by laboratory animal inoculation studies. A commercial erysipelas bacterin was found more effective than an autogenous bacterin to protect laboratory animals (mice and pigeons) against challenge inoculation. A vaccination program with the commercial preparation is described. A consideration of epizootiologic features of this disease in dolphins, emphasizing roles of food-fish, arthropod vectors, and animal caretakers, is discussed. --
Authors' summary.

71. Pickett, M. J. (University of California, Los Angeles, California 90024) and R. E. Goodman. 1966. *β -Galactosidase for distinguishing between Citrobacter and Salmonella*. Appl. Microbiol. 14: 178-182.

Detection of β -galactosidase with the aid of *o*-nitrophenyl- β -D-galactopyranoside (ONPG) was examined as a means for distinguishing between *Citrobacter* and *Salmonella*. Several factors which influence sensitivity and reliability of the test were studied. A bacteriostat, sodium azide, was included to permit prolonged incubation of weak and negative strains of enteric bacilli. By the procedure described, *salmonellae* gave negative ONPG tests; all of 171 strains of *Citrobacter* gave positive tests. --
Authors' summary.

72. Noble, W. C. (St. John's Hospital for Disease of the Skin, London, W. C. 2, England) and J. A. Savin. 1966. *Steroid cream contaminated with Pseudomonas aeruginosa*. Lancet 1966-I (7433): 347-349.

A diluted steroid cream containing 0.1% chlorocresol was found to be contaminated with *Pseudomonas aeruginosa*. Although 0.02% chlorocresol in aqueous solution is sufficient to prevent growth of *Pseudomonas*, the chlorocresol was found to divide between the oily and aqueous constituents of the cream in such a way as to leave the aqueous portion without sufficient chlorocresol to exert an inhibitory effect. Examination of the clinical records suggested that use of this cream had resulted in minor but clinically apparent infections over a period of several months. Precautions in the dispensary have overcome this source of infection. Cream from two out of eight other hospitals was found to be contaminated with *Pseudomonas*, and from one other with an *Achromobacter* species. -- Authors' summary.

INFECTIOUS DISEASES: PARASITIC

73. Bell, J. F. (National Institute of Allergy and Infectious Diseases, Rocky Mountain Laboratory, Hamilton, Montana 59840), C. M. Clifford, G. J. Moore, and G. Raymond. 1966. *Effects of limb disability on lousiness in mice. III. Gross aspects of acquired resistance.* Exptl. Parasitol. 18: 49-60.

Studies of louse populations on partially disabled mice kept individually to prevent mutual grooming have demonstrated that after initial exposure to the parasite, subsequent populations were limited because of development of acquired resistance by the mice. During these experiments it was established that a long period of intensive exposure is required for full development of the resistant state. Further, based on a limited period of observation, the inhibitory function appears to be limited to the exposed site rather than generalized over the entire body. Although detritus that accumulates in a region heavily infested with lice was not a major factor in the resistance to reinfestation that was noted, it could not be eliminated as a minor one. The successful feeding of larval ixodid ticks on louse-resistant mice in a single experiment indicated that the resistance is probably specific for lice. -- *Authors' summary.*

74. Jervis, Helen R. (Walter Reed Army Institute of Research, Walter Reed Army Medical Center, Washington, D. C. 20012), T. G. Merrill, and H. Sprintz. 1966. *Coccidiosis in the guinea pig small intestine due to a Cryptosporidium.* Am. J. Vet. Res. 27: 408-414.

Coccidia of the genus *Cryptosporidium* were observed in the guinea pig. They were similar to *Cryptosporidium parvum* of the mouse small intestine. Whether they represented a new species or an adaptation of *C. parvum* to a new host was not determined. The coccidia produced enteritis characterized by shortening and thickening of the villi and infiltration of inflammatory cells in the lamina propria. In the absorptive cells, the activity of the following intracellular enzymes was decreased: alkaline and acid phosphatases, glucose-6-phosphatase, succinic dehydrogenase, diphosphopyridine and triphosphopyridine diaphorases, and monoamine oxidase. The acid phosphatase activity of macrophages in the lamina propria also was decreased. The mucosal reaction was attributed to a toxic action of metabolites of the parasite discharged directly into the parasitized epithelial cells through the attachment zone.

The coccidial infection was greatly influenced by the nutritional status of the host. When the feed was withheld for four days the number of parasites was decreased significantly. When feeding was resumed the number increased. This suggested that the coccidia derived their nutrients, at least in part, from the lumen. -- *Authors' summary modified.*

75. Cosgrove, G. E. (Biology Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831). 1966. *The trematodes of laboratory primates*. Lab. Animal Care 16: 23-39.

Keys, drawings, a host-parasite list, and laboratory techniques of value in the diagnosis of the families and genera of trematodes known to occur in laboratory primates are presented. The following families and genera are included.

Dicrocoeliidae--*Athesmia*, *Brodenia*, *Concinnum*, *Controrchis*, *Dicrocoelium*, *Eurytrema*, *Leipertrema*, and *Platynosomum*; Diplostomidae--*Neodiplostomum*; Echinostomatidae--*Artyfechinostomum*, *Echinostoma*, *Reptiliotrema*; Fasciolidae--*Fasciola*, *Fasciolopsis*; Heterophyidae--*Haplorchis*, *Metagonimus*; Lecithodendriidae--*Phaneropsolus*, *Primatotrema*; Notocotylidae--*Ogmocotyle*; Paragonimidae--*Paragonimus*; Paramphistomidae--*Chiorchis*, *Gastrodiscoides*, *Watsonius*; Schistosomatidae--*Schistosoma*. -- Author's summary.

76. Warren, McW. (National Institutes of Health, Bethesda, Maryland 20014), G. R. Coatney, and J. C. Skinner. 1966. *Plasmodium jefferyi* sp. n. from *Hylobates lar* in Malaya. J. Parasitol. 52: 9-13.

Plasmodium jefferyi is described as a new species of malaria from the gibbon, *Hylobates lar*, in Malaysia. In blood-induced infections the parasite runs a mild to moderately severe course. There is a striking level of deep circulation schizogony. The evidence available suggests a tertian periodicity although the possibility of a quotidian cycle cannot be eliminated. *P. jefferyi* can readily be separated on morphologic grounds from the other known species of malaria from this host. It is not infective to the rhesus monkey by the inoculation of parasitized blood. -- Authors' summary.

77. Noble, G. A. (California State Polytechnic College, San Luis Obispo, California 93401). 1966. *Stress and parasitism. III. Reduced night temperature and the effect on pinworms of ground squirrels*. Exptl. Parasitol. 18: 61-62.

Groups of the ground squirrel, *Citellus armatus*, were subjected to the stress of reduced nighttime temperature to determine the effect on the numbers of the cecal pinworms, *Syphacia citelli*. Stressed and control groups were given an anthelmintic, and each animal was fed 500 worm eggs. Bedding was removed from the stressed groups at night and blocks of ice were placed among them, whereas the control animals had bedding and their cages were warmed by electric heat. After two weeks all animals were killed, weighed, adrenal glands weighed, and a count taken of the pinworms. The average adrenal weight in the stressed animals was 110 mg/kg of body weight and in the control animals it was 81 mg. Twenty of the 47 stressed squirrels became infected with an average of 11.5 worms while six of the 30 control animals became infected with an average of 2.8 worms. Results indicated that there is a definite response to cold stress which results in an increase in numbers of pinworms. -- Author's summary.

78. Lankester, M. W. (University of Guelph, Guelph, Ontario, Canada) and R. C. Anderson. 1966. *Small mammals as paratenic hosts of lungworms*. Can. J. Zool. 44: 341-342.

Ten species of small rodents were examined as potential paratenic hosts of lungworms. Larvae were found in four: *Blarina brevicauda*, *Tamias striatus*, *Peromyscus maniculatus*, and *Sorex fumeus*. Although infective larvae of lungworms can be recognized, they cannot often be identified to species with confidence. Consequently it was not possible to say with certainty which species were represented in this survey. -- E. F. Staffeldt.

79. Goertz, J. W. (Louisiana Polytechnic Institute, Ruston, Louisiana 71270). 1966. *Incidence of warbles in some Oklahoma rodents*. Am. Midland Naturalist 75: 242-245.

Rodents were examined for warbles in Payne County, Oklahoma, from October 1959 to September 1961. The over-all incidence of warbles was 2.7% for individuals of ten different species examined. Warbles were found in one of 34 *Perognathus*, two of 1461 *Sigmodon*, 22 of 283 *Neotoma*, and 69 of 1040 *Peromyscus*. Parasitism was greatest during the summer and fall, especially July 1961, when 25% of all *Peromyscus* and 18% of *Neotoma* were infected. In *Peromyscus* more males than females were parasitized. *Peromyscus* without warbles seemed to have disappeared more rapidly, have had smaller home ranges as well as having been captured fewer times than infected individuals. -- Author's summary.

80. Payne, J. A. (Health Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831) and G. E. Cosgrove. 1966. *Tissue changes following Cuterebra infestation in rodents*. Am. Midland Naturalist 75: 205-213.

The large subcutaneous cavity that the larva of the botfly, *Cuterebra angustifrons*, produces in *Peromyscus leucopus* was studied by histologic preparations on the day of bot emergence and at intervals during the course of healing. The healing and repair of the lesion was very rapid, being nearly complete at nine days. Occasional complications such as chronic abscess formation or foreign body granuloma occur. A limited study of healing of bot cavities in *Sciurus carolinensis* revealed more extensive tissue involvement and a much slower rate of repair with persistence of purulent exudate. -- Authors' summary.

81. Ubelaker, J. E. (Colorado State University, Fort Collins, Colorado 80521). 1966. *Parasites of the gray bat, Myotis grisescens, in Kansas*. Am. Midland Naturalist 75: 199-204.

Fifty-four specimens of *Myotis grisescens* collected in Kansas were examined for parasites. Several new and additional host records are given. -- R. J. Flynn.

NONINFECTIOUS DISEASES

82. Bannerman, R. M. (State University of New York at Buffalo, Buffalo General Hospital, Buffalo, New York 14203) and R. G. Cooper. 1966. *Sex-linked anemia: a hypochromic anemia of mice*. Science 151: 581-582.

This sex-linked hereditary anemia occurs in hemizygous males and homozygous females but not in heterozygous females. It is most severe in young mice and diminishes in severity with increasing age. The red cells show marked anisocytosis with polychromasia and formation of target cells. The condition somewhat resembles the thalassemias of man and the iron-deficiency and pyridoxine-responsive anemias. In an attempt to find the cause of the anemia, androgens, pyridoxine, iron-dextran, dextran alone, and saline alone were used to treat affected mice. The iron-dextran produced an unmistakable and sustained rise in hemoglobin. However, preliminary studies indicate that the anemia, although apparently corrected by iron-dextran, is not due to a simple deficiency of iron nor to defective iron absorption but is more likely an unusual defect in iron metabolism. -- T. E. Fritz.

83. Lehner, T. (Guy's Hospital Medical School, London, England), V. M. Rosenoer, and N. E. Topping. 1966. *Amyloidosis in mice with a transplantable plasma cell tumour*. Nature 209: 930-931.

Transplantable plasma cell tumors of mice resemble human myelomatosis. Since systemic amyloidosis occurs in 14% of human cases of myelomatosis, the presence of amyloid in mouse myelomatosis was investigated. Ten BALB/c mice were inoculated with the ADJ/PC5 plasma cell tumor. They were killed 24 days later. Eight of the ten showed microscopic foci of amyloid in a wide variety of tissues. The authors conclude that the high incidence of amyloid in mice bearing a plasma cell tumor supports the view that plasma cell dyscrasia or neoplasia may be found in all cases of human amyloidosis. -- T. E. Fritz.

84. Murray, W. S. (The Jackson Laboratory, Bar Harbor, Maine 04609). 1966. *Genetic studies on the etiology and morphology of mammary tumors in mice*. J. Natl. Cancer Inst. 36: 249-257.

Data on reciprocal crosses between three parental stocks of mice are presented in support of the following conclusions: 1) The milk-transported mammary tumor virus stimulates the formation of A and B type mammary adenocarcinoma in early age and early middle age. 2) The other mammary tumors found--type C, fibrosarcoma, hemangioendothelioma, and adenoacanthoma, which characteristically develop in late middle and old age and are independent of the direction in which the reciprocal crosses were made--have a separate etiology. 3) The parallel between the time of occurrence of the late mammary tumors and the time spread of appearance of tumors in the other organs suggests a common etiology for all late tumors. -- Author's summary.

85. Jones, E. Elizabeth (Wellesley College, Wellesley, Massachusetts 02181), Jane Parker, and Sarah Deitrich. 1966. *Spontaneous tumors of the thyroid gland in mice*. J. Natl. Cancer Inst. 36: 1-8.

Nine spontaneous tumors of the thyroid gland in mice are reported: two in an inbred C3Hf strain and seven in (C3H or C3Hf x I) F₁ hybrids. Seven tumors arose in females (one parous, one incompletely ovariectomized, five ovariectomized) and two in intact males (one bearing a transplanted pituitary tumor). Pituitary and adrenocortical tumors were present in all ovariectomized females; a pituitary tumor was also in the intact untreated male. No thyrotrophic effects of one pituitary tumor could be demonstrated in 15 transplant generations. Three of the thyroid tumors were autonomous and were studied in serial transplantation. Two anaplastic tumors were nonfunctional; a microfollicular tumor was functional. The latent period of the secretory tumor was significantly shortened by thyroidectomy in both males and females and significantly lengthened by thyroxine injections in males only. The pathologic effects of this tumor on the untreated host are described. Genetic factors, hormonal imbalance, and age are discussed as contributory to the development of thyroid neoplasms. -- *Authors' summary*.

86. Durbin, Patricia W. (Lawrence Radiation Laboratory, University of California, Berkeley, California 94720), Marilyn H. Williams, N. Jeung, and J. S. Arnold. 1966. *Development of spontaneous mammary tumors over the life-span of the female Charles River (Sprague-Dawley) rat: the influence of ovariectomy, thyroidectomy, and adrenalectomy-ovariectomy*. Cancer Res. 26: 400-411.

Several groups of virgin female caesarean-originated, barrier-sustained Charles River CD rats were observed for incidence of mammary tumors over their life-spans. Maximum life-span ranged from 885 to 1040 days. Crude mammary tumor incidence for all groups was 61.7%. When a life-table method was used to correct the extraneous deaths, the mean mammary tumor incidence for all groups was $71.5 \pm 5.7\%$. The age at onset of the median mammary tumor was 671 ± 41 days. Cumulative mammary tumor incidence agreed closely among control groups early and late in life, with a greater variability appearing from the 500th to the 850th day of age.

In normally aging rats there were at least two age-related changes leading to abrupt increases in the rate of development of mammary tumor--one occurring at about the 500th and the other at about the 660th day of life.

Both total mammary tumor incidence and mammary tumor incidence rate were the same for uniparous rats as for virgin controls. Thyroidectomy did not reduce the life-span incidence of mammary tumor, but did postpone slightly those mammary tumors arising late in life. Ovariectomy nearly eliminated mammary tumor development; only 6.7% of ovariectomized rats developed mammary tumors over a maximum life-span of 1295 days. No mammary tumor developed in adrenalectomized-ovariectomized rats although they lived long enough (maximum life-span of 1119 days) to have permitted observation of late-appearing mammary tumors.

The proportion of mammary tumors diagnosed as carcinomas in the individual control groups was highly variable, $18.6 \pm 12.1\%$. In these studies carcinomas did not appear to arise earlier than benign fibroadenomas. Other superficial tumors arising in tissues different from the breast are tabulated.

The results of these studies are compared with those from other laboratories using the same or a related strain of rat. The relationships between development of spontaneous mammary tumor and the age-related changes in the ovary and pituitary gland are discussed. -- *Authors' summary.*

87. Patek, A. P. (Goldwater Memorial Hospital, Columbia University College of Physicians and Surgeons, New York, New York), N. M. De Fritsch, and R. L. Hirsch. 1966. *Strain differences in susceptibility of the rat to dietary cirrhosis.* Proc. Soc. Exptl. Biol. Med. 121: 569-573.

Two studies were made of the incidence of dietary cirrhosis in rats. In both studies the incidence was greatest in Wistar rats, less in Sherman rats and least in Long-Evans rats. The authors conclude that there is a definite strain difference in susceptibility. -- *R. J. Flynn.*

88. Murthy, A. S. K. (Children's Cancer Research Foundation, Children's Hospital, Boston, Massachusetts 02115) and Agnes B. Russfield. 1966. *Evidence for three types of benign adrenal tumors in Syrian hamsters.* Arch. Pathol. 81: 140-145.

Histological and histochemical studies were performed on the adrenals of male Syrian hamsters which were (1) untreated, (2) gonadectomized, (3) implanted with diethylstilbestrol, and (4) both castrated and implanted with diethylstilbestrol. Three types of adrenal adenomas occurred: AB-cell subcapsular nodules, cortical nodules, and extracapsular nodules. The subcapsular nodules enlarged after castration and B-cells increased. Diethylstilbestrol decreased B-cells. Subcapsular nodules exhibited only isocitric and glucose-6-phosphate dehydrogenase activity. This was localized in B-cells. Cortical and extracapsular nodules failed to respond to castration. They exhibited isocitric, glucose-6-phosphate, β -hydroxybutyric, succinic, and 3- β -hydroxysteroid dehydrogenase activity. Diethylstilbestrol administered to intact males induced nuclear atypicality in cortical but not in extracapsular nodules. It is suggested that three biologically distinct classes of benign adrenal tumors exist in hamsters and that this finding may be pertinent to pathogenesis of malignant tumors. -- *Authors' summary.*

89. Kersting, E. J. (University of Connecticut, Storrs, Connecticut 06268) and S. W. Nielsen. 1966. *Experimental ethylene glycol poisoning in the dog.* Am. J. Vet. Res. 27: 574-582.

The minimal lethal dose of ethylene glycol given orally was 6.6 ml/kg of body weight, although some dogs survived as much as 13.2 ml/kg; this suggested a variation in individual tolerance. Rapid ingestion produced toxicosis faster and more severely than the slower rate of consumption over several hours. The poisoning was difficult to recognize, but rapidly developing ataxia, polydipsia, normal body temperature, depression, miosis, tachycardia, tachypnea, hyperpnea, bradycardia, and coma were usually observed. Convulsions and vomiting were infrequent. Gross lesions were not pathognomonic, but birefringent, polarizing crystals in renal tubules and walls of some blood vessels of the brain were characteristic of the poisoning.

Results of examination by renal biopsy, unilateral nephrectomy, and necropsy indicated that calcium oxalate crystals may disappear following a nonfatal dose of ethylene glycol without permanent damage to the kidney. -- Authors' summary.

90. Lindsay, S. (School of Medicine, University of California, San Francisco, California 94122) and I. L. Chaikoff. 1966. *Naturally occurring arteriosclerosis in nonhuman primates.* J. Atherosclerosis Res. 6: 36-61.

Arteriosclerotic lesions are described and illustrated in the coronary arteries and in the thoracic and abdominal segments of aortas in the majority of the members of 17 families of primates (a total of 67 primates were studied). The arteriosclerotic process seemed to be initiated by degeneration of the internal elastic membrane, or in the case of the thoracic aorta, of the innermost medial elastic tissue. This was associated with intimal accumulations of mucopolysaccharide, followed by intimal proliferation of fibroblasts and smooth muscle cells, and by development of intimal connective tissue fibrils. Extreme variability was observed in the amounts of lipids deposited in intimas with the same degree of thickening, from mild to severe. Pronounced intimal thickening in some cases showed little or no lipid involvement. Continuing intimal lipid infiltration in some primates seemed responsible for the eventual mobilization of macrophages and deposition of cholesterol crystals in the intima--and hence eventually for the development of the mature, atheromatous plaques closely resembling those seen in the human being. The pathogenesis of naturally occurring arteriosclerosis in primates differs significantly from that induced in them by feeding cholesterol. The initial degenerative intimal process in the naturally occurring disease appears clearly *primary*, and seems neither associated with nor caused by lipid deposition in the intimal layer. -- Authors' summary.

91. Snyder, R. L. (Penrose Research Laboratory, Zoological Society of Philadelphia, Philadelphia, Pennsylvania) and H. L. Ratcliffe. 1966. *Primary lung cancers in birds and mammals of the Philadelphia Zoo.* Cancer Res. 26: 514-518.

Postmortem examinations at the Philadelphia Zoological Garden have been continuous since 1901 and by December 31, 1964, included records on over 19,000 animals. Approximately 300 malignant neoplasms were recognized in the mammals and birds of this series, and of these 23, or about 7%, were primary epithelial tumors of the lungs. Lung cancers were not discovered in reptiles and amphibians.

Pulmonary cancers were found in seven families of mammals and four families of birds as follows: in mammals four squamous cell carcinomas and five adenocarcinomas, and in birds 13 adenocarcinomas and one undifferentiated carcinoma.

Aside from its occurrence in the family Anatidae, primary lung cancer would be considered a rare tumor in the collection of the Philadelphia Zoo. The pulmonary adenocarcinomas occurred among ducks and geese between 1943 and 1961. Average longevity of anatids on exhibition had not changed significantly during the period from 1901 to 1964; thus increased frequency of

lung cancers could not be attributed to advanced age of the ducks and geese on exhibition. Rather, attention was focused on the possibility of increasing amounts of carcinogens in the atmosphere because ducks and geese were kept outdoors the year around. -- *Authors' summary.*

92. Stewart, H. L. (National Cancer Institute, Bethesda, Maryland 20014). 1966. *Pulmonary cancer and adenomatosis in captive wild mammals and birds from the Philadelphia Zoo.* J. Natl. Cancer Inst. 36: 117-125.

This paper presents the results of a personal examination of pulmonary cancer and pulmonary adenomatosis and squamous metaplasia in captive wild mammals and birds from the Philadelphia Zoo. The initial diagnoses of the lesions of these animals are listed along with the revised diagnoses. Histologic material was available for examination from 31 to 36 mammals and birds. The diseases in these 31 animals were: 14 adenocarcinomas in 11 birds of the family Anatidae, a silver pheasant, a red jungle fowl, and a coypu; one squamous cell carcinoma in a North American otter; one undifferentiated small cell carcinoma in a Java sparrow; one alveologenic carcinoma in a striped skunk; two pleural mesotheliomas in a Cape hunting dog and a clouded leopard; ten adenomatosis or squamous metaplasia or both in a red fox, puma, North American otter (also had squamous cell carcinoma of lung), squirrel monkey, peafowl, African eared vulture, Chinese myna, two toucan barbets and a rabbit-eared bandicoot; one tuberculosis in a civet; one pneumonia in a kangaroo, and one metastatic renal carcinoma of the lung in a red wolf. -- *Author's summary.*

ZOOZOSES

93. Hartley, E. G. (National Institute for Medical Research, Mill Hill, London, N. W. 7, England). 1966. "B" virus disease in monkey and man. Brit. Vet. J. 122: 46-50.

"B" virus causes a benign disease of monkeys characterized by a herpes-like stomatitis which heals spontaneously in seven to 14 days. However, when the virus is established in man by accidental monkey-bite or from infected tissues or fluids, it may produce a fatal encephalitis or encephalomyelitis. A clinical description of the disease is given and methods of diagnosis in monkey and man are described. Methods to reduce the risk of infection to those closely involved in the handling of monkeys or their tissues are suggested. -- *Author's summary.*

94. Hartley, E. G. (National Institute for Medical Research, Mill Hill, London, N. W. 7, England). 1966. "B" virus: *Herpes virus simiae*. Lancet 1966-I (7428): 87.

"B" virus is probably the most lethal virus capable of infecting man. Despite this, the incidence of infection in man is extremely low in proportion to the number of people handling monkeys and monkey tissue. The clinical and epidemiologic aspects of the disease for both man and monkey and the routine precautions which should be followed in the management of a monkey colony are described. -- *R. W. Camden.*

95. Diesch, S. L. (Institute of Agricultural Medicine, College of Medicine, University of Iowa, Iowa City, Iowa 52240), W. F. McCulloch, J. L. Braun, and H. C. Ellinghausen, Jr. 1966. *Leptospire*s isolated from frog kidneys. Nature 209: 939-940.

In the summer of 1964, cases of leptospirosis developed in man as a result of swimming in a farm creek. During epidemiological studies, six leopard frogs (*Rana pipiens*) were collected from these waters. Blood samples were obtained from the frogs. Two suspensions of kidneys were made from three frogs each. Leptospire were not observed on dark-field microscopy of the kidney suspensions but were subsequently isolated from one suspension after inoculation into semisolid media and incubation at 28-30 C for 20 days. The isolate reacted against *Leptospira ballum* antiserum in a dilution of 1:25 with the microscopic agglutination test. Actively growing cultures of the isolate were inoculated intraperitoneally into guinea pigs, hamsters, gerbils and mice. No fever or weight loss was observed following inoculation, and the isolate could not be recovered from blood culture or from the kidneys of the experimental animals. -- *R. J. Flynn.*

96. Hargreave, F. E. (Institute of Diseases of the Chest, London, S. W. 3, England), J. Pepys, J. L. Longbottom, and D. G. Wraith. 1966. *Bird breeder's (fancier's) lung*. *Lancet* 1966-I (7435): 445-449.

Pigeon and budgerigar breeders or fanciers may develop a pulmonary disease which resembles farmer's lung and affects the peripheral gas-exchanging tissues. The disease is caused by inhalation of the antigens in the avian excreta. Fever, shivering, malaise, and loss of weight are accompanied by cough and dyspnea, crepitant rales, evidence of impaired carbon-monoxide transfer, and decreased lung compliance. In seven affected pigeon fanciers and five affected budgerigar fanciers, precipitins were present against antigens in the avian excreta and serum proteins. In the pigeon fanciers, the attacks tended to come on 5-6 hr or more after the exposure; in the budgerigar fanciers the onset tended to be insidious and the patients presented with advanced lung damage. Inhalation tests provoked a febrile response coming on after 6-7 hr, together with the other symptoms and signs. Skin tests gave, in all except two cases, dual reactions consisting of an immediate weal followed, after 3-4 hr, by an extensive, edematous reaction, regarded as being of the Arthus type. A strong immunological response, consisting of the appearance of precipitins, results from the entry of the organic, avian antigens through the respiratory tract, and the evidence suggests that the clinical manifestations are the result of a precipitin mediated hypersensitivity reaction. -- *Authors' summary*.

97. Burton, A. N. (College of Veterinary Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, Canada), J. R. McLintock, J. Spalatin, and J. G. Rempel. 1966. *Western equine encephalitis in Saskatchewan birds and mammals* 1962-1963. *Can. J. Microbiol.* 12: 133-141.

In Saskatchewan during 1962 and 1963 Western equine encephalitis (WEE) virus was isolated from 23 English sparrows, one Swainson's hawk, one mourning dove, one Richardson's ground squirrel, and one chicken from a sentinel or indicator flock. The findings indicate that these species provide a source of virus for mosquito infection and transmission during the summer months. Antibody studies revealed a wide range of birds and mammals susceptible to the virus. It would appear that WEE isolates obtained from a mature mourning dove and from an adult Richardson's ground squirrel, May 19, 1962, were the result of latent infection because of the lack of mosquito activity before this date. Infection rates in domestic birds suggest an agreement with the incidence of clinical cases in man and horses during 1962 and 1963. -- *Authors' summary*.

ZOOTECHNIQUES: ANESTHESIA

98. Ingall, J. R. F. (Roswell Park Memorial Institute, Buffalo, New York 14203) and P. H. Hasenpusch. 1966. *A rat resuscitator*. Lab. Animal Care 16: 82-83.

A simple, inexpensive resuscitator is described for use in rats or other small animals with prominent incisor teeth. The apparatus permits pulling the tongue forward to clear the airway. It fits over the nostrils and is used to inflate the lungs of animals in respiratory distress. --
R. W. Camden.

99. Lindsay, H. A. (West Virginia University Medical Center, Morgantown, West Virginia 26506) and V. S. Kullman. 1966. *Pentobarbital sodium: variation in toxicity*. Science 151: 576-577.

The survival rate of groups of female mice given a standard dose of pentobarbital sodium was studied to determine if the susceptibility of a mammal to the drug would vary during a short time. Groups of 18 mice were given, intraperitoneally, 130 mg of the drug per kilogram of body weight, at intervals of 1-1/2 hr during a 12-hr period. The experiment was repeated seven times over a nine-month period. Data were subjected to analysis of variance. When mean survival rate was plotted against time, a curve with several inflections was described. The data indicate that fluctuations in the toxicity of pentobarbital sodium in a mammalian species do occur. --
C. M. Poole.

100. Clayton, F. W. (Ecology Field and Training Station, Heart Disease Control Program, U. S. Public Health Service, Columbia, Missouri 65201), T. E. Bauman, and L. D. Kintner. 1966. *Successful use of intrathoracic anesthesia in wild raccoons*. Vet. Med. 61: 44-45.

A 2.5% solution of methohexital sodium was administered intrathoracically to a group of 120 live trapped raccoons at a dose rate of 1 cc/5 pound body weight. After about three minutes the animals could be handled safely. Recovery from the anesthetic required from 12 to 15 min. The only death, in the series of 120, was attributed to rupture of the atrium resulting from cardiac puncture.

In another study 15 raccoons were anesthetized from 9 to 52 times (a total of 460 intrathoracic injections). Six of these were necropsied (one died from anesthetic shock, five were killed at the end of the study). Needle puncture scars, fibrous plaques and some small pleural adhesions were observed. There were no gross lesions in the parenchyma of the lungs. --
C. M. Poole.

101. Foley, Diane M. (Halifax Laboratory, Fisheries Research Board, Halifax, Nova Scotia, Canada), J. E. Stewart, and R. A. Holley. 1966. *Isobutyl alcohol and methyl pentynol as general anesthetics for the lobster, Homarus americanus* Milne-Edwards. Can. J. Zool. 44: 141-143.

Tricaine methane-sulfonate, quinaldine, ether, chloroform, and magnesium sulfate were tested for their anesthetic effect for the mature lobster (*Homarus americanus*). All were rejected because either too large a dose was required for practical purposes or they were ineffective. Two other materials, isobutyl alcohol and methyl pentynol were studied and found effective. Of the two, isobutyl alcohol is superior because it produces no toxic effects even at high concentrations. Smaller doses are required, and the relationship between concentration and effect is good. -- C. M. Poole.

102. Berger, J. (Wellcome Research Laboratory [East Africa], Kabete, Kenya). 1966. *A comparison of some anesthetic techniques in young calves*. Brit. Vet. J. 122: 65-73.

Ten methods of anesthesia in preparation for splenectomy were compared in groups of ten calves. Barbiturates, chloral hydrate and an antagonist were used. Of these methods, that using chloral hydrate was found to be the best for routine splenectomies. -- *Author's summary*.

ZOOTECNIQUES: SURGICAL PROCEDURES, IMPLANTS

103. Wilson, R. (Lobund Laboratory, University of Notre Dame, Notre Dame, Indiana 46556), Margaret Bealmear, and K. Sjodin. 1966. *A technique for thymectomizing germfree mice.* J. Appl. Physiol. 21: 279-281.

A technique for thymectomizing germfree mice has been developed and used successfully at the Lobund Laboratory. An operating chamber with a window of good optical properties was added to a flexible plastic film isolator to permit maximum visualization of the surgical area, and surgical gloves were mounted into the operating compartment. Hypothermia was selected as the form of anesthesia in order to obviate the problems that would result from using diethyl ether in an environment where static electrical charges accumulate on the inner surface of the isolator. Use of germfree mice for thymus studies provides an animal that does not develop wasting disease and, therefore, is available for long-term experimentation. -- *Authors' summary.*

104. Lin, T. P. (School of Medicine, University of California, San Francisco, California 94122). 1966. *Microinjection of mouse eggs.* Science 151: 333-337.

A technique has been developed for injecting known amounts of liquids into fertilized one-celled mouse eggs by use of a calibrated ocular micrometer superimposed on the terminal regions of the injection pipette. From 128 pronuclear eggs, each injected with 180 or 770 μ^3 of bovine gamma globulin at a concentration of 25 mg/ml in citrate-Locke's solution and then transferred to the oviducts of pregnant foster mothers, 18 living fetuses developed; from 74 eggs, each injected with 2730 μ^3 , five fetuses survived. The living fetuses that developed from the injected eggs were smaller than normal in six of 23 surviving experimental fetuses as contrasted to only one of 19 control fetuses. -- *Author's summary.*

105. Ronai, P. M. (University of Sydney, Sydney, Australia). 1966. *The use of sodium sulphide to facilitate tail vein injections in mice and rats.* Transplantation 4: 208-209.

The use of sodium sulfide solution to facilitate tail vein injections in rats and mice is described. The method was found to cause depilation, hydrolysis of the tissue, removal of surface epidermis and vasodilation. This made the lateral and ventral veins more conspicuous and injection easier, particularly in dark colored mice. -- *D. V. Tolle.*

106. Zeman, W. V. (Biological Research Division, Schering Corporation, Bloomfield, New Jersey 07003). 1966. *New device for permanent cannulation of the gallbladder, urinary bladder, stomach, and intestine of dogs. Applications in biological investigation.* Surgery 59: 387-396.

A universal device applicable to cannulation of a variety of organs has been developed for long-term animal experimentation. Modifications of the device and techniques for cannulation of the gallbladder, urinary bladder, stomach, and intestine are presented, with applications to biologic research. -- *Author's summary modified.*

107. Cutt, R. A. (Presbyterian Hospital, Philadelphia, Pennsylvania 19104). E. W. Keels, M. Litvin, and R. J. Wolfson. 1966. *Implanted electrodes for electronystagmography in the squirrel monkey.* J. Appl. Physiol. 21: 715-717.

The authors describe an electrode assembly and operative procedure for implanting electrodes in the lateral orbital wall of the squirrel monkey for purposes of recording nystagmus. A comparison of electronystagmograph tracings recorded with implanted and subdermal electrodes reveals that the implanted electrodes reduce artifacts introduced by muscle potentials, increase the amplitude of the recorded response by more than 10 db, and are convenient for long-term experimentation. -- *Authors' summary.*

108. Kenney, D. W. (Scripps Institution of Oceanography, University of California, San Diego, California), R. W. Elsner, and D. L. Franklin. 1966. *Simple surgical approach to iliac arteries of the horse for blood flow measurement.* J. Appl. Physiol. 21: 705-706.

Implantation of blood flowmeters on vessels which are major branches of the abdominal aorta generally involves a major surgical procedure. As a consequence, several days to weeks are required for healing before normal physiologic information may be taken from the recovered, healthy, unrestrained animal. The goal of this investigation was to obtain measurements soon after surgery in a fully conscious animal. The experimental animal chosen was the horse because of its relatively large peripheral arteries. A surgical approach to the iliac arteries was made through the vagina. A Franklin Doppler blood flow-telemetry system was placed on the external iliac artery using a retroperitoneal approach, and blood flow was measured during standing and walking. -- *R. J. Flynn.*

109. Straw, R. N. (College of Medicine, University of Iowa, Iowa City, Iowa 52240) and C. L. Mitchell. 1966. *A simple method of implanting electrodes for long-term stimulation of peripheral nerve.* J. Appl. Physiol. 21: 712-714.

A simple method for implanting long-term electrodes on a peripheral nerve is described. This method had the advantage of not requiring fabrication before implantation. In addition, a "plug" which can be used to hold the electrode wires and their receptacles on the animal's back is described. -- *Authors' summary.*

110. Gillette, D. D. (College of Veterinary Medicine, Iowa State University, Ames, Iowa 50010). 1966. *Cartwheel "transdermor": a device for securing entry leads into animals.* Am. J. Vet. Res. 27: 610-611.

A simple cartwheel "transdermor" of polytetrafluoroethylene was developed and successfully used in dogs and sheep to secure plastic tubes leading to the viscera. The device causes very little tissue reaction and is well secured to the skin of the animal. It could be used in other applications where entry leads such as wires are used in animal monitoring research. --
Author's summary.

ZOOTECNIQUES: EXPOSURE, RESTRAINT

111. Quattrone, P. D. (Ames Research Center, Moffett Field, California 94035) and R. W. Staley. 1966. *Exposure system for small animals at atmospheric and reduced pressures.* J. Appl. Physiol. 21: 741-744.

An exposure system is described which provides for chronic exposure of experimental animals (rats) to selected gaseous environments of varied composition and pressure (150-760 mm Hg absolute). The system includes specially designed exposure capsules, a gas flow system, an automatic pressure-regulation system, and a respiratory gas analyzer for operation at both atmospheric and reduced pressures. The system has been operated at reduced pressure (450 mm Hg absolute) for a period of 64 days with no apparent operational problems and provided ± 5 mm Hg pressure control. Air control animals at atmospheric pressure over this period demonstrated that: 1) the capsule environment did not restrict the animals, and 2) growth rates and food consumption data did not differ appreciably from that for animals in metabolic cages. -- *Authors' summary.*

112. Lawson, R. L. (Radiation Biology Laboratory, Texas A. and M. University, College Station, Texas 77843), S. Barranco, and A. M. Sorenson, Jr. 1966. *A device to restrain the mouse, rat, hamster and chinchilla to facilitate semen collection and other reproductive studies.* Lab. Animal Care 16: 72-79.

Restraining jackets of pliable leather for mice, rats, hamsters and chinchillas are described. These devices are simple to construct and facilitate such procedures as semen collection, insemination, collection of blood samples, injection, and application of medication. -- *Authors' summary modified.*

113. Hall, R. D. (Massachusetts Institute of Technology, Cambridge, Massachusetts 02139), J. Clayton, and R. G. Mark. 1966. *A device for the partial restraint of rats in operant conditioning studies.* J. Exptl. Anal. Behavior 9: 143-145.

In studies of operant behavior it is sometimes desirable to place narrow limits on the kinds of possible behavior. This is often the case when excessive movement might interfere with acquisition or interpretation of some physiologic measures. A device that will partially restrain rats for such studies is described. Its advantages include: (1) simple and rigid construction, (2) the ease with which animals may be inserted, (3) its use in the restraint of rats for extended periods of time, (4) excellent control of operant behavior it allows, and (5) the accessibility of most of the animal's body, especially the head. -- *R. J. Flynn.*

114. Thompson, T. (University of Minnesota, Minneapolis, Minnesota 55455), D. Seal, and W. Bloom. 1966. *A suspended platform for use in chronic restraint of monkeys*. J. Exptl. Anal. Behavior 9: 146.

When rhesus monkeys are restrained for long periods in commercially available primate chairs they tend to develop neck and mandibular lesions and slough their ischial callosities. This report describes the modification of such a chair by replacing the usual two-bar seat with a nine-inch square adjustable platform. Monkeys have been maintained in such a modified chair for six to nine months without untoward effects. -- R. W. Camden.

ZOOTECNIQUES: SAMPLING, MEASURING, RECORDING, OTHER

115. Nobunaga, T. (Chugai Pharmaceutical Company, Ltd., Toshima P. O., Tokyo, Japan), K. Nakamura, and T. Imamichi. 1966. *A method for intravenous injection and collection of blood from rats and mice without restraint and anesthesia.* Lab. Animal Care 16: 40-49.

It is often difficult to perform intravenous injection of rodents without anesthesia because the animals do not remain in a quiet state during the injection. Accordingly, the authors developed a technique whereby an animal could be injected intravenously using the dorsal metatarsal vein without anesthesia or undue restraint. The procedures for intravenous injection of rats, mice, and guinea pigs are described. These procedures may also be used to collect small amounts of blood. -- *Authors' summary modified.*

116. Gnabasik, F. J. (Yale University School of Medicine, New Haven, Connecticut 06520), G. S. Groch, J. J. Dineen, Jr., and S. C. Finch. 1966. *A disposable micropipet method for performing reticuloendothelial clearance studies in small animals.* Am. J. Clin. Pathol. 45: 93-95.

The use of disposable micropipets in determining ^{131}I -labeled human albumen clearance in rats and rabbits is described. This method is simple and rapid. It also eliminates the possibility of radioactive contamination of laboratory personnel, glassware, and scintillation crystals. Cost in technician's time and laboratory glassware was also greatly reduced. Results were accurate and variations within the same sample were insignificant. -- *D. V. Tolle.*

117. Kaufman, W. C. (6570 Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio) and J. C. Pittman, Jr. 1966. *Quantitative radiometric measurement of skin temperature.* J. Appl. Physiol. 21: 302-304.

A simple radiometer has been constructed and a method devised by which the surface temperature of skin can be precisely measured. The instrument has a precision of ± 0.1 C. Measurements show the variation of the front surface of the forearm in neutral thermal conditions to be, at extremes, $+1.7$ C and -2.3 C from the mean. Temperature patterns vary to some degree when the hand is heated or cooled. The magnitude of the variations is essentially unchanged during heating but is approximately doubled during cooling. -- *Authors' summary modified.*

118. Stegall, H. F. (USAF School of Aerospace Medicine, Brooks Air Force Base, Texas 78235), R. F. Rushmer, and D. W. Baker. 1966. *A transcutaneous ultrasonic blood-velocity meter.* J. Appl. Physiol. 21: 707-711.

An ultrasonic flowmeter has been developed for continuously indicating instantaneous arterial or venous blood flow velocity in vessels under intact

skin or even deep within the body. This flowmeter is based on the Doppler principle that continuous wave ultrasonic energy backscattered from moving blood is altered in frequency. The difference in frequency between transmitted sound and sound backscattered from blood is within the audible range. Mean frequency of the sound spectrum appears to be directly related to mean flow velocity. This signal may also be analyzed by differentiation to inscribe on a standard strip chart recorder the change of blood velocity with time. If the angles between ultrasonic beams and the vascular channel are known, it is possible to record blood flow velocity. In its current form, this flowmeter does not distinguish forward from backward flow. Its particular utility lies in its easy detection of relative blood flow in vessels beneath the skin without pain or injury. -- *Authors' summary modified.*

119. Mäntzer, T. L. (Brown University, Providence, Rhode Island 02912). 1966. *Comparison of three methods for obtaining psychophysical thresholds from the pigeon.* J. Comp. Physiol. Psychol. 61: 96-101.

Three methods for obtaining differential thresholds for brightness from pigeons were compared. The three conditions were the two- and four-key forced-choice methods and the "yes-no" method. Each method yielded consistent psychophysical functions that approximated the classic ogival form. None of the methods proved consistently superior. Individual differences were large. The data were analyzed for habit tendencies that might interfere with stimulus control of behavior. One such tendency was the formation of strong position habits which varied in strength as a function of the difficulty of the discrimination. -- *Author's summary.*

120. Chambers, P. L. (Trinity College, Dublin, Ireland) and T. J. Salmons. 1966. *An electronic animal activity recorder.* Experientia 22: 127-128.

A method for detecting and recording the general activity of small animals is described. Balanced electrical signals of equal amplitude and opposite polarity are transmitted to metal cage grills located at the top and bottom of a plastic cage respectively. Introduction of the test animal causes an imbalance of the signal strength. This difference is detected by antennae at the cage ends and amplified. The signal activity is then recorded on calibrated chart paper. At high amplification with the animal at rest, movements of the chest wall in respiration can be detected. --
D. V. Tolle.

121. Young, B. A. (University of New England, Armidale, New South Wales, Australia). 1966. *A simple method for the recording of jaw movement patterns.* J. Inst. Animal Tech. 17: 20-21.

A rubber balloon is tied into a fabric pocket sewn onto the inside of the jaw strap of a halter. The balloon is connected via a length of flexible rubber tubing to a tambour which operates a pen on a kymograph. The apparatus has been used in studies of the eating behavior of sheep and was particularly useful in determining the duration of each rumination and the frequency of jaw movements during rumination. -- R. J. Flynn.

122. Adolph, R. J. (Cincinnati General Hospital, Cincinnati, Ohio 45229) and J. C. Frommer. 1966. *A transducer for recording the instantaneous respiratory waveforms in animals and man.* J. Appl. Physiol. 21: 737-740.

A simple, inexpensive transducer is described for use in animal experiments or for patient monitoring in which the exact timing of respiratory events is desired. The sensing element is a very fine tungsten wire with negligible thermal time delay. For experiments in which right heart events, e.g., pressure, flow, and heart sounds, are to be correlated with respiratory events and the exact time of the beginning and end of inspiration and expiration is desired, the tungsten wire transducer would seem superior to other available techniques. -- *Authors' summary.*

123. Wheatley, D. N. (University Medical Buildings, Foresterhill, Aberdeen, Scotland). 1966. *Rapid ascites tumour production.* Nature 209: 1255-1256.

Detailed studies of the usefulness of kieselguhr for promoting ascites tumor growth are reported. Kieselguhr, an irritant diatomaceous earth, when injected intraperitoneally into mice a few hours before the injection of tumor cells causes both increases and more rapid production of ascites fluid and tumor cells. As much as a six-fold increase was observed. This observation has academic interest. It is also of great practical importance. Kieselguhr could be used to increase the production of tumor cells for such things as cell cultures, virus propagation, or tumor cell antigen extraction. It could also be used to increase the production of ascitic fluid for antibody extraction. -- *T. E. Fritz.*

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