Meetings

Primate Biology: Planning Meeting

Acting upon a recommendation made by the third meeting of the U.S.–Japan Committee on Scientific Cooperation, scientists of the two countries met at Gamagori and Kyoto on 24–29 February 1964 to discuss the possibility and desirability of cooperative efforts between the United States and Japan in the study of primates.

The importance of primate studies as a field of modern science as well as a part of natural history was recognized early in the United States. Laboratory studies of primates were begun in the 1920's, field investigations of the social activities of monkeys and apes in Latin America, Africa, and Southeast Asia were started in the 1930's, and an institute for behavioral and physiological studies of the chimpanzees was established in 1930. Since then primate studies in the United States have become wide in scope and breadth in terms both of the numbers of scholars participating in them and of the academic disciplines they represent. The recent founding of seven regional primate research centers with full financial support from the United States Government gives a prospect of rapid growth of primate studies.

In Japan, field studies of primates were started in 1950 by a group of ecologists. These studies were facilitated by the widespread existence of wild monkeys throughout Japan. Investigators of laboratory animals have also cooperated in the extensive development of studies of primates.

The establishment of the Japan Monkey Centre at Inuyama in 1956 had the effect of increasing the number of scientists interested in this area and extending the scope of activities to include field studies in other countries. Today both the United States and Japan occupy advanced positions in primate studies. There are certain opportunities for study which are unique to each country and, on the other hand, there are problems which are of common interest to both countries.

For example, the United States has conducted laboratory studies of imported primates, whereas the Japanese have engaged in long-term field observation of successive generations of native monkeys. These studies complement each other in an impressive way.

However, due to the history of separate developments and barriers of distance and language, exchange of information between the U.S. and Japan has so far been limited, and neither country has fully understood and utilized the results of primate studies in the other. Cooperative activities of scientists in both countries will accelerate research in primatology and improve communication. It was with this objective that scientists of both countries discussed problems in concrete terms and proposed the programs outlined here.

The three areas for joint studies agreed upon by the participants were (i) comparative studies of inter- and intra-species characteristics of primates, (ii) anatomical, physiological, and behavioral studies of primates, and (iii) studies of the care and diseases of free and captive primates.

Some examples of specific research topics in these areas are inter- and intra-species ecology and social organization of primates both in the wild state and in the laboratory; vocalization and communication; development and aging; anatomy and physiology of the nervous system and receptors; endocrinology, reproductive physiology, and population regulation; dental research and experimental dental pathology; adaptive mechanisms, learning, performance, and motivation; experimental pharmacology and toxicology; infectious and degenerative diseases; and nutrition and its relationship to cardiovascular and other diseases.

One responsibility of a primate research center is to provide information to other laboratories and scientists, to serve as a clearinghouse for literature from all over the world, and to analyze the materials gathered. One primate center in the United States is already engaging in such activity. It is desirable to establish a similar primate information center in Japan. These two agencies working together would assure highly dependable services for the strengthening of international research efforts and would avoid undesirable duplication of studies. For this purpose it will be necessary for the information center to conduct exchange of graphic, photographic, and film materials, as well as bibliographies, published books, and research papers.

Most species of primates occur in areas outside Japan and the United States, and field and laboratory studies should be conducted in such areas. Laboratories already existing in these areas and others yet to be established will prove helpful, and their participation is to be encouraged. The cooperation of international and national conservation organizations should also be sought. From these activities international research institutions may be developed.

Since Japanese scientists have accomplished a great deal of research and have long experience in the study of Japanese monkeys, it was the consensus of the participants in this meeting that it is desirable to establish in Japan a primate research institute which would have international interests and would attract scientists from all over the world.

It is also essential in appropriate areas to maintain some troops of primates, separated from sightseers, to be used solely for scientific studies.

Exchange of capable scientists and students in the field of primate studies has already taken place between the United States and Japan, and it is highly desirable to promote further exchanges in order to apply more effectively the specialized techniques that have been developed independently in both countries. It is also desirable to exchange specimens between the two countries in order to promote the study of common materials.

Because of the complex nature of primate behavior, it is necessary to provide investigators and technicians with specialized training in the methodology of field and laboratory studies. For this purpose, it is important to take advantage of the staffs and facilities of existing primate research laboratories and centers. New cooperative programs will have to be developed to meet these objectives adequately.

It was recommended that within the framework of the U.S.–Japan Cooperative Science Program a series of semi-

nars be held, starting with the topic of "Group structure and interactions of primates."

Discussions at the meeting showed that primatologists from both countries have similar points of view. The scientists who participated in the meeting unanimously expressed the hope that primate biology would be made a part of the U.S.–Japan Cooperative Science Program.

Leonard Carmichael was American chairman of the meeting, and A. J. Riopelle was secretary. The other U.S. members were C. R. Carpenter (Pennsylvania State University), W. H. Eyestone (National Institutes of Health), and T. C. Ruch (University of Washington).

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Fetal Homeostasis

Homeostatic mechanisms operative in the earliest periods of gestation were the main topic of discussion at the first of a projected series of conferences on fetal homeostasis held in Princeton, New Jersey, 28 June–1 July 1964, under the sponsorship of the Interdisciplinary Communications Program of the New York Academy of Sciences. Participants in this conference were drawn from the fields of biochemistry, physiology, genetics, and morphology, and from the related clinical areas of obstetrics, pediatrics, and veterinary medicine, each of which is concerned with problems of mammalian reproduction.

Robert Noyes (Vanderbilt University) led the first discussion, which dealt with ovulation, tubal transport of ova, and the transport of spermatozoa. A synthesis of biochemical and morphological data regarding follicular maturation and atresia, the sialoproteins of the zona pellucida, neogenesis of ova, and capacitation of spermatozoa was presented. Despite the contributions of several morphologists and endocrinologists in the group, the reason for the inhibition of simultaneous ovulation of all ova during the first cycle remained a mystery. Similarly, controversial data on the problems involved in follicular rupture were presented, but no final solution was agreed upon. Sydney Asdell (Cornell University) provided comparative data regarding the tubal transport of ova in farm animals, and Sheldon Segal (Population Council) presented preliminary evidence that MRL-41 may antagonize the effect of estrogen on tubal spasticity. Luigi Mastroianni (University of California, Los Angeles) indicated that suction of ova into the human fallopian tube under physiologic conditions had not been demonstrated; he likened oviductal activity to that of a carpet sweeper rather than that of a vacuum cleaner. Both laboratory and clinical observations suggested that in humans both the cervix and the uterotubal junction act as barriers to the ingress of sperm.

The second session, under the leadership of Samuel Solomon (McGill University), was devoted to the control of ovulation, fertilization, and maintenance of early pregnancy by endocrine glands. In presenting the results of his experiments with perfusion of progesterone in intact and adrenalectomized fetuses, performed jointly with Egon Diczfalusy (Stockholm), Solomon differentiated secretory from metabolic clearance rates, which he defined as the ratio of production rate to concentration in the blood. His measurements of progesterone concentration in the male varied surprisingly from 0.037 to 0.07 μg per 100 ml. In studying the metabolism of ovarian and adrenal steroids by the fetus and placenta, MacDonald (Southwestern Medical School, Texas) showed that in anencephalic infants the estradiol produced from dehydroepiandrosterone sulfate is necessarily of ovarian rather than adrenal origin.

The discussions of the second morning centered about mechanisms of implantation. Bent Böving (Carnegie Institution of Washington) provided cinematographic support for his theory of the spacing of blastocysts as a function of the location of endometrial capillaries. Louis Fridhandler (U.C.L.A.) questioned the crucial role of carbonic anhydrase in implantation, indicating that free carbonate ion could not exist at the physiologic *p*H concerned. E. C. Amoroso (Royal Veterinary College, London) described unusual patterns of blastocystic spacing in the antelope *Kobus* and suggested experiments to test Böving's hypothesis by mechanically displacing the early blastocysts and noting their sites of reimplantation. Geoffrey Sharman (Canberra, Australia) contributed the results of his own studies of the early stages of implantation and blastocyst formation in the marsupials *Macropus canguru* and *Megaleia rufa*. Carl G. Hartman added pertinent comments based on his embryologic studies of the opossum and other animals during the last half century. New techniques for obtaining and analyzing the physical properties and chemical constituents of the blastocystic fluid of the cow were offered by Louis Holm (University of California, Davis).

In concluding the discussion of implantation, Ralph Wynn (State University of New York, Downstate Medical Center) attacked the concept that envisions the trophoblast as fundamentally malignant during implantation. He quoted the work of Kirby, who showed the invading trophoblast of the mouse to be cellular rather than syncytial, and demonstrated ultrastructural homeostatic adaptations in his own electron micrographs of trophoblast from a variety of hemochorial placentas. He showed that in the rabbit and some rodents the "syncytium" actually comprises clumps or sheets of overlapping cytotrophoblast. Many theories, but few conclusions, regarding the fundamental nature and biologic significance of the placental syncytium and giant cells were offered by the group.

The fourth session, on early placental development, was introduced by Kurt Benirschke (Dartmouth University), who provided theoretical and anatomic support for his concept of anomalies of placental development as related to aberrant insertion of the umbilical cord. He showed that single umbilical arteries were more common in cords with velamentous insertion. A discussion of the relationships of the membranes in twins led to an argument regarding the origin of the human amnion, which was resolved, with some reservation, in favor of the trophoblast. Benirschke provided several examples of non-sterile natural hybrids and explained the usual infertility of the hybrid in terms of chromosomal discrepancies between the parents. Henry Thiede (Rochester, N.Y.) demonstrated chromosomal anomalies, particularly polyploidy, in abortuses, opening another area for the study of human reproductive wastage. O. J. Miller (Columbia University) contributed autoradiograms illustrating normally late replication of one of the X chromosomes. He showed, furthermore, that in tetraploidy involving the X chromosomes, three of the four chromosomes underwent late replication.