

LABORATORY PRIMATE NEWSLETTER

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Edited by

Allan M. Schrier

with the assistance of

Fred Stollnitz

Consulting Editor: Morris L. Povar

Psychology Department
Brown University
Providence, Rhode Island

CONTENTS ISSUE: VOLUMES 1-4

POLICY STATEMENT
(Revised January, 1965)

The primary purpose of the Newsletter is to provide information on maintenance and procurement of nonhuman primates for laboratory studies. A secondary purpose is dissemination of general information about the world of primate research. Examples of the kind of practical information that would be useful are as follows: new drugs; novel aspects of cage design; new products; evaluations of various products; references to or short summaries of articles of general interest; experiences in connection with the procurement of monkeys. The Newsletter will also publish offers to exchange monkeys (for example, older monkeys for young or infant monkeys) and requests for monkeys with special characteristics (for example, good breeders or pregnant females). If someone has a special problem, he might want to request help through the Newsletter.

As a rule, only research articles or summaries which have some practical implications or which provide general information likely to be of interest to investigators in a variety of areas of primate research will be accepted for inclusion in the Newsletter. Descriptions of current research projects will also be welcome. It should be kept in mind that the Newsletter is not a formal publication and it is not likely to be obtainable in libraries. Therefore citation of Newsletter notes or articles in publications should be limited to special circumstances.

Information for the Newsletter will be welcome from anyone in any research area who is using monkeys or apes. The Newsletter will appear quarterly and will continue so long as people are interested enough to contribute items of information. The mailing list is open to anyone expressing an interest. There is no charge for new issues and back issues for the current year. Volumes 1 and 2 of the Newsletter may be purchased for \$2.00 per volume and Volume 3 for \$1.00. (Please make checks payable to Brown University.)

All correspondence concerning the Newsletter should be addressed to:
Allan M Schrier
Psychology Department
Brown University
Providence, Rhode Island 02912

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EDITOR'S NOTES

The first two issues of Volume 5 (1964) of the journal, Primates, have recently been published by the Japan Monkey Centre. Dr. Itani, the editor, indicated in the journal that the editorial staff was re-organized prior to publication of Volume 5. The journal will now be published quarterly and will continue to be in English. The intention is to speed publication of the remainder of Volume 5, as well as Volume 6, so that, by the end of the year, the journal will be up to date. Up to now, Primates has been largely a bulletin of the Japan Monkey Centre, but the plan is to increase its scope by strongly encouraging contributions from all over the world on all aspects of primatology. Theoretical articles and articles of a more general nature will be accepted in addition to research reports. Starting with Volume 6, several pages will be reserved for short reports and communications, book reviews, and the like. According to Dr. Itani, the first journal of primatology in the world appeared in Italy during 1917-1918, but lasted for only two issues. This means that Primates, which first appeared in 1957, is the second, and Folia Primatologica, which first appeared in 1963, the third journal of primatology to appear in the world.

We recently learned of a health problem with juvenile (450-550 gm body weight) squirrel monkeys which raises an interesting point about the maintenance of young primates. The group of young animals in question progressively lost weight and some eventually died, although they were on a diet of commercial chow which was used successfully with a group of older squirrel monkeys at the same laboratory. We mentioned in the Editor's Notes in a previous issue (October, 1964) that, at the Brown University Primate Behavior Laboratory, we have been successfully maintaining a variety of macaques and adult squirrel monkeys solely on commercial chow. However, there is some feeling among those most experienced in maintaining squirrel monkeys that they require more protein than do macaques. Be that as it may, there is, in addition, good evidence that young, growing animals require a higher quantity and quality of protein than do adults of the same species. Thus, while one may be able to maintain a group of adult monkeys on a relatively low-protein diet, it does not necessarily follow that this will be true of young, growing animals.

In two places in this issue of the Newsletter, concern is expressed about inadequate means of distribution of information about nonhuman primates. We wonder whether it is as much a problem of availability of distribution media as a failure to make use of available media. For example, people have not contributed nearly as much information as this Newsletter alone could handle.

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The Newsletter is supported in part by U. S. Public Health Service Grant MH-07136 from the National Institute of Mental Health.

CONFERENCE REPORTS: THE AVAILABILITY AND LONG TERM SUPPLY OF
PRIMATES FOR MEDICAL RESEARCH*

This conference, held May 21-22, 1965, was sponsored by the New York Zoological Society and the International Union for the Conservation of Nature and Natural Resources. The co-chairmen were Fairfield Osborn, President of the Society, and François Bourlière, President of the Union.

The participants were: Geoffrey H. Bourne, Director, Yerkes Regional Primate Research Center, Emory University, Atlanta, Georgia; William Conway, Director, New York Zoological Park, New York, N. Y. 10460; Harold J. Coolidge, Executive Director, Pacific Science Board, Washington, D. C.; Lee S. Crandall, General Curator Emeritus, New York Zoological Park; Joseph A. Davis, Jr., Curator of Mammals, New York Zoological Park; Willard Eyestone, Chief, Animal Resources Branch, DRFR, National Institutes of Health, U.S. Public Health Service; C. R. Schroeder, Director, San Diego Zoological Garden; Donald R. Griffin, Chairman, The Biological Laboratories, Harvard University; Carl Koford, Supervisory Biologist, Department of Health, Education, and Welfare, Playa Humacao, Puerto Rico; William Montagna, Director, Oregon Regional Primate Research Center, Beaverton, Oregon; Theodore Reed, Director, National Zoological Park, Washington 9, D. C.; Arthur J. Riopelle, Director, Delta Regional Primate Research Center, Covington, Louisiana; Theodore C. Ruch, Director, Regional Primate Research Center, Seattle, Washington; Richard W. Thorington, Jr., New England Regional Primate Research Center, Harvard Medical School, Boston, Massachusetts.

I. THE EXPORT DRAIN UPON WILD PRIMATES

The importance of primates to medical research and pharmaceutical production can hardly be overestimated. So like man in physique and physiology, they occupy a place no other animals can fill, and for this reason if no other their preservation is essential. Certain hazards, such as destruction of habitat and hunting for food and pelts, have long existed and are increasing, but in recent years new dangers to the populations of wild primates are coming to the fore: the needs of the pharmaceutical industry, of medical research, of zoological gardens, and of the pet trade.

Surveys made by Southwick of rhesus and langur populations in India reveal sharp declines. Elsewhere small and little-studied populations appear to be near extermination. The golden marmoset is said to be disappearing in Brazil, and there are intimations that the same fate awaits many forest monkeys in Africa and Latin America. These are informed guesses, of course, based on the experiences of collectors, travelers, and naturalists, for accurate information on primate populations is un-

*This report was prepared by William G. Conway, one of the participants in the conference.

fortunately scanty. Forest monkeys are an exceptionally difficult problem to the population biologist, and, in fact, there is as yet no method of estimating non-territorial populations of these animals. The Cap-chur gun and radio-telemetry have been suggested as useful tools, but adequate censuses will require species research as well as methodology.

While we do not yet have accurate pictures of the status of primate populations beyond very noticeable declines, we do have importation figures which reveal the magnitude of the drain on the wild stock. Only a few of these figures are from the countries of origin, but we know that 25,000 vervets were exported from East Africa in 1962 and that since 1959 an estimated 100,000 monkeys have been exported from India each year. Other figures come from the records of foreign airports; in 1963, London Airport reported the passage of 42,000 monkeys. Since the United States is said to import more primates than all other countries, the U.S. import figures compiled by the National Institutes of Health are especially significant. This agency has kept track of rhesus monkey importations since 1955 and more recently langur importations. Their figures are on a fiscal year basis:

	<u>Total</u>	<u>Medical Research</u>	<u>Pharmaceutical</u>
1956	128,634		
1957	186,074		
1958	73,511		
1959	102,060		
1960	107,819	13,040	97,776
1961	66,358		
1962	53,978		
1963	56,681		
1964	47,905	5,328	42,577

The National Institutes of Health itself uses 5,000 to 7,000 monkeys each year to test vaccines.

Figures from the United States Customs, supplied through the Department of Health, Education, and Welfare, reflect the total number of all primates imported. Available figures are:

1952	32,000
1955	151,649
1958	223,000
1959	190,000
1960	221,000
1961	126,000
1962	162,000
1963	150,000
1964	115,000

Customs records indicate that 1965 importations in the early months of the year were at about the same rate as 1964. It is of interest to

note that from October through December, 1964, imports included 289 baboons, 29 chimpanzees, and 8 gorillas. From January through March, 1965, customs passed 172 baboons, 38 chimpanzees, and 7 gorillas.

Importations during the late nineteen-fifties and in 1960 were especially high. The majority were of rhesus monkeys, apparently reflecting the peak years of polio vaccine production. In recent years there has been a slight swing away from rhesus and langur importations as other species assume a more important part in research and pharmaceutical work. Also, the pet trade has developed a thriving mail order business in squirrel monkeys and marmosets. Zoo demands are comparatively unimportant in terms of numbers, but zoo collectors do stimulate the interest of natives in collecting primates. More important has been the zoo threat to certain rare primates such as the orangutan.

The purchase by American zoos of illegally exported orangs has been effectively halted since September, 1962, and several European zoo associations have put similar self-imposed restrictions into effect. Nevertheless, exportation of orangutans continues to be a major danger to the preservation of this species and zoo boycotts of course have no effect on the practices of private individuals or research centers.

The preservation of chimpanzees is likely to require special attention. Space research programs have presumably gone beyond the need for experimental chimpanzees, but more use of them in organ transplantation seems inevitable. The drain on chimpanzee stocks is potentially enormous if kidney transplants become more successful; 30,000 persons in the United States die each year from kidney deterioration. It is an ominous fact that the total wild chimpanzee population is probably less than 250,000, and that only 10% of this number may be presumed to belong to the blood type O required in transplant procedures.

Future research trends and scientific development are likely to create constantly changing problems of primate preservation. The development of a new vaccine, such as a measles vaccine, may make heavy demands on wild primates. If neurophysiological work trends more to monkeys than to cats, the number of monkey imports required could increase by 10,000 a year. Indeed, squirrel monkeys often cost less than cats. What would a "run" on squirrel monkeys do to the population? At this moment, we can only guess, for the exact status of its population is unknown. We can be sure, however, that many and perhaps most medical researchers are not fully aware of the decline in monkey populations, and thus in all innocence may make demands that will virtually exterminate a species.

While the rhesus monkey, the langur, the squirrel monkey, and the chimpanzee seem to be the most popular animals in current medical research, no one species is the perfect primate for all kinds of studies. Spider monkeys, for example, are refractory to polio virus. Thus research workers are not likely to restrict themselves to a few forms, and the conservationist must be equally broad. That our knowledge of

the biology, population, and management of these essential animals, in captivity and in the wild, is still so primitive, is astonishing but undeniable. To fill the gaps in our understanding must be a first-priority objective.

II. WAYS OF PRESERVING THE PRIMATE RESOURCE

When concern over declining primate populations is coupled with research requirements, it is natural to think of breeding in captivity as a solution.

Zoos, unfortunately, are not likely to produce significant surpluses for laboratory use. Most zoo collections are systematic in organization and only a small group of each species is maintained, and it is becoming evident that even to maintain their own stocks, zoos will have to show fewer species and maintain them in larger groups.

In some respects there are great advantages in captive-bred animals. A captive-bred primate is a "clean" animal of known age and medical history, acclimated to the situation in which it is kept captive, and usually amenable to change and handling. On the other hand, it may be socially undeveloped and its behavior may be biased by its rearing conditions, so that it is quite useless for some kinds of behavior studies. Experimental work often inhibits breeding, and in any event a monkey bred under controlled conditions is likely to be very expensive.

A wild-caught rhesus monkey of breeding age may cost \$35 to \$70, and a laboratory colony's monkey-production expenses may be much greater per animal. Rhesus monkeys take 5 or 6 years to mature, and at least one laboratory figures its food and care costs as \$1 a day for each animal. The problem is not simply one of cost, however. Lack of knowledge is the major deterrent to breeding primates in captivity.

The biology of the primates varies enormously from species to species, and is mostly unknown. To breed them successfully, we must develop a science of primate husbandry. That primates cannot be bred like laboratory rats is all too evident; they require special accommodations, often species-specific in nature, and social factors are critical in breeding success and even in proper growth and development of some forms. Individual variations are notorious in the highly developed primates, especially the great apes.

Diet, at least, is not a first-ranking problem. Laboratory nutrition is well worked out for the commoner forms, and zoos are comparatively advanced in the maintenance of many of the more exotic species. Exchange of information, particularly between the zoos and the laboratories, would remove much of whatever nutritional problems exist.

Thus far, neither laboratories nor zoological gardens have scientifically, systematically, and experimentally varied breeding and maintenance conditions to determine the most productive management methods.

Up to now we have not been able to get young from a broad group of species on a predictable, economic, and large-scale basis under controlled conditions. The time is ripe for the development of primate management methods.

The pedigrees of rare species, especially lemurs and the great apes, as well as strains of special medical interest, should be recorded in stud books such as those kept by zoo people for the wisent, the Pere David's deer, and Prjevalsky's horse. Diet and life-history information must be gathered, species by species, and information on accommodations and handling must be compiled. Certainly a survey in depth of primate breeding biology both in captivity and in the wild is needed.

The "farm" approach has been productive in some zoos and probably has much to offer laboratories, for too often the research man is unwilling to divert his attention from research to the proper management of his animals close at hand. Thus, if prospects for meeting a significant part of the primate demand through controlled breeding colonies seem dim, those for productive semi-wild colonies are bright. The success of the rhesus colonies at Cayo Santiago in Puerto Rico is a case in point.

Eight hundred rhesus roam three small islands at Cayo Santiago. While the population has been used mostly for study and has not been farmed, it tends to double every 5 years. The Cayo Santiago method can produce 4- to 7-lb. monkeys for \$50, F.O.B. Puerto Rico. Reproduction could probably be increased if farm culling of non-reproductive animals and extra males were undertaken. Surprisingly, these animals are virus-free, for viruses apparently die out in the colony. There are more than a thousand uninhabited islands in the Virgin Islands and there is little doubt but that many would be suitable for semi-wild primate colonization, even of chimpanzees. Food supplementation is necessary (1/3 lb. of monkey chow per day per monkey at Cayo Santiago), but costs are low, and waste, compared to that in caged colonies is slight. Probably certain Cercopithecus monkeys would adapt well to these conditions; in fact, there is an established colony on St. Kitts.

In final analysis, maintaining sufficiently large populations of primates in the wild is the most economical way of insuring the future supply of monkeys for research. Some species, such as the pygmy chimpanzee (bonobo) and some of the colobus monkeys, have very restricted or particularly endangered ranges and need quick help; immediate steps should be taken to set up captive and semi-wild colonies. For the vast majority of species, however, what is needed is ecological investigation and the establishment of adequate wildlife reserves. New studies could be supported by the Regional Primate Centers, and even programs now in progress could be modified to include work on population dynamics and ecological surveys. The National Institutes of Health should be able to program such work in studies it supports. And eventually a system for constant monitoring of the status of primate populations must be found.

All these matters are basic to the long-term problem of a steady supply of wild primates, but wasteful practices in use today are an immediate concern. Some African governments have actually embarked on primate destruction programs, considering the animals as agricultural pests. A few years ago nearly 25,000 guenons were destroyed in Sierra Leone. Where governments are likely to be involved in monkey control, the primate researcher is obligated to keep himself informed and, if possible, to obtain the offending animals for use or colonization elsewhere.

Wastage sometimes occurs when abundant and suitable species are overlooked, and thus there could be important advantages in research and the pharmaceutical industries spreading their primate demands over a wider variety of species. Some of the baboons appear to be increasing in East Africa but in one typical year 23,000 vervets passed through Nairobi Airport, and only 1,200 baboons. The research value of certain prosimians may prove to be high; some galagos, for example, breed well, grow rapidly, and mature early. The tree shrews, especially, need management investigation. It may be fairly argued that the discovery of satisfactory primates, other than those now in use, should be an obligation of primate research centers.

Especially severe wastage has occurred in the trapping and transportation of wild primates. Losses in past years during transportation and at the port of arrival are said to have sometimes exceeded 50%, but mortality after arrival is now no longer great; the NIH reports a current casualty rate of 3% to 4% within 6 weeks after arrival, based on an importation of 5,000 to 7,000 monkeys a year. New regulations as to cage size, the use of antibiotics, and a better understanding of the use of electrolytes in dehydration have all contributed to the improvement. However, mortality before shipment is still excessive.

No actual figures are available for the number of primates killed in trapping or holding operations before shipping. The consensus of opinion, however, admits two deaths in the country of origin for each primate successfully transported to the United States. If this is true, the primate drain assumes truly shocking proportions. Development of efficient, safe, collecting and holding techniques, and effective acclimatization procedures, are the most important immediate need in the whole field of primate importation. But it must be added that however easy the development of such techniques and procedures may be, their enforcement upon native collectors promises to be difficult.

III. CONCLUSIONS AND ASSIGNMENTS

A vigorous plan for primate preservation must be put into effect now, and its major programs should be concerned with a better exchange of information on primate biology and population, and development of management techniques for wild and captive primates.

Bio-medical people must be made aware of the diminishing primate

populations. An organized exchange of information among research centers, pharmaceutical laboratories, and zoological gardens is essential both to a science of primate husbandry and to a systematic understanding of primate biology. Such a cross-fertilization of ideas must inevitably yield important results. There is need for an authoritative work on primate conservation and management, perhaps along the lines of Dasman's Wildlife Biology.

Intelligent management of the primate resource requires better methods of population assessment, greater knowledge of life histories and, most obviously, better collecting techniques and procedures. Captive management should include improved techniques and also the maintenance of breeding stocks of endangered species.

In order to initiate action, the Conference reviewed certain areas of difficulty and, where possible, special assignments were proposed to handle them:

A. The need for improved primate census techniques, especially for forest primates, is especially important. A review of methods such as the index methods, and comparative techniques for diverse species, and new tools such as telemetry, is badly needed. It was decided to request: Dr. Charles Southwick to prepare a paper on line-transect population techniques and on other relevant population-assessment methods from his work in India. Dr. Carl Koford to prepare a summary of appropriate wildlife-management population-assessment techniques, and to test these techniques on his well-known Cayo Santiago colonies. Dr. Koford was requested to act as chairman of the Primate Census Group.

B. Improvement of collecting procedures poses special problems. Tranquilizers may prove useful tools. The veterinarian of the Toledo Zoo is gathering information from zoos, and Dr. Anthony Harthoorn has compiled much information on the use of anesthesia and tranquilizers in Cap-chur gun collecting, particularly with ungulates. However, most wild monkeys are captured in traps and it is in this trapping, initial transport, and acclimatization that the greatest losses occur. It was decided to request: Dr. Leon Schmidt to be chairman of a committee including Dr. Theodore Reed and Mr. William Conway to gather information for a critical review of the problems posed by primate capture, transportation, and acclimatization.

C. Improvement of breeding procedures should include the development of criteria for ascertaining the physiological condition of monkey and apes. It was decided to request: Dr. William Montagna to attempt the development of such criteria. Dr. C. R. Austin to investigate the usefulness of artificial insemination in captive primate management.

D. The importance of studbooks in the long-term captive breeding of wild animals was recognized. It was decided to request: Dr. Geoffrey Bourne to be chairman of a committee including Dr. Schroeder and Mr. Conway to set up such books for orangutans and chimpanzees.

E. Improved distribution of information was considered at length and arrangements were made for a full interchange of publications between zoos and primate research centers. The IUCN and American Committee for International Wild Life Protection can provide information to biomedical people on wild primate status, but distribution remains a problem.

Dr. Theodore Ruch volunteered that his center could publish material on demand if it is something of bulk. Reports from committees could be so handled.

The unique information of the Primate Centers, it was pointed out, could be made more generally available through the International Zoo Yearbook. An expanded Laboratory Primate Newsletter which included a check-list of species maintained and bred should be arranged, if possible. It should include: 1. An estimate of the total population of each species every year; 2. Animal productivity figures for commonly bred species, such as, breeding population, number of young, viability, etc. (For example: Total number of pig-tailed monkeys; Sex ratio; Age ratio; Total breeding population; Total births; Total number of young, 6 mos. old.); and 3. International Zoo Yearbook census material.

F. Finally, the Conference reviewed its representation and determined to invite additional investigators and representatives from pharmaceutical laboratories to a future meeting. Dr. Fairfield Osborn renewed the offer of the New York Zoological Society to be host to the next conference at a date to be arranged in 1966.

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SYMPOSIUM REPORTS: A PRIMATE SYMPOSIUM

The symposium was held September 11, 1965 and sponsored by The Chicago Branch-Animal Care Panel, The Illinois Society for Medical Research, and Presbyterian-St. Luke's Hospital.

The following papers were read: Epidemiology of platyrrhine Herpes virus, by A. W. Holmes, Presbyterian-St. Luke's Hospital, Chicago; Care and raising of infant rhesus monkey (Macaca mulatta), by George R. Kerr, Regional Primate Research Center, Madison, Wisconsin; The importance of taxonomy in primate research and care, by Philip Hershkovitz, Chicago Natural History Museum; Use of platyrrhine monkeys in medical research, and their care in the laboratory, by James Devine, Presbyterian-St. Luke's Hospital; Care of laboratory primates at the Upjohn Laboratories, by Edward De Young, Upjohn Laboratories, Kalamazoo, Michigan; Handling and restraint of the squirrel monkey--a discussion and demonstration, by Alan Kraus, Michael Reese Hospital, Chicago. (Grants toward subsidizing the Symposium were received from: Acme Metal Products, Allied Mills, and Diversey Corporation.)

SYMPOSIUM REPORTS: SOME RECENT DEVELOPMENTS IN COMPARATIVE MEDICINE*

This symposium, held June 15-16, 1965, was sponsored by the Zoological Society of London and the World Health Organization (see April, 1965, issue of this Newsletter for additional details about participants in this symposium and topics of papers).

The symposium was concerned with the use of primates in medical research with special reference to cardiovascular disease and oncology, and with the role of viruses in the etiology of leukemia in man and other animals.

All who attended the meeting had been greatly impressed by the recent important advances achieved in the U.S.S.R. and U.S.A. in the development of their primate research centers. Such centers are essential now that nonhuman primates occupy so important a position in the development of medical research programs. In one way or another, these animals are sure to play a vital role in research on many important diseases, including cancer and leukemia, diseases of the heart and arteries, rheumatism and diseases of the joints, psychiatric and neurological conditions, and dental conditions.

It was generally agreed that additional primate centers were an essential requirement both in Britain and in other parts of the world. In the U.S.A. each primate center includes a breeding colony; it had become abundantly apparent from the discussions at the symposium that any program for primate centers must necessarily include provision for and research into the breeding of these animals. This was necessary, not only for the provision of animals for medical research, but in the interests of primate species themselves, many of which are threatened with extinction because of the increasing spread of human habitation and the elimination of natural habitats. The provision of primate centers was, therefore, an important feature of world conservation programs.

Among points discussed was the dissemination of information regarding the ways in which primates can be kept healthy and active in captivity. Information centers already exist under Professor B. Lapin at the Sukhumi Primate Center in Georgia, U.S.S.R., and under Doctor Theodore C. Ruch at Seattle, Washington. At present, however, the means of world-wide dissemination of information are limited, and World Health Organization representatives agreed to consider ways of rectifying this situation.

It was felt that there exists a need for a more comprehensive work on the diseases of primates, although members were appreciative of Ruch's Diseases of Laboratory Primates. This has been partly met

*Based on a release by the Press Office of The Zoological Society of London.

by the preparation of a monograph on Zoonoses of Primates by R. N. T-W-Fiennes, distributed in draft form to participants at the symposium; it will be published shortly as a joint working paper by the Food and Agriculture Organization and the World Health Organization.

The conference recognized the special problems connected with such highly evolved animals as primates, and urged agreement and adoption of optimum standards of feeding, housing, transit, and welfare generally; also of protective measures to safeguard the health of attendants looking after their animals. The World Health Organization delegates agreed to do what was possible about this immediately and to keep the question under review.

The conference realized the need for more exact identification of primate species, and recommended the preparation of a simple practical key to the different species. Scientists using primates were recommended to have their animals precisely identified.

The World Health Organization will consider the arrangement of further symposia and smaller study groups for specific problems; it will also endeavor to make available more fellowships to enable persons working with primates to visit other centers.

On June 17th many of the participants formed themselves into a World Health Organization Working Party under the Chairmanship of Professor Beveridge, Head of the Veterinary Public Health section of W H O, to advise the World Health Organization on areas in which they could usefully implement some program of action arising from the conference proceedings.

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WHOLE BLOOD NEEDED

We are presently conducting a phylogenetic survey of a number of primate blood proteins and enzymes. We are, therefore, in need of 2.0 to 5.0 ml of whole blood from various nonhuman primate species. It would be appreciated if anyone capable of supplying this blood contact the undersigned.--Michael H. Crawford, Laboratory of Primate Genetics, Regional Primate Research Center, Seattle, Washington 98105.

SERA OF ANIMALS RECOVERED FROM MONKEY POX NEEDED

Sera of animals recovered from Monkey Pox (not Monkey B) are requested for evaluation of a fluorescent antibody test useful in other animal pox infections.--L. R. Christensen, Berg Institute, New York University Medical Center, 550 First Avenue, New York, N. Y. 10016 (Phone: 212 OR 9-5987).

NEW PRODUCTS AND SERVICES

An automatic primate watering system with arrangements for pressure regulation, warning of failure of water supply, and automatic switching to an alternate water supply. Each animal-cage rack is plumbed with drinking founts for individual cages, with quick-disconnect couplings at both ends of the rack. The watering system has a recoiling hose attached to the end of the pipe, so that when the rack is wheeled into the room, it is put into position, the person reaches up and pulls the hose down, connects the water to the cage and the animals are fed water automatically. The system can be built with completely corrosion-resistant materials.--M. & J. Associates, Inc., P.O. Box 24, Timonium, Maryland 21093.

Laboratory animal care equipment, including monkey cages.--Lenderking Metal Products, Inc., 1000 S. Linwood Ave., Baltimore, Maryland 21224.

Holding and conditioning of primates has been started at our European branch in Uden, Holland. Both branches are equipped and maintained in much the same manner. That is, individual cages of various sizes suspended from the walls, steel partition between the cages, or wrap-around cages. Each cage has individual drinking nipples, individual control of feeding, and observation of food consumption. All rooms are individually controlled for heating and ventilation. Fresh and conditioned primates are maintained in separate nonconnecting rooms. There is no mixing of species nor interchange of equipment between rooms. Support equipment includes use of automatic mixture of cleaning solutions, fly protection, fogging equipment, footwear disinfectant trays, gowns, equipment for disinfecting vehicles used for transport of shipments, autoclaves, etc. Disposable items are used as often as possible. We can condition primates to the various requirements of laboratories. Our services include T.B.-testing, deworming upon request, and also collecting feces, urine, and blood for preselection of primates. Conditioned primates can be shipped in individual containers with filter material over the normally open areas to prevent contamination en route. Isolated primates are also available from the bush. All of our shipments arriving at Schipol Airport and J.F.K. International Airport receive personal handling to preserve their original high quality.--Hartelust-Thorsen & Co., Land Van Ravenstein Str. 29, Uden (N.B.) Netherlands, and P. O. Box 488, Belmar, New Jersey.

Announcement of opening of new primate conditioning facilities. Staff consists of experienced animal husbandman, veterinary consultant, bacteriologist, and animal caretakers. All animals are housed in climatically controlled facilities and delivered in a climatically controlled vehicle. Individual cages, cleaned and disinfected before and after each shipment, are always used. During the conditioning period, primates are given the following treatments: (1) A minimum of two tuberculin tests, one upon arrival and a second within 21 days. A certificate of negative reaction is provided to each consignee. (2)

Anthelmintics for gastrointestinal and external parasites. JEJA will notify the consignee of the kind and amount of any drug used during the conditioning period. JEJA will gladly condition primates on the diet the consignee is using. If requested by the investigator, animals will be specially tested bacteriologically and serologically.--JEJA, Inc., Freetown Road, Simpsonville, Maryland.

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VISITING PET MONKEY GIVES CHILDREN DYSENTERY

The uncle of a 2-year-old Welsh child landed from a ship bringing with him a pet monkey that delighted his niece and other child relatives he visited. Unfortunately, seven children and one adult contracted acute bacillary dysentery caused by organisms of the Shigella genus, which infect only monkeys, apes, and humans.

The danger of Shigella flexneri Y, the organism infecting four of the seven children and the monkey, was demonstrated as long ago as 1931 when three children in Germany under 5 years of age died following similar contact with guenon monkeys brought from West Africa as pets. None of the Welsh children died, although some of them were hospitalized.

The risk to adult handlers from primates in zoos and laboratories is not great, but the intimate fondling of pet monkeys in a household carries real risk of infection, a team of scientists reported in the British Medical Journal, April 3, 1965. Children are especially vulnerable.

Doctors and veterinarians should discourage families, particularly those with young children, from taking monkeys as pets, the researchers said.

D. T. Robinson, director, Public Health Laboratory, Liverpool; Dr. Elizabeth C. Armstrong, senior bacteriologist of the same laboratory; and Dr. Patricia Carpenter, director, Dysentery Reference Laboratory, Colindale, London, reported the findings.--From the April 24, 1965, issue of Science News Letter.

UNITED STATES LAW PROHIBITS IMPORTATION OF ORANGUTANS*

For a number of years several conservation agencies, notably the International Union for the Conservation of Nature and Natural Resources and the American Association of Zoological Parks and Aquariums, have been deeply concerned with the rapid decline of the wild population of orangutans. One of the major reasons for the predicament of this ape is the demand for this large primate by medical research facilities, universities, the pet market, to a lesser degree zoos, and occasionally museums. In most cases infants are involved because of the ease of acquisition and shipping. This means that the mother is sacrificed, thereby removing a breeding female from the population. Some authorities have estimated that only one infant in six survives the experience, greatly increasing the pressure on the population.

Several years ago the American Association of Zoological Parks and Aquariums blacklisted orangutans and as a result orangutan traffic to zoos in the United States was almost completely halted. However, orangutan traffic began to flow to a new outlet, that of expanding medical research and universities. Unfortunately, most of the medical research facilities and universities were not aware of the conservation aspects for this species until recently.

In the meantime, groups such as the International Union for the Conservation of Nature and Natural Resources were studying the problem on a world basis and several vigorous programs were inaugurated by such persons as Mrs. Barbara Harrisson of the Orangutan Recovery Service (OURS) program. Mrs. Harrisson learned of Section 43, Title 18 of the United States Code and immediately recognized the value of this law for orangutan conservation.

"Section 43. Transportation of wildlife taken in violation of State, National, or foreign laws; receipt; making false records

Whoever delivers, carries, transports, ships, by any means whatever, or knowingly receives for shipment, to or from any State, territory, the District of Columbia, the Commonwealth of Puerto Rico, any possession of the United States, or any foreign country, any wild mammal or bird of any kind, or the dead body or parts thereof, or the offspring or eggs therefrom, as the case may be, which was captured, killed, taken, purchased, sold, or otherwise possessed or transported in any manner contrary to any Act of Congress or regulation issued pursuant thereto or contrary to the laws or regulations of any State, territory, the District of Columbia, the Commonwealth of Puerto Rico, possession of the United States, or foreign country; or

* An American Association of Zoological Parks and Aquariums release prepared by Clyde A. Hill, Chairman, Subcommittee Primate Conservation, Conservation of Wildlife Committee.

Whoever receives, acquires, or purchases, knowingly, any such wild mammal or bird of any kind or the dead body or parts thereof, or the offspring or eggs therefrom, which was so transported, delivered, carried, or shipped by any means whatsoever, as aforesaid; or

Whoever, having acquired any of the foregoing properties which was so transported, delivered, carried, or shipped by any means whatever, as aforesaid, makes any false record, account, label or identification thereof; or

Whoever imports from or exports to Mexico any game mammal, dead or alive, or parts or products thereof, except under permit or authorization of the Secretary of the Interior, in accordance with regulations issued by him and approved by the President--

Shall be fined not more than \$500 or imprisoned not more than six months, or both; and the wild animals or birds, or the dead bodies or parts thereof, or the eggs of such birds, shall be forfeited. As amended Sept. 2, 1960, Pub. L. 86-702, S 2, 74 Stat. 754"

Mrs. Harrisson pursued the obvious course of action and secured ordinances prohibiting the exportation of orangutans from each of the nations in which the orangutan occurs in nature. Photostatic reproductions of these laws have been deposited at the San Diego Zoo. They are the Wild Animal Protection Ordinance, 1931, with a cover letter from I. Made Taman, Head of the Division of Nature Conservation and Wildlife Management, Borgor, dated October 20, 1964; Chapter 128, Wildlife Protection, State of Sarawak, January 1958, and the Conservation Ordinance of North Borneo, June 1963. All of these documents are still in effect, and each prohibits the exportation of orangutans.

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ANNUAL ANIMAL CARE PANEL MEETING

The 16th annual meeting of the Animal Care Panel will be held at the Sheraton Hotel, Philadelphia, Pennsylvania, November 15-19, 1965. A seminar on the use of isoniazid for the control of simian tuberculosis will be one of several sessions of special interest to primate researchers.

RECENT BOOKS AND ARTICLES

Books

Behavior of nonhuman primates. Schrier, A. M., Harlow, H. F., & Stollnitz, F. (Eds.) New York: Academic Press, 1965. 2 vols.

This is the only work to date which surveys modern laboratory and field research on the behavior of monkeys and apes. Among the topics covered are learning, behavior development, aging, social behavior, and effects of ionizing radiations.

Japanese monkeys: A collection of translations. Articles selected by Imanishi, K., and edited by Altmann, S. A. Edmonton, Alberta, Canada: Editor, 1965.

Copies of this multilithed, bound volume (151 pp.) can be purchased by sending \$4.00 to: Japanese Monkeys, Yerkes Regional Primate Research Center, Emory University, Atlanta, Georgia.

Methods of animal experimentation. Vol. I. Gay, W. I. (Ed.) New York: Academic Press, 1965.

Contains the following chapters: Collection and withdrawal of body fluids and infusion techniques; anesthesia and sedation; care of animals during surgical experiments; radiography; methods of euthanasia and disposal of laboratory animals; methods of parasitic infections: outline of general principles; methods of germfree animal research; aerosol challenge of animals; principles in drug administration.

Disease

A severe infection of a Macaca mulatta with an acid-fast organism. Knezevic, A. L., & Ushijima, R. N. (Oregon Reg. Primate Res. Center, Beaverton, Ore. 97006) Laboratory Animal Care, 1965, 15, 247-253.

Spontaneous Proteus mirabilis infection associated with chronic diarrhea in a rhesus monkey (Macaca mulatta). Povar, M. L. (Psychol. Dept., Brown U., Providence, R. I. 02912) Laboratory Animal Care, 1965, 15, 262-263.

A naturally acquired quotidian-type malaria in man transferable to monkeys. Chin, W., Contacos, P. G., Coatney, G. R., & Kimball, H. R. (National Inst. Allergy and Infect. Diseases, Bethesda, Md. 20014) Science, 1965, 149, 865.

Atherosclerosis in subhuman primates. Malinow, M. R. (Oregon Reg. Primate Res. Center, Beaverton, Ore. 97006) Folia Primatologica, 1965, 3, 277-300.

Atherosclerosis in primates. Gresham, G. A., et al. (U. of Cambridge, England) British Journal of Experimental Pathology, 1965, 66, 94-103.

Physiology

Peripheral blood of wild Japanese monkeys (Macaca fuscata fuscata and M. f. yakui). Inoue, M., Itakura, C., Takemura, N., & Hayama, S. (first 3 authors: Gifu U., Gifu, Japan; last author Kyoto U., Kyoto) Primates, 1964, 5, 75-112.

Persistence des phénomènes d'ovogénèse chez l'adulte de Daubentonia madagascariensis (Prosimii, Lemuriformes). Petter-Rousseaux, A., & Bourlière, F. (Centre de Gérontologie Claude Bernard and Dépt. de Physiologie, Faculté de Méd. de Paris, 45, rue des Saints-Pères, Paris VIe) Folia Primatologica, 1965, 3, 241-244.

Simian blood groups. A "new" blood factor, A^{ba}, of Celebes black ape red cells demonstrated with rabbit antisera. Moor-Jankowski, J., Wiener, A. S., Gordon, E. B., & Guthrie, C. B. (1st author: Dept. Forensic Medicine, New York U. School of Med., New York, N. Y.) Folia Primatologica, 1965, 3, 245-250.

Instruments and Techniques

A restraining device and procedure for continuous blood pressure recordings in monkeys. Forsyth, R. P., & Rosenblum, M. A. (U. of California Med. Center, San Francisco, Calif.) Journal of the Experimental Analysis of Behavior, 1964, 7, 367-368.

A device for measuring fluid intake by primates. Povar, M. L., & Salk, Rae (Psychol. Dept., Brown U., Providence, R. I. 02912) Journal of the Experimental Analysis of Behavior, 1965, 8, 187-188.

NIH Standard Animal Care Equipment Bethesda, Md.: National Institutes of Health, 1965. (Copies may be obtained by writing to Purchase Standards Unit, Procurement Section, SMB, Bldg. 13, Rm. 2338, National Institutes of Health, Bethesda, Md. 20014)

A catalogue of N.I.H. standardized animal cages and accessories. Each piece of equipment is illustrated and described in terms of overall dimensions, construction, and general usage.

Facilities, Care and Breeding

Guide for laboratory animal facilities and care (Rev. ed.)

Washington, D. C.: U.S. Dept. Health, Education, and Welfare, 1965. (For sale by the Supt. of Documents, U.S. Government Printing Office, Washington, D. C. 20402. Price 25 cents.)

Contains much valuable information for anyone planning laboratory animal facilities and a selected bibliography on the care and management of laboratory animals.

Laboratory animal facilities. Jonas, A. M. (Yale U., School of Med., New Haven, Conn.) Journal of the American Veterinary Medical Association, 1965, 146, 600-606.

Standards for the breeding, care, and management of laboratory primates: I. Macaca mulatta. Washington, D. C.: National Academy of Sciences, National Research Council, 1965. (Mimeographed copies may be obtained from Dr. Robert H. Yager, Institute of Laboratory Animal Resources, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, D. C. 20418.)

Breeding Macaca nemestrina: A program of birth engineering. Kuehn, R. E., Jensen, G. D., & Morrill, R. K. (Oregon Reg. Primate Res. Center, Beaverton, Ore., 97006, Dept. Psychiatry and Reg. Primate Res. Center, U. of Washington, Seattle, Wash.) Folia Primatologica, 1965, 3, 251-262.

Laboratory animals. Part IV: Graduate education in laboratory animal medicine, proceedings of a workshop. Washington, D. C.: National Academy of Sciences, National Research Council, 1965. (For sale by Printing and Publishing Office, National Academy of Sciences, 2101 Constitution Ave., N.W., Washington, D. C. 20418. Price \$1.25)

A report of the workshop's findings on (1) Definitions, scope, and status of knowledge in laboratory animal medicine, (2) Present and projected manpower needs in laboratory animal medicine, (3) Need and methods for continuing education in laboratory animal medicine, and (4) Composition and educational philosophy of graduate training activities in laboratory animal medicine.

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Morphological studies of Macaca fuscata: I. Dermatoglyphics of the hand. Iwamoto, M. (Japan Monkey Center, Aichi) Primates, 1964, 5, 53-73.

The pterion in macaques. Iwamoto, M., & Hayama, S. (Japan Monkey Center, Aichi, and Lab. of Physical Anthropol., Kyoto U., Kyoto) Primates, 1964, 5, 113-116.

Der canalis sacralis als indikator für die Länge der Caudalregion der Primaten. Ankel, F. (Anthropologisches Inst. der U. Zürich, Kunstlergasse 15, 8001 Zürich) Folia Primatologica, 1965, 3, 263-276.

General

Report of the preliminary survey on the orang-utan in North Borneo. Yoshida, K. (Kyoto U., Kyoto, Japan) Primates, 1964, 5, 11-26.

Primates from trap to test tube. Roth, T. W. (3413 Turner Lane, Chevy Chase, Md. 20015). Laboratory Animal Care, 1965, 15, 243-246. (Editorial)

ADDITIONS TO MAILING LIST

Robert E. Bagdon
Dept. of Toxicology
Hoffmann-La Roche, Inc.
Nutley, N. J. 07110

Allen Barnett
Dept. of Toxicology
Hoffmann-La Roche, Inc.
Nutley, N. J. 07110

Biol Sci. Comm. Project
of the Airlie Center
George Washington Univer.
Suite 700, 2000 P St., N.W.
Washington, D. C. 20036

Depts. Surg. Res. &
Animal Care
Biophysics Res. Lab.
Univer. of Illinois, Coll. Eng.
Urbana, Ill. 61803

George Bjotvedt
Animal Res. Facilities
The Mount Sinai Hospital
100th St. & Fifth Ave.
New York, N. Y. 10029

Evelyn Bock
1500 North Manhattan
Manhattan, Kansas 66502

James O. Brick
Oak Ridge National Lab.
Post Office Box Y
Oak Ridge, Tenn. 37831

Kenneth F. Burns
Vivarium Sci. & Res.
Tulane Univer., Sch. of Med.
1430 Tulane Ave.
New Orleans, La. 70112

Thomas M. Butler
117 Fairway Drive
Bryan, Texas 77803

John A. Chapman
Dept. of Psychology
Carnegie Inst. of Tech.
Pittsburgh, Pa. 15213

Donald H. Clifford
Lab. Animal Med. & Care
VA Hospital
2002 Holcombe Boulevard
Houston, Texas 77031

Carmen Costa
3035 N.W. 84th Terrace
Miami, Florida

Michael H. Crawford
Lab. of Primate Genetics
Reg. Primate Res. Cen.
Univer. of Washington
Seattle, Wash. 98105

Anthony C. D'Agostino
Dept. of Anthropology
Coll. of Arts & Sciences
State Univer. of N. Y.
Buffalo, N. Y. 14214

Paul D'Encarnacao
Dept. of Psychology
Vanderbilt University
Nashville, Tenn. 37203

Richard E. Doyle
Dept. of Medicine
J. Hillis Miller Hlth Cen.
Univer. of Florida
Gainesville, Fla. 32603

Abbott S. D'Veer
Dept. Lab. Animal Med.
A.S.P.C.A. Hosp. & Clinic
441 East 92nd Street
New York, N. Y. 10028

The Endocrine Labs.
P. O. Box 1436
979 Jonathan Drive
Madison, Wisc. 53701
Att. E. G. Shipley

Howard Feinman
Pharmacology Dept.
Hazleton Labs, Inc.
P. O. Box 30
Falls Church, Va. 22046

Charles S. Feldstone
Dept. of Psychology
Box U-30
The Univer. of Conn.
Storrs, Conn. 06268

Derek Freeman
Dept. of Anthropology
Australian Nat. Univer.
Box 4, P. O.
Canberra, A.C.T., Australia

J. J. Gerrity
M. & J. Associates, Inc.
P. O. Box 24
Timonium, Md. 21093

Michael G. Groves
529 Terry Parkway
Gretna, Louisiana

David A. Hamburg
Dept. of Psychiatry
Stanford University
School of Medicine
Palo Alto, Calif. 94304

Donald K. Hinkle
2947 Linn
San Antonio, Texas 78223

Eugene W. Hupp
Dept. of Biology
Texas Woman's University
Box 3716, TWU Station
Denton, Texas 76204

Charles Impellizzeri
Dept. of Toxicology
Hoffmann-La Roche, Inc.
Nutley, N. J. 07110

Dan Johnson
Dept. Psychol. & Sociology
Virginia Polytechnic Inst.
Davidson Hall, Room 406
Blacksburg, Va. 20061

Harold Josephs
General Electric Co.
Rm. 3137M
King of Prussia, Pa. 19101

M. F. Jurko
Lab. of Exp. Behavior
Univer. of Miss Med. Gen.
2500 North State Street
Jackson, Miss. 39216

Ernest D. Kemble
Dept. of Psychology
Vanderbilt University
Nashville, Tenn. 37203

Dept. Lab. Animal Med.
College of Medicine
Univer. of Cincinnati
Cincinnati, Ohio 45221

William A. Little
Dept. Obstet. & Gyn.
J. Hillis Miller Hlth Cen.
Univer. of Florida
Gainesville, Fla. 32603

Charles J. Long
Dept. of Psychology
Vanderbilt University
Nashville, Tenn. 37203

Howard C. May, Jr.
Animal Hospital
Primate Quarantine Unit
Nat. Inst. of Health
Bethesda, Md. 20014

Polly L. Morris
4953 W. Pt. Loma Blvd.
Apt. 2
San Diego, Calif. 92107

J. R. Neill
102 Harbeson Pl.,
Glenville
Wilmington, Del. 19804

Steven P. Pakes
Directorate of
Biological Operations
USA Pine Bluff Arsenal
Pine Bluff, Ark. 71601

Jere M. Phillips
P. O. Box 164
College Station, Texas 77841

A. Plenthl
P & S 16-434
630 W. 168 St.
N. Y., N. Y. 10032

Michael W. Rohovsky
Dept. of Vet. Pathol.
The Ohio State Univer.
1925 Coffey Road
Columbus, Ohio 43210

Harry Rudiger
Dept. of Toxicology
Hoffman-La Roche, Inc.
Nutley, N. J. 07110

Henry P. Schneider
Biological Res. Lab.
Hahnemann Medical College
230 North Broad St.
Philadelphia, Pa. 19102

John N. Sheagren
Bldg. 10, Rm. 11S-242
Nat. Inst. of Health
Bethesda, Md. 20014

Kathleen Shupp
4253 44th St.
San Diego, Calif. 92115

K. Smith
Biological Sciences
Riker Laboratories
19901 Nordhoff Street
Northridge, Calif.

Vincent G. Stenger
Dept. Obstet. & Gyn.
Univer. of Florida
School of Medicine
Gainesville, Fla. 32603

Jim A. Stunkard
247 W. Dickson, Apt. 226
San Antonio, Texas 78214

Henry L. Taylor
Comp. Psychol. Div.
6571st Aeromed. Res. Lab.
Holloman AFB, New Mexico 88330

William Wagman
Dept. of Psychology
Southern Illinois Univer.
Carbondale, Ill. 62903

Stanley N. Wampler
Pesticide Res. Lab.
US Public Health Service
P. O. Box 490
Perrine, Florida 33157

R. C. Wolf
Dept. of Physiology
Service Memorial Inst.
The Univer. of Wisconsin
Madison, Wisc. 53706

Sheldon M. Wolff
Bldg. 10, Rm. 11N-313
Nat. Inst. of Health
Bethesda, Md. 20014

David H. Wood
3203 Bolmore, Apt. 143
San Antonio, Texas 78223

ADDRESS CHANGES

R. Andrew
Sch. Biological Studies
University of Sussex
Brighton, U.K.

Terence R. Anthony
5715 S. Drexel Avenue
Chicago, Ill. 60637

Stewart Altmann
Yerkes Regional Primate
Research Center
Atlanta, Ga. 30322

John Buettner-Janusch
Dept. of Anatomy
Duke University
Durham, N. C. 27706

Theodore E. Cadell
Dept. of Psychology
Univer. of Waterloo
Waterloo, Ontario
Canada

James D. Clark
RFD No. 1
Box 1030
Kenner, La. 70062

G. L. Fisher
Dept. of Psychology
Univer. of Maryland
College Park, Md. 20910

Jack Fooden
Div. of Mammals
Chicago Natural
History Museum
Chicago, Ill. 60605

Donald P. Foshee
Dept. of Psychology
Auburn University
Auburn, Alabama 36830

Edward Garner
Dept. of Toxicology
Hoffman-La Roche, Inc.
Nutley, N. J. 07110

Jack R. Hessler
Animal Department
J. Hillis Miller Hlth Cen.
University of Florida
Gainesville, Fla. 32603

John E. Holman
4103 Byrd Court
Kensington, Md.

Robt. L. Hummer
Southwest Foundation for
Res. & Education
P. O. Box 2296
San Antonio, Texas 78206

Dennis O. Johnsen
2865 Fleetwood Dr.
San Bruno, Calif. 94066

Richard A. King
Psychology Dept.
University of N. C.
Chapel Hill, N. C. 27515

Carl J. Koehn
8610 N. McCullough Ave.
Apartment 705 West
San Antonio, Texas 78216

Michael Nolan
Primate Imports Corp.
34 Munson Street
Port Washington, N. Y. 11050

M. W. Parrott
Delta Regional Primate
Research Center
Covington, La. 70433

Carl Pfaffmann
Rockefeller University
New York, N. Y. 10021

Charles M. Rogers
Yerkes Regional Primate
Research Center
Emory University
Atlanta, Ga. 30322

Evalyn F. Segal
Dept. of Pharmacology
Royal Coll. Surg. England
Lincoln's Inn Fields
London, W.C.2, England

Lawrence G. Sharpe
Dept. of Psychology
Purdue University
Lafayette, Ind. 47907

Elwood W. Speckmann
2951 Jonquil Lane
Downers Grove, Ill.

David A. Stevens
Dept. of Psychology
Clark University
Worcester, Mass. 01610

Clyde Stormont
Dept. Vet. Microbiology
Univer. of California
Davis, Calif. 94616

Roger Stretch
Dept. of Psychology
Univer. of Alberta
Edmonton, Alberta
Canada

Delbert D. Thiessen
Dept. of Psychology
University of Texas
Austin, Texas 78712

John G. Vandenberg
Dorothea Dix Hospital
Raleigh, N. C. 27602

Gerhard Werner
Dept. of Pharmacology
University of Pittsburgh
School of Medicine
Pittsburgh, Pa. 15213

Robert A. Whitney, Jr.
Chemical Research and
Development Labs.
Edgewood Arsenal, Md. 21010

James F. Wright
Radiobiology Lab.
Sch. of Veterinary Med.
Davis, Calif. 95616

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