depraved, it seemed that the last good reaction which survived was the love of flowers. This deep-seated feeling manifests itself very early in life and perhaps may be described as essentially a love of beauty, of form and color. But the animal world adds a third element, that of movement, and all who have to do with children know how great is their delight in the activities of living things. The beauty, mystery and romance of animal life are inexhaustible, and their contemplation should be a constant source of delight throughout life. To the pageant passing before the unaided eye we now add the marvels revealed by the microscope and I well remember how, as a child, I regarded with extraordinary interest every puddle by the roadside after being shown the life in a drop of water.

There have been many natural history books, but there certainly was room for a new one, relatively complete and up to date, containing the many beautiful photographic illustrations which are now available. This has been supplied by Professor Hegner, and probably it will appear, when all his numerous services to education are recounted, that this work has been the most far-reaching in its effects. It begins with the Protozoa, including Volvox but not the Mycetozoa, and continues through the various groups, to end with the gorilla. We miss some interesting forms, such as Peripatus, and it would really seem that the closing chapter should have dealt with the Hominidae. The book seems remarkably accurate, and I have not found a single misprint. It is easy to point out various omissions; thus we are told that the San Jose scale appeared in 1880 near San Jose, California, but nothing is said of its origin. The sea-slugs are described as having protective coloration, but nothing is said of the splendid warning colors of certain genera. Such omissions are inevitable and presumably for the most part deliberate, to avoid increasing the size of an already large book. I do not quite understand why all the land slugs are described as "garden slugs." The information given relates principally to the habits of the animals, and it seems to me that the author has been remarkably successful in presenting an abundance of facts with a minimum of technical expressions. Some popular writers are so anxious to appeal to the unthinking multitude that they leave out the materials for thought. Hegner has an entirely different aim; he wishes to stimulate thought and observation, and he knows full well that the active-minded young person will gladly enter the open door to mysteries at first (and indeed, at last) not fully understood. There is one matter concerning which I feel some doubt. The first chapter begins with a rather long pseudoserious account of Noah and his Ark, and the last ends: "Noah must have heaved a sigh of relief when the gorillas finally entered the ark and the gangplank was hauled in. We hope they all had a pleasant time on board. We know that every species landed safely on Mount Ararat, since it has been our privilege to describe their descendants in this book."

Now it is a fact that in my own case, Noah was associated with the beginnings of zoological knowledge. I had a Noah's Ark, full of animals carved in wood, and many a parade was staged on the nursery floor. Somewhat later, I used to lustily sing:

Oh, Noah of old he had an ark,
Hurrah, hurrah!
He set it afloat in Regents' Park,
Hurrah, hurrah!
And they all came marching in.

The animals came in one by one,
Hurrah, hurrah!
The elephant eating a penny bun,
Hurrah, hurrah!

And so on through many verses now forgotten. But in spite of this extreme levity toward Noah, I did not find him in my natural history books, and I do not think I wanted him there. I notice that the first part of Hegner's work is rather abundantly leavened by humorous allusions, but toward the end these seem to give out. On the whole I doubt their value, and prefer the more sober style. But I wonder whether this feeling will be at all generally shared by readers, young or old. Something might have been added concerning the use of moving pictures to depict the activities of animals. Such pictures will admirably supplement Hegner's "Parade," and will serve to further develop the interest which he has stimulated.

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REPORTS

YALE LABORATORIES OF PRIMATE BIOLOGY, INCORPORATED

INCORPORATION in Florida of the Anthropoid Experiment Station of Yale University, which is located at Orange Park, Florida, is hereby announced and the following summary statement is offered concerning the history, status and objectives of the establishment.

In 1925 Yale made provision for the systematic use of chimpanzees in biological research by creating as a section of the Institute of Psychology a Primate Labo-

ratory. As a result of developments in this laboratory, the Anthropoid Experiment Station[1] was organized in 1929 as a subtropical breeding, observation and supply station, which, in addition to providing anthropoid subjects of known ancestry, age, life history and condition, should furnish opportunities, nowhere else available, for the study of varied problems of primate reproduction, genetics, behavioral adaptation, hygiene and pathology. Following the establishment of the breeding station the name of the New Haven and Orange Park laboratories was changed to "Laboratories of Comparative Psychobiology, Yale University." In connection with incorporation it was deemed desirable to indicate, by use of the term "primate biology," that the scope of the establishment is broader than, although inclusive of, psychobiology.

It is now ten years since anthropoid research was thus undertaken in the university. Initially four young chimpanzees, two of each sex, constituted the experimental group of the Primate Laboratory. During 1935 as many as forty individuals have been in use in the laboratories. A population census made on November 1, 1935, revealed six mature males, thirteen mature females, twelve children and adolescents and ten infants under three years of age. Of these forty-one chimpanzees, nine individuals, with a single exception immature, served as experimental group in the New Haven laboratory; one, a male estimated to be between thirty and thirty-five years old, was in the Philadelphia Zoological Garden as a loan exhibition specimen; and the remaining thirty-one specimens constituted the breeding colony in Florida.

The possibility of breeding and rearing chimpanzees in North Florida already has been demonstrated convincingly. Between the opening of the station in July, 1930, and November, 1935, fourteen normal births and nine miscarriages were recorded. With the exception of one pair of twins, all were single births. Thirteen of the infants listed as of normal, full-term birth are living and thriving at present either in Orange Park or New Haven. Of the reproductive mishaps, several should be charged to experimental requirements and a few, in the early history of the colony, to inexperience. The rate of population increase probably could have been at least doubled had experimental use of the animals been wholly subordinated to breeding requirements. Our accumulated and rapidly accumulating observations, when fully published, will importantly supplement available single case history studies by providing descriptive norms for the female sexual cycle (menstrual, swelling and oestrual), receptivity, mating behavior, gestational period and mother-infant relations.

Yale Laboratories of Primate Biology now own sixteen dated chimpanzees, so designated because ancestry, date of birth, and, with few exceptions, developmental history, experience, use in experiments and individual pathology are matters of reliable record. It is planned to replace as rapidly as practicable all members of the breeding colony whose age and history are unknown by dated individuals for whom such complete life-history records are available.[2]

The general objectives of this undertaking are four —naturally there are many specific aims and problems: (1) Improved availability and relative standardization of chimpanzee as material of research; (2) extension of knowledge of the biology of this primate type with resulting approximation to completeness of description, in order that the investigator may be fully acquainted with what he is using; (3) increasingly effective use of this animal in the solution of fundamental problems—morphological, physiological, psychological and sociological—for which human subjects should and would be used if it were practicable; and, finally, (4) achievement of maximal usefulness for each experimental subject as result of carefully planned and coordinated functional and structural studies.

The outstanding and immediate functions of the laboratories as contrasted with these general objectives are the satisfactory breeding, rearing, descriptive characterization and utilization of the chimpanzee in the extension of knowledge of life. A large amount of useful information already has been accumulated. In the early years of the laboratories problems of hygiene, health and handling tended to monopolize attention, whereas at present the urgency of practical demands has so far diminished that research is paramount.

Uniquely important in this connection is the life-history record of each individual subject. Manifestly an organism which serves as material in a study of organic function, and especially in neuro-, psycho- or socio-physiological investigations, can not be too intimately, inclusively and reliably known by the investigator. Usually an exhaustively detailed case history would be valuable, sometimes invaluable. For this reason attempt is being made in this establishment to press forward the boundaries of our knowledge of chimpanzee until it shall be known both comprehensively and thoroughly. When this has been achieved, the animal may be used experimentally with a degree of intelligence, assurance, convenience, economy of

[1] Both Primate Laboratory and Anthropoid Experiment Station have been supported generously by the Rockefeller Foundation. The Experiment Station has been guided by the wisdom of a Scientific Advisory Board, consisting of Drs. James R. Angell, Edwin G. Conklin, Milton J. Greenman, Frank R. Lillie, John C. Merriam, H. Gideon Wells and Clark Wissler.

[2] This experiment in the breeding and culturing of chimpanzee in the interests of biological research has been immeasurably advanced and quickened by gift from Mr. Pierre S. Abreu to Yale University of nine mature and four immature but dated chimpanzees from the Rosalia Abreu collection in Havana, Cuba.

effort and interpretability of results which at present are unapproached save in our research uses of certain relatively simple organisms, and which heretofore have commonly been considered unattainable for highly organized creatures like the anthropoid apes and man.

Scarcely less excusable in current practice than the use of inadequately known materials whose variability is extreme is the sacrifice of a valuable animal after employment in a single experiment or investigation. There are times of course when this is fully justified, even essential, but not rarely what amounts to inexcusable wastage of material results from lack of foresight in planning and arranging for sufficient inclusiveness of interest within a given laboratory. Accustomed as we are to sacrificing protozoan, invertebrate or lower vertebrate to a single experiment, we psychobiologists, and many another physiologist, act similarly when far more costly and difficultly obtainable subjects are in use.

The anthropoid ape, whether orang-outan, chimpanzee or gorilla, is the most suitable substitute for man in certain important inquiries. At maturity it represents a relatively huge investment by nature or by man. One might suppose that, dead or alive, every specimen would be highly prized and used in the most varied ways to advance knowledge. The opposite, however, actually is the case. From fairly ample information the estimate is hazarded that of all anthropoid apes captured ostensibly for educational or scientific needs, not one in twenty is ever employed in a really worth-while and well-conducted investigation, while of those which die in captivity not one in a hundred is used effectively for morphological investigations or either wholly or in part finds its way into an institutional collection. The wastage of our most expensive, and from various points of view our most precious, biological materials is unbelievably great. For this reason, among others, these laboratories are attempting to breed and culture chimpanzee so that it shall be as nearly as possible ideally available and useful in biological research.

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THE NATIONAL ACADEMY OF SCIENCES. III.

ABSTRACTS OF PAPERS PRESENTED AT THE AUTUMN MEETING[1]

Anthropological excavations on Kodiak Island[2]*:* A. HRDLIČKA. All studies on the origin of the American aborigines point to Asia as the source of their derivation. The basic identity of the American man, his unquestionable status as a variety of modern man, and the nature of his cultures, all point to a relatively late, post-glacial, peopling of America. The routes practicable for the coming of man from Asia to America, during the time such comings were taking place, were limited to Bering Strait, and possibly the Aleutian Islands. The newcomers must all, therefore, have passed over parts of Alaska, and they must have left there the remains of their stay. Such remains were the kitchen and house refuse with the bones of the fish, birds and mammals the people ate; cultural objects, especially those of stone, bone and ivory; and the skeletal parts of those of the migrants who died there. Such remains, in the Far North, are almost indestructible and should still be preserved in that region. The object of American anthropology and archeology is to locate these remains and learn what information they can give. Preliminary surveys of the regions in question revealed a great number of "dead" sites, some of which had been abandoned far back of the Russian times. But they revealed also serious obstacles to exploration. The main of these is the fact that the coasts, the rivers, the land in western Alaska have changed greatly during the last few thousands of years and are still changing. This means that the location of the earlier remains will be very difficult, in a large measure in fact impossible. The second great obstacle is that the ground over most of the territory is perpetually frozen, which makes excavation exceedingly slow and difficult. The only favorable places for excavation are those on the southern shores of the Aleutians, of the Peninsula and of southeastern Alaska. They include Kodiak Island, and it is on this island that an undisturbed pre-Russian site of much promise was discovered. This site for three years and a half now has been excavated by the Smithsonian, and has yielded astonishing results. The human accumulations are up to 16 feet in thickness. They lie directly on glacial till and a layer of fine loess. They cover the period of perhaps 2,000 years. There were two different human occupations, with two different types of man and culture. The deep old type, while slightly Eskimoid, was in the main Indian. Its counterpart has been recovered from the deep layers of a huge mound on Frazer River, British Columbia. Its culture was both broad and artistic. The people domesticated the fox. They left signs of animism, fetishism and other mythical practises. They knew cannibalism and burnt human sacrifice. They were rather delicate physically, but free from constitutional diseases aside from arthritis. Their medicine men made use of human bones, and knew even the art of trephining. They paved with dressed slate slabs their lower lying habitations, and made slate-paved walks between their houses. They made jar-like receptacles from prepared clay, but

[1] Charlottesville, Va., November 18, 19 and 20, 1935.
[2] Illustrated by motion pictures.