The only thing missing is *Eoanthropus,* and since he was never there anyway, the loss is small; besides, we can well afford to continue our search and live in the hope that he may be caught next time. Meanwhile the restorations by Woodward, McGregor and others may still serve a more or less useful purpose as substistutes for *Eoanthropus* until he shall have been found.

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PROVISION FOR THE STUDY OF MONKEYS AND APES

BIOLOGISTS are generally agreed that the study of the primates, and especially of the monkeys and anthropoid apes, is of extreme importance. It is evident that this work, nevertheless, has been neglected. We have but fragmentary and unsatisfactory knowledge of the structure and development (gross anatomy, histology, embryology) of most of the primates; we know less, definitely, concerning their physiological processes, diseases and pathological anatomy; still less, of the phenomena of heredity and of their life history; and next to nothing, with certainty, concerning their instincts, habits, other individual modes of behavior, mental life, and social relations.

The reasons for this ignorance where knowledge might reasonably be expected are not difficult to discover. Most investigators are either impelled or compelled by circumstances to work on easily available and readily manageable organisms. Many of the primates fail to meet these requirements, for they are relatively difficult and expensive to obtain by importation or breeding, and to keep in normal condition. It is clear from an examination of the literature on these organisms and a survey of the present biological situation that the neglect by scientists of systematic study of all of the primates excepting man is due, not to lack of appreciation of their scientific value, but instead, to technical difficulties and the costliness of research.

For hundreds of years men have been interested in the various types of lower primates and have more or less casually and incidentally studied aspects of their lives. But thus far there has been no definite plan or program for the systematic and continuous study of these animals. In view of the obvious and urgent need of such a program for research which is admittedly of practical as well as theoretical importance I venture to present to my scientific colleagues the following briefly sketched plan.

There should be provided in a suitable locality a station or research institute which should offer adequate facilities (1) for the maintenance of various types of primates in normal and healthy condition; (2) for the successful breeding and rearing of the animals to many generations; (3) for systematic and continuous observation under reasonably natural conditions; (4) for experimental investigations from every significant biological point of view; (5) for profitable cooperation with existing biological institutes or departments of research throughout this country and the world.

The institute should be located in a region whose climate is in high degree favorable to the life of a variety of lower primates and to man. It is eminently desirable to avoid, in the interests of scientific achievement, an enervating tropical climate and unnecessary isolation from civilization and from centers of scientific activity. Since it is probably impossible to find a location which would be ideal for both subjects and observers, it will doubtless prove necessary to sacrifice in a measure the interests of each. During the past three or four years, I have accumulated information bearing on the several problems involved in the locating of an anthropoid station and have had opportunity to prospect for such an institute in widely separated regions. Chief among the regions considered are Borneo, Hawaii, southern California, Florida, the Panama Canal Zone, Jamaica and the Canary Islands. Of all of these, southern California seems at present most promising, and although it is not perfectly certain that any or all of the anthropoid apes can be successfully bred there (various other primates

can be kept and bred successfully), it seems eminently desirable to test the matter thoroughly before locating an institute in any less accessible or climatically less favorable part of the world.

Given adequate provision in the shape of a scientific establishment for the study of the primates in their relations to man, the following program might be carried out: (1) systematic and continuous studies of important forms of behavior, of mind, and of social relations; (2) similar studies of physiological activities, normal and pathological, with adequate provision for medical research; (3) studies of heredity (genetics), life history, embryology; (4) research in comparative anatomy, including gross anatomy, histology, neurology and pathology.

Each of these several kinds of research should be in progress almost continuously that no materials or opportunities be needlessly wasted. It would be necessary to provide, first of all, for those functional studies which demand healthy and normally active organisms whose life history is known intimately and completely. Simultaneously with observations on behavior, instinct and social relations, and often upon the same individuals, genetic experiments could be conducted. After the usefulness of an animal in these psychological, behavioristic, or genetic lines of inquiry had been exhausted, it might be made to render still further service to science in various medical, physiological or pathological inquiries. And finally, the same individual might ultimately be used for various forms of anatomical research. Thus the usefulness of a lemur, a monkey or an ape, as research material, might be maintained at a high level throughout and even beyond the period of its life history, that is, for several years.

The necessity of some such economical use of primate materials as has been suggested is due, clearly enough, to the high cost of breeding and maintaining the animals. It would be inexcusably wasteful to maintain a primate or anthropoid station for psychological observations alone, or indeed for any other narrowly limited biological research.

The establishment under consideration should be permanent, since for many kinds of investigation it would be necessary that the life history of individuals be intimately known for many generations. With the lower primates, a generation might be obtained in two to five years; with the higher, not more frequently than ten to fifteen years. It is therefore probable that the value of the work done in such an institute would continue to increase for many years and would not reach its maximum short of fifty or even one hundred years. Ultimately, the interests of the institute might come to include other organisms in addition to the primates, and thus in the end, the most varied sorts of biological information might be brought to bear, from the broadly comparative point of view, upon the problems of human life. This would mean a gradual transformation of what was originally founded as a station for the special study of the primates into an inclusively psycho-biological institute.

Adequate provision in a research institute for the study of the various types of primates would demand a staff of several highly trained and experienced biologists. The following organization is suggested as desirable, although, as indicated below, not necessarily essential in the beginning: (1) an expert especially interested in the problems of behavior, psychology and sociology, with keen appreciation of practical as well as of theoretical problems; (2) an assistant trained especially in comparative physiology; (3) an expert in genetics and experimental zoology; (4) an assistant with training and interests in comparative anatomy, histology and embryology; (5) an expert in experimental medicine, who could conduct and direct studies of the diseases of man as well as of the lower primates and of measures for their control; (6) an assistant trained especially in pathology and neurology.

To this scientific staff of six highly trained individuals there should be added a business manager, a clerical force of three individuals, a skilled mechanician, a carpenter, and at least four laborers.

The annual expenditures of an institute with such a working staff would, in Southern Cali-

fornia, approximate fifty thousand dollars. It would therefore be necessary that it have an endowment of approximately one million dollars.

In the absence of this foundation, it would of course be possible to make a reasonably satisfactory beginning on the work which has been outlined in the following less expensive manner. A working plant might be established, on ground rented or purchased at a low figure, for about ten thousand dollars; the salary of a director, his assistant, a clerical helper, and combined mechanic and laborer might be estimated at the same figure; the cost of animals and of maintenance of the plant would approximate five thousand dollars. Thus, we should obtain as an estimate of the expenditures for the first year twenty-five thousand dollars. Without expansion, the work might be conducted during the second year for fifteen thousand dollars, and subsequently it might be curtailed or expanded, resources permitting, according as results achieved and in prospect justified.

An institute established on such a modest basis as this still might render largely important scientific service through its own research and through organized cooperation with other existing research establishments. Thus, for example, supposing that behavioristic, psychological, sociological and genetic inquiries were conducted in the institute itself, animals might be supplied on a mutually satisfactory basis to institutes for experimental medicine, for physiological research, and for anatomical studies. Under such conditions, it is conceivable that extremely economical and good use might be made of all the available primate materials. But it is not improbable that even cooperative research would prove on the whole more profitable, except possibly in the case of morphological work, if investigators could conduct their studies in the institute itself rather than in distant laboratories. In any event, the idea of cooperation should be prominent in connection with the organization of a research station for the study of the primates. For thus, evidently, scientific achievement in connection with these important types of animal might be vastly increased over what would be possible in a single relatively small institution with a limited and necessarily specialized staff of workers.

Finally, I wish to emphasize the important relations of the plan which I have outlined to strictly human interests and problems. It is eminently desirable that all studies of infra-human organisms, and especially those of the primates which are most similar, structurally and functionally, to man, should be made to contribute to the solution of our own intensely practical, medical, social and psychological problems. During our own generation, it has been amply demonstrated that knowledge based upon observation of other organisms may be of extreme value to man, and there is every reason to suppose that the solution of many of the most interesting and pressing problems of experimental medicine, of human genetics, physiology, psychology, sociology and economics may be solved, at least in large measure, most directly and economically through the use of the monkeys and anthropoid apes.

Were I required to designate the chiefly significant points of contact between studies of the lower primates and practical endeavor toward human betterment, I should name the medical, the sociological, and the psychological. For I am wholly convinced by my own experience as well as by that of others that the various medical sciences and medical practise have vastly more to gain than has yet been achieved, or than any considerable number of medical experts imagine, from the persistent and ingenious use of the monkeys and anthropoid apes in experimental inquiry. Likewise, I am convinced that education and all other forms of social service will profit immeasurably from experimental studies of the fundamental instincts of the other primates and from thorough investigation of the forms of habit formation and of the characteristics of social relations. And last, but not least important, it is safe to assume that our genetic psychology as well as other historical or genetic forms of biological description may be developed more rapidly and satisfactorily by the thorough

study of the monkeys, apes and other primates than by any other means.

It does not seem extravagant to claim that the securing of adequate provision for the systematic and long-continued study of the primates is by far the most important task for our generation of biologists, and the one which we shall therefore be most shamed by neglecting. But it is also a task which, as history clearly indicates, will not be accomplished unless we devote ourselves confidently and determinedly to it, with faith, vision and enthusiasm. For my own part, I am so entirely convinced of the scientific importance and human value of this kind of research that I am willing to devote my life wholly to it.

If we are to progress beyond the present narrow limits of our knowledge of the lower primates and make them contribute importantly to human welfare, it must be through adequate provision for their systematic study. I have presented to my fellow biologists a plan in the hope that their interest, criticisms, and support may ultimately lead to excellent facilities for this work, if not to the realization of the particular plan in question.

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SCIENTIFIC NOTES AND NEWS

The forty-fifth anniversary of its establishment was celebrated on February 9 by the United States Bureau of Fisheries, with the unveiling of a tablet in memory of its founder, Spencer Fullerton Baird, presented by his associates and followers. Professor Edwin Linton, of Washington and Jefferson College, presented the tablet, and Mr. Edwin F. Sweet accepted it on behalf of the Department of Commerce. The bronze tablet bears a bas-relief of Professor Baird with the inscription:

> He devoted his life to the public service and through the application of science to fish culture and the fisheries gave his country world-wide distinction.

The Albert medal of the Royal Society of Arts has been presented to Sir J. J. Thomson, "for his researches in chemistry and physics and their application to the advancement of arts, manufactures and commerce."

The fifth annual dinner of the Columbia University Biochemical Association took place on February 10, at the Hotel Majestic, with about 250 members and guests present. Dr. A. B. Macallum, professor of physiology at the University of Toronto, was the guest of honor, and made the principal address.

Professor Samuel Wendell Williston, of the department of paleontology at the University of Chicago, has been elected a fellow of the American Academy of Arts and Sciences.

William H. Burr, professor of civil engineering in Columbia University, retires from active service at the close of the present academic year.

At the annual meeting of the Royal Meteorological Society on January 19 the Symons memorial gold medal was presented for transmission to Dr. C. A. Angot, of the French Meteorological Bureau.

Professor Ayres Kopke, of Lisbon, has received the prize offered by the Sociedade de geographia of Lisbon for the best work by a Portuguese writer on sleeping sickness.

The Academy of Sciences at Vienna has granted a further subsidy of $960 to Professor R. Pöch to continue his anthropologic measurements and photographing of the various ethnologic types among the prisoners of war.

The Tri-State Medical Society of Arkansas-Louisiana-Texas has awarded the gold medals for the three best papers on original research work presented to the society, as follows: first prize, Dr. Thomas E. Wright, Monroe, La.; second prize, Dr. Herbert L. McNeil, Galveston, Texas, and third prize, Dr. Truman C. Terrell, Fort Worth, Texas.

The *Journal* of the American Medical Association states that Dr. Richard P. Strong has accepted the position of vice-president to the American International Corporation. This corporation recently formed with a capital of fifty million dollars is designed to explore, purchase or lease, lands and mercantile business in any part of the world. Dr. Strong will