

# LABORATORY PRIMATE NEWSLETTER

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#### POLICY STATEMENT

The purpose of the *Laboratory Primate Newsletter* is (1) to provide information on care, breeding, and procurement of nonhuman primates for laboratory research, (2) to disseminate general information about the world of primate research (such as announcements of meetings, research projects, nomenclature changes), (3) to help meet the special research needs of individual investigators by publishing requests for research material or for information related to specific research problems, and (4) to serve the cause of conservation of nonhuman primates by publishing information on that topic. As a rule, the only research articles or summaries that will be accepted for the *Newsletter* are those that have some practical implications or that provide general information likely to be of interest to investigators in a variety of areas of primate research. However, special consideration will be given to articles containing data on primates not conveniently publishable elsewhere. General descriptions of current research projects on primates will also be welcome.

The *Newsletter* appears quarterly and is intended primarily for persons doing research with nonhuman primates. Back issues may be purchased for \$1.00 each. (Please make checks payable to Brown University.)

The publication lag is typically no longer than the 3 months between issues and can be as short as a few weeks. The deadline for inclusion of a note or article in any given issue of the *Newsletter* has in practice been somewhat flexible, but is technically the fifteenth of December, March, June, or September, depending on which issue is scheduled to appear next. Reprints will not be supplied under any circumstances.

PREPARATION OF ARTICLES FOR THE NEWSLETTER.--Articles and notes should be submitted in duplicate and all copy should be double spaced. Articles in the References section should be referred to in the text by author(s) and date of publications, as for example: Smith (1960) or (Smith & Jones, 1962). Names of journals should be spelled out completely in the References section. Technical names of monkeys should be indicated at least once in each note and article. In general, to avoid inconsistencies within the *Newsletter* (see Editor's Notes, July, 1966 issue) the scientific names used will be those of Napier and Napier [*A Handbook of Living Primates*. New York: Academic Press, 1967].

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## HAZLETON LABORATORIES AMERICA, INC.

Dan W. Dalgard

Hazleton Laboratories America (HLA) is the largest of 5 allied companies within Hazleton Laboratories Corporation. Other companies include Hoeltge, Inc., Kirschner Scientific, Hazleton Research Animals, and Hazleton Laboratories Europe. HLA is located on a 125 acre tract of land in Vienna, Virginia (approximately 20 miles from Washington, D.C.) with satellite facilities in Reston, Virginia and Alice, Texas. The main laboratory has expanded over the past 28 years from a one room garage to a complex of multi-story buildings providing 240,000 sq. ft. of floor space.

There are approximately 380 people employed by HLA of which over 100 are B.S., M.S., or doctorate level personnel. Organizationally, the company is comprised of a Product Safety Division and a Life Sciences Division. Much of the effort of the Product Safety Division involves evaluation of various drugs, chemicals, etc. for commercial manufacturing organizations while the Life Sciences Division is engaged primarily in government sponsored research programs.

The majority of all primate activities are performed within the Life Sciences Division under the direction of David A. Valerio, D.V.M. Within this Division, Dan W. Dalgard, D.V.M. is Director of Primatology and Dale D. Boyd, D.V.M., M.S. is Director of the Texas Primate Breeding Center.

The Department of Primatology consists of three operating units: Primate Toxicology, Primate Carcinogenesis, and Primate Reproduction. The total primate colony numbers approximately 2,000 animals and consists of prosimians, Old and New World monkeys, chimpanzees, and gibbons. *Macaca mulatta*, *M. fascicularis*, and *Cercopithecus aethiops* are used in the largest numbers.

Fred Snyder, B.S., A Hazleton employee since 1964, is supervisor of the Primate Toxicology unit. The acquisition and quarantine of all primates for HLA is supervised by Mr. Snyder, or in the case of the Texas facility, handled indirectly by coordination with Dr. Boyd. The quarantine facility, located in Reston, Virginia approximately seven miles from the main laboratories, has seven rooms with a total capacity for 480 animals. Generally HLA personnel travel to the importers' facilities to select and tuberculin test animals which are then shipped immediately to the quarantine facility.

In addition to this, Mr. Snyder supervises the conduct of all pri-

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mate toxicology studies. This may consist of studies varying in length from eye irritation studies lasting a few days, to 26-week intravenous toxicity studies, to 10-year oral contraceptive studies. Presently, over 500 animals are utilized in this unit.

The Primate Carcinogenesis unit is supervised by Jeannette Reeves, who has been with HLA for the past 14 years. Under contract to the National Cancer Institute, we have been evaluating the relative susceptibility of nonhuman primates to known rodent chemical carcinogens such as aflatoxin B<sub>1</sub>, diethylnitrosamine, urethane, etc. and suspected carcinogens such as the cyclamates, DDT, and others. This program consists of approximately 120 breeding animals and 430 laboratory reared offspring. The infants are separated at birth and raised by the nursery personnel, who are present 24 hours a day. Exposure to carcinogens is generally initiated at birth and the animals are monitored for evidence of tumor for several years.

The Primate Reproduction unit, supervised by Jonathan E. Githens, B.S., is responsible for all breeding studies. Most of this work is done in a newly established outdoor breeding facility located at the main laboratories. This facility consists of a group of "pole barn" type buildings with 20-40 cyclone fenced runs (4 ft. wide, 10 ft. long, 7 ft. high) on a sloped concrete floor. The facility is equipped with overhead garage doors and a heating system which can be employed during periods of cold weather. Removable panels on the sides of the run allow animals to utilize more than one run. Animals are generally arranged in harem groups of one male to 8-12 females. A total of 190 animals are currently on this National Institutes of Health funded program, designed eventually to produce 250 infants annually.

The Texas Primate Breeding Center is the newest of our primate facilities. It is located in Alice, Texas on 208 acres of land. The facility is still in the construction phase but is scheduled to achieve an inventory of 800 animals by 1976. Dr. Dale Boyd is the director of this facility and is located on site on a full time basis. He is assisted by Mr. John Munster, the colony supervisor, and a staff of seven persons at the present time. The "corn crib" (12 ft. in diameter, 8 ft. high) is the basic animal enclosure utilized with an interconnecting passageway joining two adjacent cribs. This passageway is also used as the trapping area and provides an escape lock. The harem mating system employing 1 male and 8-12 females is utilized. Several buildings (mobile laboratories) to provide for quarantine, surgery, necropsy, treatment, office, and clinical laboratory space have been erected along with a mobile home which serves as a residence.

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## NONHUMAN PRIMATE-ASSOCIATED HEPATITIS

Between May 22 and May 28, 1974, 5 individuals in Cumberland County, Pennsylvania, developed jaundice, and diagnoses of hepatitis were made. Tests for hepatitis B surface antigen (HB<sub>S</sub>Ag) conducted on specimens from these individuals were negative.

None of the patients had been exposed to known cases of viral hepatitis, blood transfusions, needles, raw shellfish, or contaminated food or water. All 5 patients, however, had had contact with a young, newly-imported chimpanzee. This 12-month-old chimpanzee had arrived at a privately-owned zoo on April 10, 1974. She was thin and highly nervous, with dry, scaly skin. In addition, she had a poor appetite and persistent diarrhea.

On May 1 the chimpanzee was treated by a local veterinarian and cared for by an assistant of another veterinarian in her home. Subsequently, over a 7-day period in late May, the chimpanzee owner (aged 53), his wife (55), a part-time employee (17), the veterinarian's assistant (20), and her boy-friend (24), all of whom had had frequent contact with the chimpanzee, developed acute HB<sub>S</sub>Ag-negative hepatitis.

Fifty-two contacts of these 5 individuals and the chimpanzee received immune serum globulin (ISG). No additional cases of hepatitis were discovered. A blood specimen from the implicated chimpanzee revealed an SGOT of 85 IU (chimpanzee normal 0-15 IU) and a bilirubin of 2.0 mg% (chimpanzee normal 0.1-0.5 mg%). A cage mate of the implicated chimpanzee appeared healthy, but blood tests revealed a normal bilirubin with an SGOT of 81 IU.

*Editorial Note.*--Since the first reports of nonhuman primate-associated hepatitis, over 200 cases have been reported in humans. The frequency of such reports appears to be increasing; and in 1974, 8 separate outbreaks occurring in 7 different states were reported to CDC. The disease is usually mild, of brief duration, and clinically indistinguishable from hepatitis A. Tests for HB<sub>S</sub>Ag in human cases and implicated animals have been uniformly negative. Various nonhuman primates have been associated with cases of hepatitis in humans, but the most frequently implicated have been chimpanzees. These have generally been young, newly-imported chimpanzees that appear well or have non-specific clinical illness. Immune serum globulin seems to protect animal handlers from the development of clinical hepatitis.

Those persons who must work with newly-imported nonhuman primates are advised to maintain scrupulous hygiene and to wear protective clothing when handling primates and primate excreta. Routine administration of ISG is recommended for those persons having repeated close contact with such animals.--From *Morbidity and Mortality Weekly Report*, 1974, 24, 115.

## PROBABLE VACCINE-INDUCED RABIES IN A PET MARMOSSET

On February 19, 1974, a pet marmoset (*Saguinus nigricollis*) was brought to a Los Angeles veterinarian because of ascending paralysis of the right leg. Rabies was suspected, and the diagnosis was confirmed by fluorescent rabies antibody (FRA) examination of brain tissue at the Los Angeles County Health Department laboratory. Five of 6 persons who had had contact exposure to the marmoset but were not bitten received post-exposure prophylaxis.

Investigation revealed that the animal was 1 of 2 marmosets smuggled into Miami, Florida, on February 7 via an airline flight from Peru. They were hidden under the coat of the woman who brought them in. After spending several days in Miami, the woman proceeded to California via a commercial airline flight on February 11. At that time, the airline required that the 2 marmosets be caged and placed in the baggage compartment of the airplane. The animals were imported without prior issuance of a permit by the California State Department of Health as required by the California Wild Animal Importation Law and thus entered the state illegally.

On arrival in Los Angeles, 1 of the 2 marmosets, believed to be a pigmy marmoset (*Cebuella pygmea*), was dead. It was buried at the airport by the owners. The carcass was later exhumed, and the brain was examined for rabies by the FRA test. The results were negative.

Investigation also revealed that the 2 marmosets had been vaccinated with a modified live-virus rabies vaccine of avian origin on February 6, the day prior to departure from Peru. The viral isolate from the rabid marmoset had characteristics consistent with an egg-adapted vaccine strain. These included a short incubation period in mice (4-5 days), absence of FRA detectable virus in salivary glands and corneas of the mice, only rare inclusions typical of Negri bodies produced on mouse passage, and high titered growth in eggs on first passage. Thus, the cumulative evidence suggests that the marmoset's infection was vaccine-induced.

*Editorial Note.*--This case illustrates the danger of inducing rabies in wild animals by vaccination with live-virus rabies vaccines. Currently, no rabies vaccine is licensed in the United States for use in wildlife. If immunization of a wildlife species is felt to be absolutely necessary, only inactivated vaccines should be used.--From *Morbidity and Mortality Weekly Report*, 1975, 24, 99.

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CURRENT STUDIES OF NONHUMAN PRIMATES IN SEMI-FREE  
RANGING OR OPEN-FIELD SITUATIONS

The following information was prepared from questionnaires forwarded to us by Dr. David Chivers. The questionnaires were distributed for the purpose of compiling a catalog of current studies of free ranging primates in natural habitats. A second issue of the catalog was recently published (see p. 26 of the January, 1975 issue of this *Newsletter*). Readers are encouraged to inform us of other studies of the type reported here.

Bermuda: Hall's Island

Experimental modification of behavior in an open field situation using gibbons (*Hylobates lar*), by N. S. Kline, A. H. Esser, J. M. R. Delgado, C. R. Carpenter, and J. B. Newkirk. Correspondence address: International Psychiatric Research Foundation, 18 E. 67th St., New York, NY 10021

Puerto Rico: La Cueva

Study of the early stages of socialization of infant *Macaca mulatta*, high and low in the dominance hierarchy, by F. E. Poirier. Correspondence address: Dept. of Anthropology, Ohio State University, Columbus, OH 43210

Puerto Rico: Cayo Santiago

Study relating behavioral patterns of locomotion with anatomical structure of *Macaca mulatta* for various age/sex classes, by R. Rawlins. Correspondence address: Caribbean Primate Research Center, Box 106, Punta Santiago, Puerto Rico 00741

Puerto Rico: Cayo Santiago

Study of social relationships and structure of *Macaca mulatta*, by S. Datta. Correspondence address: Caribbean Primate Research Center, P. O. Box 106, Punta Santiago, Puerto Rico 00741

Puerto Rico: La Parguera

Studies of endocrine synchrony and social behavior, and comparison of corrals with free range for studies of *Macaca mulatta*, by J. Vandenberg and L. Drickamer. Correspondence address: Lee Drickamer, Biology Dept., Williams College, Williamstown, MA 01267

Mexico: Tanaspi Island, Lake Catemaco, Veracruz

Establishment of a semi-free ranging colony of chimpanzees (*Pan troglodytes*) and stumptailed macaques (*Macaca arctoides*) for breeding

and behavioral research, by A. Kling, F. Ervin, C. Guzman, and associates. Correspondence address: Arthur Kling, Dept. of Psychiatry, Rutgers Medical School, University Heights, Piscataway, NJ 08854

U. S. A.: 25-acre island in Loxahatchee District, Palm Beach County, FL

Long range research on chimpanzee (*Pan troglodytes*) behavior with emphasis on individuality, group dynamics, mother-infant relationships, and role structuring, using six adult males, six adult females, and four juveniles, by G. E. Huggins. Correspondence address: Edison Community College, College Parkway, Fort Myers, FL 33901

U. S. A.: Warner Bros. Jungle Habitat, NJ

Study of inter-specific social contact among three semi-free ranging species, *Theropithecus gelada*, *Papio anubis*, and *Papio hamadryas*; social adaptations to cold and shortened daylight; relations with other large mammals and birds; and effects on the behavioral repertoire of the conditions of semi-captivity, by N. A. Ossorio and associates. Correspondence address: Dept. of Anthropology, Rutgers University, 794 Bevier Rd., Piscataway, NJ 08854

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#### RESIDENT SCIENTIST NAMED FOR LA PARGUERA PRIMATE INSTALLATION

A wildlife management specialist, H. John Herbert, has been named Scientist-in-Charge at the La Parguera site of the Caribbean Primate Research Center, of the University of Puerto Rico Medical Sciences Campus. Herbert's responsibilities include administration of the Center's monkey colonies on the islands of La Cueva and Guayacán, located off the southwest coast of Puerto Rico. He will also conduct research of his own and coordinate the work of visiting scientists.

Before coming to Puerto Rico, Herbert spent six years in Africa, most recently as chief research officer at the 5,000 square mile Wankie National Park in Rhodesia. Prior to that he took a Master's degree in zoology at the University of Pretoria in South Africa and spent two years with a Smithsonian Institution field party studying mammals and their parasites in four African countries. He has done extensive research on the waterbuck. He is a graduate of Baldwin-Wallace College in Ohio and took post-graduate courses at the University of Wyoming and California State College at Long Beach.

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## NEW REGULATIONS ON U.S. IMPORTATION OF NONHUMAN PRIMATES PROPOSED

The U.S. Department of Health, Education, and Welfare recently proposed that future commercial imports of nonhuman primates for sale as pets be prohibited.

The proposed regulations, published in the *Federal Register*, March 14, 1975, were developed by the Center for Disease Control because such animals are a significant source of infectious disease in humans, including hepatitis, tuberculosis, and parasitic infections. Many of the reported infections have been severe, and a number have resulted in death or long term disability. About 50,000 nonhuman primates are imported for sale as pets each year.

Nonhuman primates imported for scientific, educational, or exhibition purposes are not prohibited by the proposed regulations, although the requirements for disease surveillance and control procedures would be strengthened.

One state, Colorado, has already banned the sale of such animals for pets. Norway prohibits importation of such animals as pets, and England and Germany have stringent quarantine measures that have in effect resulted in a ban. In addition, a number of state health departments and other organizations have publicly supported a ban on pet sales.

Quarantine and disease control measures for animals imported for approved purposes would be changed in several significant ways. At present, on arrival, animals are inspected at the port of entry for evidence of communicable disease. Because such animals may be incubating disease or fail to show readily apparent signs of infection, the present procedure is inadequate. Therefore, a system of post-importation surveillance is proposed, with the primary responsibility for surveillance resting with the importer.

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## NATIONAL CAPITAL AREA BRANCH OF AALAS TO HOLD SEMINAR

The Fifth Annual Seminar sponsored by this branch of the American Association for Laboratory Animal Science will be entitled: "Current Concepts in Lab Animal Science." It will be held September 10 and 11, at the Hunt Valley Inn, Cockeysville, Maryland.--Contact: Mr. Doug Dinkle, Rt. 2, Box 193, Knoxville, MD 21758.

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## PRIMATE TEETH WANTED

We are in urgent need of teeth from nonhuman primates for the purposes of producing thin sections upon which our histological investigations are based. In addition to species identification, information on the dietary regimen, age, sex, whether wild- or captive-born, state of health and nature of the research for which the animal was used, will also be of assistance.

During the past two decades, there has been a shift in emphasis from implications of dental histology for caries recognition in ancient teeth to implications for environmental and evolutionary changes. The initial work was conducted by Sognaes and continued with comparative nonhuman primate studies by Schuman and Sognaes in the 1950s. Data resulting from this research suggested that an increased tendency for microstructural defects is evident in the Anthropoidea, especially in the Hominoidea. Recent work conducted by Molnar has supported Sognaes' suggestion. At present, work is continuing on histological investigation of prehistoric populations of man, but, due to a lack of specimens, we are unable to continue our research upon nonhuman primate populations. --Contact: Dr. Stephen Molnar, Department of Anthropology, Washington University, St. Louis, MO 63130, Attn.: Mr. David Gantt.

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## FOURTH CONFERENCE ON EXPERIMENTAL MEDICINE AND SURGERY IN PRIMATES NOT HELD

For a variety of reasons, the Fourth Conference on Experimental Medicine and Surgery in Primates planned for Jerusalem, February 24-27, 1975, was not held. A smaller conference consisting of some of the participants scheduled for the original conference was held in Jerusalem on those dates (see note on page 9 of this *Newsletter*). The co-chairmen of the original conference, who did not participate in the Jerusalem conference, are planning to edit a volume composed of many of the articles that would have been in the Proceedings of the Fourth Conference.

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## ORANGUTAN TWINS BORN

Orangutan twins were born prematurely in October, 1974 at Vilas Park Zoo in Madison, Wisconsin. The twins, a male and a female, each weighing under 2 lbs. at birth, were taken to the Wisconsin Regional Primate Research Center. The twins were confined in incubators at 90°F and were given intensive 24-hr. care after feeding problems developed. The twins have been progressing well since then.

## JERUSALEM CONFERENCE ON PRIMATOLOGY

On February 24-27 the Jerusalem Conference on Primatology was held at the Israel Academy of Sciences and Humanities, Jerusalem. 28 Participants from abroad and 54 registered Israeli scientists took part. Five sessions were held and included presentations on the following main topics: Cardiovascular studies, reproduction and husbandry, ophthalmology, neurobiology and immunology.

At the farewell banquet, held at the Plaza hotel, some of the speakers suggested that this conference be the start of a series of similar events to be held regularly in Jerusalem. One speaker, however, questioned the value of bringing together scientists of diverse professional disciplines, whose only common link was their tool--the nonhuman primate.

For the Israel primatological community this conference was a major event in its short history, and the personal acquaintances with primatologists from all over the world will certainly be beneficial for our future work.--Efraim Benhar, Secretary of the Primatological Society of Israel.

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## THE INTERNATIONAL PRIMATE PROTECTION LEAGUE

The International Primate Protection League was founded in 1973 to promote conservation and protection of primates throughout the world. The League is interested in, among other things, gathering information about numbers and distribution of nonhuman primate species, exposing channels of illicit trade, improving methods of capture, conditions of shipment, care of animals in zoos and research institutions, and increased regulation of experimentation with these animals. The chairpersons are Dr. Shirley McGreal, 73 Soi 12 Sukhumvit, Bangkok, Thailand and Ms. Sheila Curtin, Dept. of Anthropology, San Francisco State University, California 94132. Those wishing for more information should contact the latter.

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SUDDEN INFANT DEATH SYNDROME ACT OF 1974

In conjunction with the Sudden Infant Death Syndrome Act of 1974 (P.L. 93-270), the National Institute of Child Health and Human Development (NICHD) is responsible for support of research concerning all aspects of the problem of the sudden infant death syndrome. This syndrome is a world-wide public health problem. It is estimated that each year in the United States between 7,500 and 10,000 apparently healthy infants, predominantly between the ages of one and six months, die suddenly and unexpectedly while they sleep. Cause of death remains unexplained after complete autopsy.

In 1971, the Perinatal Biology and Infant Mortality Branch, NICHD, embarked on a broad based program of research to increase understanding of underlying mechanisms of the syndrome, to discover its probable cause(s), and to explore preventive approaches. Emphasis areas for scientific investigation include: developmental neurophysiology; cardio-respiratory-vascular responses; metabolic endocrine and thermal phenomena; developmental aspects of infection and immunity; epidemiology; anatomic pathology; and the psychosocial problems encompassing a death in infancy. NICHD is interested in receiving research grant applications in these various emphasis areas. Funding of research proposals will be contingent on approval of NIH review groups and the availability of funds. For further information write to: Dr. Eileen G. Hasselmeyer, Program Director, Perinatal Biology and Infant Mortality Branch, National Institute of Child Health and Human Development, Bethesda, MD 20014.

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RECENT BOOKS AND ARTICLES\*  
(Addresses are those of first authors)

Books

*Prosimian Biology*. R. D. Martin, G. A. Doyle, and A. C. Walker (Eds.)  
London: Duckworth, 1974. 1005 pp. [Price: £30]

The Proceedings of a meeting of the Research Seminar in Archaeology and Related Subjects held at the Institute of Archaeology, London University, April 14-17, 1972. Contents: Foreward by W. C. Osman Hill. Part 1. PROSIMIAN BEHAVIOUR. The study of prosimian behaviour, by G. A. Doyle and R. D. Martin. Section A. FIELD STUDIES OF BEHAVIOUR AND ECOLOGY. How to remain prosimian in a simian world, by F. Bourliere. The behaviour and ecology of the sportive lemur (*Lepilemur mustelinus*) in relation to its dietary peculiarities, by C. M. Hladik and P. Charles-Dominique. A study of the population density and home range of *Indri indri* in Madagascar, by J.-J. Petter and A. Peyriéras. Patterns of mating in *Propithecus verreauxi verreauxi*, by A. Richard. Ecological distinctions in sympatric species of *Lemur*, by R. W. Sussman. Ecology of bushbabies, *Galago senegalensis* and *Galago crassicaudatus*, with some notes on their behaviour in the field, by S. K. Bearder and G. A. Doyle. Ecology and feeding behaviour of five sympatric lorises in Gabon, by P. Charles-Dominique. A preliminary field-study of the western tarsier, *Tarsius bancanus* Horsfield, by M. Fogden. A preliminary field report on the lesser tree shrew (*Tupaia minor*), by F. D'Souza. Influence of light on the activity rhythms of two Malagasy lemurs, *Phaner furcifer* and *Lepilemur mustelinus*, by G. Pariente. Section B. LABORATORY STUDIES OF BEHAVIOUR. A prosimian research colony, by J. A. Bergeron. The behaviour of the lesser bushbaby (*Galago senegalensis moholi*), by G. A. Doyle. Social interactions of *Perodicticus potto* kept in captivity in Kampala, Uganda, by J. Epps. Behaviour and social structure in a laboratory colony of *Galago crassicaudatus*, by J. M. Tandy. Co-operative behaviour in *Perodicticus*, by U. M. Cowgill. Mother-young relations in lemurs, by P. H. Klopfer. Learning set in *Lemur macaco*, by H. Cooper. Section C. OLFATORY COMMUNICATION IN PROSIMIANS. Urine-washing: comparative notes, by R. J. Andrew and R. B. Klopman. Functions of the external genital glands of *Perodicticus* and

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\*In many cases, the original source of references in the following section has been the Current Primate References prepared by The Primate Information Center, Regional Primate Research Center, University of Washington. Because of this excellent source of references, the present section is devoted primarily to presentation of abstracts of articles of practical or of general interest. In most cases, abstracts are those of the authors. Any author wishing to have a published paper abstracted in this section may do so by sending the Editor a copy of the reprint or abstract and indicating his desire on the reprint.

*Arctocebus*, by G. H. Manley. Olfactory communication in *Lemur fulvus*, by J. Harrington. A study of marking behaviour in *Lemur catta*, by A. Schilling. Section D. PHYSIOLOGY OF BEHAVIOUR IN CAPTIVITY. Photoperiod, sexual activity and body weight variation of *Microcebus murinus*, by A. Petter-Rousseaux. Variations of endocrine glands in the lesser mouse lemur, *Microcebus murinus*, by M. Perret. Social stress in the tree-shrew: its causes and physiological and ethological consequences, by D. von Holst. Part II. PROSIMIAN ANATOMY, BIOCHEMISTRY AND EVOLUTION. Section A. GENERAL STUDIES OF PROSIMIAN EVOLUTION. Notes on Early Tertiary prosimians, by E. Simons. A review of the Miocene Lorisidae of East Africa, by A. Walker. Taxonomy and phylogeny of prosimians, by C. P. Groves. The phylogenetic relationships of the prosimian primates: evidence from the morphogenesis of the placenta and foetal membranes, by W. P. Luckett. What can the eye tell us about behaviour and evolution? or: The eye-eyes have it, but what is it?, by L. R. Wolin. Section B. ANATOMY AND FUNCTION OF SKULL AND TEETH. Mastication in *Galago crassicaudatus*: a cinefluorographic and occlusal study, by R. F. Kay and K. M. Hiemae. Dental function in the Palaeocene primate *Plesiadapis*, by P. Gingerick. Dental occlusion and the masticatory apparatus in *Lemur* and *Varecia*, by D. Seligsohn and F. Szalay. Facial structure and mandibular mechanics in *Archaeolemur*, by I. Tattersall. Thegosis in prosimians, by R. G. Every. Premolar loss in primates: a re-investigation, by J. Schwartz. Non-metrical variation in the prosimian skull, by C. Berry. *Daubentonia*, *Dactylopsila*, woodpeckers and klinorhynch, by M. Cartmill. Section C. MORPHOLOGY OF THE BRAIN. The external morphology of the brain of some Lorisidae, by D. E. Haines, B. C. Albright, G. E. Goode, and H. M. Murray. The cerebellum of some Lorisidae, by D. E. Haines. Prosimian brain morphology: functional and phylogenetic implications, by L. Radinsky. Section D. PROSIMIAN LOCOMOTION. Proportions of the extrinsic foot muscles in some lorid prosimians, by C. Jolly and A. Gorton. Biomechanics of vertical leaping from the ground in *Galago alleni*: a cineradiographic analysis, by F. K. Jouffroy, J. P. Gasc, M. Décombas, and S. Oblin. Physiological and histochemical parameters in comparative locomotor studies, by E. C. B. Hall-Craggs. Section E. CHROMOSOMES, PROTEINS AND EVOLUTION. The molecular and cytogenetic approaches to prosimian phylogeny, by N. Barnicot. Chromosomal evolution in prosimians, by J. Egozcue. Cytogenetic contributions to a new classification of lemurs, by Y. Rumpler. The chromosomes of the prosimians, by B. Chiarelli. Immunodiffusion systematics of the primates: findings on *Tarsius*, Lorisidae, and Tupaiidae, by M. Goodman. Electrophoretic studies on prosimian blood proteins, by N. A. Barnicot and D. Hewett-Emmett. Haemoglobin of the lesser bushbaby, *Galago senegalensis*: Starch gel electrophoresis and alkali-resistance, by F. Bush, D. Haines, and K. Holmes. Comparative analysis of protein determinants in primatological research, by K. Bauer. The uses of protein sequence data in systematics, by C. N. Cook and D. Hewett-Emmett. Prosimian biology and protein evolution, by R. Doolittle.

*Primate Utilization and Conservation.* Gordon Bermant and Donald G. Lindburg (Eds.) New York: Wiley-Interscience, 1975. 225 pp. [Price: \$16.50]

This volume contains papers of 15 of the participants in the New Concepts in Primate Production Conference held at the Battelle Seattle Research Center, August 11-12, 1972. The papers focus on three major themes: Current and projected research needs for primates. The present status of natural sources of supply. Innovative programs for providing reliable sources of primates that would not endanger natural resources. Contents: 1. Introduction and overview, by G. Bermant and D. G. Lindburg. 2. Primate resources--current status and future needs, by W. J. Goodwin. 3. Importing primates for research, by M. A. Nolan. 4. Needs of the pharmaceutical industry for experimental primates, by K. T. Kirton. 5. Primate populations and biomedical research, by C. H. Southwick, M. R. Siddiqi, and M. F. Siddiqi. 6. A current appraisal of Colombia's primate resources, by R. W. Cooper and J. Hernandez-Camacho. 7. The African coastal rain forest and its primates--threatened resources, by J. S. Gartlan. 8. The future of southeast Asian nonhuman primates, by F. C. Cadigan, Jr. and L. B. Liat. 9. Current efforts in primate conservation: The IUCN, by B. Harrisson. 10. Twenty years with Mount Takasaki monkeys, by J. Itani. 11. Production of specialized laboratory primates with consideration for primate conservation, by O. A. Smith. 12. Tupaia--low-cost primates for medical research--a breeding program at Battelle-Frankfurt, by A. Schwaier. 13. The feasibility of supplying relatively large numbers of primates for research, by K. R. Hobbs. 14. A domestic primate production feasibility study, by R. A. Whitney, Jr. 15. Summary: Primate conservation and utilization, by D. G. Lindburg and G. Bermant.

*Primates: Comparative Anatomy and Taxonomy.* Vol. 7. *Cynopithecinae: Cercocebus, Macaca, Cynopithecus.* W. C. Osman Hill. New York: Halsted Press, 1974. 970 pp. [Price: \$75]

This volume, the 7th of the projected series of at least 12 volumes, continues the family Cercopithecidae, started in volume 6 and completed in volume 8, which was published prior to the present one. Anatomical discussions are accompanied by 138 line drawings, 48 black and white plates, and many tables of measurements.

*Advances in Behavioral Biology.* Vol. 11. *Reproductive Behavior.* W. Montagna and W. A. Sadler (Eds.) New York/London: Plenum, 1974.

The proceedings of the Conference on Reproductive Behavior held at the Oregon Regional Primate Research Center, July 16-17, 1973. Among other chapters are the following: Pheromones in primate reproduction and social behavior, by G. Epple; The relationship between fetal hormones and the differentiation of the central nervous system in primates, by J. A. Resko; Social factors affecting the development of mounting behavior in male rhesus monkeys, by R. W. Goy, K. Wallen, and D. A. Goldfoot; The role of androgens in the