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PSYCHOLOGIST UNDERTAKES TO EDUCATE CHIMPANZEES

By Dr. Edwin E. Slosson

Already the revival of the controversy about man's origin by "special creation" or by "evolution" has given a new impetus to research. Dr. Robert M. Yerkes, psychologist and student of animal behavior, has undertaken an intensive study of the chimpanzee, one of the man-like apes. There are only three kinds of great ape; the gorilla, the chimpanzee and the orang outan. Of these the chimpanzee is perhaps most like man in its behavior.

Dr. Yerkes' pair of young chimpanzees were brought to him from Africa. It is reported that he originally named them Adam and Eve and called their garden home Eden! But more recent account has it that "sense" vanquished "sentiment" and the animals are now known as "Chim" and "Panzee". Thus, doubtless, the scientist hopes to avoid wounding the sensibilities of Adams and Eves of the genus homo and increasing prejudice against the anthropoid apes in those who consider evolution anti-religious.

Chim is a little "blackface" chimpanzee from the Belgian Congo. He is thought to be about 14 months old and he weighs about 20 pounds. Dr. Yerkes says it would take a lively child of three to keep up with him at play or in solving problems which depend on manual skill and dexterity. Panzee - a name peculiarly appropriate to the female of the species - is a "whiteface" from British West Africa. She is somewhat larger than Chim, but weighs less, although she is thought to be about 18 months old.

The chimpanzee couple will winter in Washington, where Dr. Yerkes plans to seek answers to such questions as: Can the chimpanzee be taught to speak? Already he knows that it can understand much that is said to it. Has it ideas and can it solve practical problems in novel and original ways? Does it of its own initiative use objects as tools? The doctor says Chim acts more "intelligently" and "reflectively" than a child of his age. To what extent is the chimpanzee educable? Can it acquire scores or hundreds of habits, if trained systematically as is the child?

Dr. Yerkes has had a great deal of experience in educating animals of all grades from earthworms to college students. He succeeded in training earthworms to find their way out of a maze so thoroughly that they would retain their training even after their heads were cut off. This experiment was not tried on college students. But I would be willing to wager that the chimpanzees will not learn as much from him as he will from them.

Man's superiority over all other creatures of earth, water and air seemingly is due to intelligence. Careful, skillful, long-continued study of the growth and development of the chimpanzee, and especially of its intelligence and its emotions may throw invaluable light on the nature and development of mind in general. This certainly would be worth while, for mind surely is the most fascinating aspect of Nature.

The task which Dr. Yerkes has set himself is as difficult as it is important, for the great apes, to be reared successfully and kept in good health and spirits, must be treated much as children. Little is known with certainty about the habits, life history and mental life of any of the apes. This is chiefly because of the discouraging difficulties in obtaining, keeping and studying them. But why journey to darkest Africa - or for that matter lightest Africa - to study the nest-building instinct (or is it tradition) of the chimpanzee when you can see a tree-nest built by one of these ridiculously and pathetically man-like animals in your own back yard!

Reports of Dr. Yerkes' discoveries in the realm of ape mind will be eagerly and impatiently awaited by those who consider the chimpanzee man's cousin as well as by those who deny their relationship to him.

FINDS EARLY APES MORE HUMAN THAN ANY MODERN SPECIES

Apes seemingly more closely related to man than any species now in existence lived in Europe more than a million years ago, Dr. Ales Hrdlicka, curator of physical anthropology of the U. S. Smithsonian Institution, declared on his return to this country from Europe where for several months past he has directed the studies of the American School for Prehistoric Studies in Europe.

The school visited all the important sites where remains of early man have been found and the students saw practically all the valuable original fossils of ancient men and fossil European apes.

"The thing that impresses most is the vastness of the deposits containing early man's remains in western and central Europe, and the little that is now being done in many places in the way of systematic investigation of them", Dr. Hrdlicka said.

"European countries are in general too impoverished to carry on the work and what interest is being shown is mostly by individuals and directed to the cultural rather than the natural history of man.

"The large fossil apes which lived in Europe from one to three million years ago are even less known than ancient man, yet the study of these forms is of great importance. Observation and careful measurements have shown in at least one case, that of the Dryopithecus rhenanus, that these fossil apes were more closely related to human beings than most if not all of the other known species of apes. Further search for the remains of these forms is of the greatest importance, for they may connect with some of man's precursors, if not with his own ancestry."

Dr. Hrdlicka declared that these fields of investigation present a great opportunity to American scientists. Sites which are known to contain remains of early man are readily available for exploration and American participation in the work would prove a leaven which would stimulate and rejuvenate work everywhere, besides being sure of results of great value to science and to human knowledge in general.

"As to the previous specimens that have already been discovered and which may be counted already by the scores, it is absolutely essential that they be studied in the original," he emphasized. Observations on imperfect casts have already lead to serious errors. In some cases, scientists working with casts have arrived at wrong conclusions because essential features of the skull or the jaw were either perverted or not brought out in the cast. In one instance, Dr. Hrdlicka said, not only he but even the representative of the institution in which both the originals and the casts were present had trouble in matching the casts and pictures with the originals because they were so unlike. Measurements of the teeth and other fossil remains in particular, he said, require such accuracy that a mistake of a very small fraction of an inch may mean throwing the specimen out of its own into another class.

Among the periods of the Ice Ages about which least is known of the development of man, Dr. Hrdlicka mentioned the second interglacial period when for thousands of years the glaciers melted, warm climate prevailed in Europe, and lions, camels, ancient elephants, rhinoceroses and other tropical creatures roamed over that part of the world. Worked pointed stones used as weapons and implements by the early men of this period are plentiful, but fossil bones of man, except for one jaw-bone found in Heidelberg, Germany, have not as yet been unearthed. Yet they are there somewhere, as are even earlier traces of man, and are waiting to be unearthed by systematic work on a larger scale than is now practiced in Europe.

READING REFERENCES - Osborn, Henry Fairfield. Men of the Old Stone Age; their environment, life and art. New York, Charles Scribner's Sons, 1921.

Hrdlicka, Ales. The Most Ancient Skeletal Remains of Man, in Smithsonian report for 1913. Pages 491-552. Washington, Government Printing Office, 1916.

SPEED BOATS

Folks in King Tut's time were not so slow. Carl Mitman, in cataloguing the ship models in his department of the Smithsonian Institution, points out that Egyptians built boat hulls of the correct form for speed nearly 4,000 years before modern scientific designers arrived at the same conclusions. Vikings had the right idea and Malay pirates had the wave-line theory of construction down to perfection when English and American sailboats were clumsy tubs.

HOW TO HEAT YOUR HOME

IV. How to Burn Bituminous Coal

by Samuel S. Wyer,
Associate in Mineral Technology,
U.S. Smithsonian Institution.

In burning soft coal, follow the following rules:

1 Bituminous coal requires more draft and attention than anthracite or coke.

2. Ordinarily, shaking down the ashes will be required only once a day. Then shake only until the glow of the fire is seen in the ash pit, not until burning coals appear.

3 Pull clinkers out, do not try to work them through the grates.

4 A deep fuel bed is desirable.

5 Stir up the fire and get it hot before adding new fuel.

6 Use some coking method of firing, that is, work the partly burned coal, from which the gas has been driven, to one part of the fire and throw the fresh coal on the remaining portion.

7 Leave visible a bright spot of live coal to ignite the combustible gases coming off the freshly fired coal.

8 After the fuel is partly burned more heat can be obtained by breaking up the fire bed with a poker if the fuel bed is caked.

9 In banking the fire, the drafts should be open for about half an hour so that the volatile matter on the coal can be driven off before the air supply is greatly reduced.

10 Keep flue surfaces free from soot and cleaning doors tightly closed.

The small sized coal, like nut, will be easier to handle and more economical than the large lump coal. Uniformity of size is desirable because it permits easier control of fire.

The practice of wetting coal decreases the fuel economy, as heat from the fuel must be used for evaporating the moisture. But with very fine coal, and particularly when the grates are not designed for fine fuel, it may be necessary to moisten the coal in order to reduce the loss of fuel through the grate.

If the entire surface of the fuel bed is covered with a heavy charge, the volatile matter from the coal fired does not ignite for a considerable length of time after firing and passes away as tarry, greenish yellow smoke. Smoke comes primarily from improper burning of bituminous coal. In most residential communities the trouble is largely from house chimneys. Smoke prevention appliances, easily adapted to industrial plants, are not generally feasible in the home.

V. How To Burn Coke

By Samuel S. Wyer,
Associate in Mineral Technology,
U.S.Smithsonian Institution.

When using coke, follow these rules.

1 Carry a deep bed of fuel; a bed about 18 inches thick gives best results.

2 Use very little draft after the fire is started and keep it always under control.

3 Do not stir the fuel. Clean the fire in the morning, if possible.

4 Use sized coke; one-half to two inches for furnaces, boilers, and stoves; one half to four inches for open grates.

5 Do not allow ashes to accumulate in ash pit.

Coke is the solid residue, carbon and ash, left when bituminous coal is heated without access to air. It burns with a smokeless flame and has aptly been called a "man-made anthracite" and can be used easily in existing appliance to replace anthracite.

The coke must not be too hard. The best size is between one-half and two inches. The screenings should be delivered with the coke because they are needed for banking fires.

For starting a fire in an ordinary furnace or boiler in a six to ten room residence, about ten to fifteen pounds of kindling wood are needed. When the wood is well ignited it should be covered with a layer of coke about six inches thick. It will usually take one hour to get this first layer of coke burning well. All the available draft should be used to start a fire; the stronger the draft the sooner the fire will start.

After the first layer of coke is ignited the furnace should be filled to a depth of fourteen to eighteen inches. A thick fuel bed helps to check the draft and gives a slow uniform combustion and uniform temperature in the house. With a thick fuel bed the fire will last a long time without requiring attention. If a thin fuel bed is carried the coke burns too fast in giving a hot uneven fire that burns out quickly and requires frequent firing. A thin fire also tends to produce more clinkers.

To get good results from a coke fire the draft must be kept under control. The amount of draft required depends on the weather conditions and the size of the coke. Generally speaking it takes much less draft to burn coke than it does to burn anthracite or bituminous coal. If too strong a draft is used after the fire is started, the coke will burn too fast, making the house too hot and requiring frequent firing.

A coke fire requires less shaking of the grate than a coal fire. In ordinary weather one shaking a day, preferably in the morning, is all that will be be necessary. Some people who have burned coke for many years say that they get better results if they have a layer of ashes about one to two inches thick on the grate all the time. The ashes help to check the draft and keep the hot coke from coming in contact with the grate.

For banking the fire, the fines from the coke pile should be used. The fines make a denser fuel, reduce the draft through the fuel bed, and thus help in keeping the fire. The fuel bed may be made still denser by lightly tapping the coke on the top with a poker or shovel. The ash pit door should be closed as tightly as possible and the draft in the furnace reduced by opening the check damper. If the ash pit door does not fit tightly, it may be necessary to open the damper in the firing door in order to keep the fire over night.

If a good bed of hot coke about six inches thick is on the grate, the grate may be shaken, clinkers removed, the fire leveled, and a heavy charge of coke placed on the furnace. Opening the damper in the ash pit and closing the check damper in the smoke pipe will help to start the fire quickly. After about half an hour, when the freshly fired coke has been well ignited, the damper in the ash pit door can be nearly closed and the check damper partly opened. If the fire is almost burned out do not shake the grate or remove the clinkers, but level the fire with a poker, slightly stirring it so as to shake some of the ashes down and then fire about a six inch layer of coke.

TELLS OF FIGHT TO SAVE AMERICAN CHESTNUT CROP

Efforts to save the chestnut industry of this country, which is rapidly being swept out of existence by the chestnut blight, were described to the Northern Nut Growers Association in fourteenth annual convention at Washington recently by C. A. Reed, of the U. S. Department of Agriculture. He told of failures, disappointments, and promising successes in securing trees resistant to this damaging plant disease.

The chestnut blight is the result of a fungus growth which gets under the bark of chestnut trees and destroys the trees by girdling them. It was discovered in 1904 in trees on Long Island which had been brought in from Asia. Since that time, it has spread throughout the chestnut growing regions of the eastern United States, made gaunt white skeletons of what were once valuable food and timber trees, and threatens to completely wipe out the American sweet chestnut.

Among the once promising experiments which have proved a disappointment, according to Mr. Reed, is the cross of the native small sweet chinkapin with the large Japanese chestnut which is almost without flavor. Seedlings from this cross developed nuts in eighteen months and during their early days appeared to be resistant to the blight. Later the blight also attacked them.

The most promising variety now appears to be the Chinese chestnut, Mr. Reed declared. The chestnut blight originated in China and the trees which have survived there are those not subject to it. Although the American sweet

chestnut is the best chestnut known, the Chinese chestnut is also of good size and quality, and experiments indicate that it may become of commercial importan in this country and may replace the less resistant kinds. The Chinese trees, however, are small and not so well suited for poles or other lumber purposes as are the native trees now being killed by the blight.

There are regions in California, Oregon, Michigan and other parts of the country in which few chestnut trees are now raised but which are well adapted to them, and there is hope that the chestnut can be established on a commercial scale in such regions free from the blight.

APPETITE EXTOLLED AS DIETARY GUIDE

Appetite is the best all round guide in the selection of diet, Dr. Graham Lusk, professor of physiology at Cornell Medical School and specialist in the study of nutrition, told members of the American Public Health Association in session at Boston recently. He criticized what he termed dietary fads.

"With a plentiful supply and choice of foods the average individual may be trusted to use his instinct in their proper selection", Dr. Rusk said. "During the war the English people rationed most of their important palatable foods, such as meat, milk, fat, and sugar, and left coarse, lightly milled wheat bread as a reserve to be taken to fulfill the energy requirements of the body. After the war when importations became easier, it was popularly stated by them that whatever else happened they would return to white bread just as soon as possible It seems as though this is a better test of values than the frantic appeals of some doctrinaires on this side of the water who wished to ordain by legislation and for all time that lightly milled or Graham bread should be the standard of the American people.

"It does not seem possible that the established habits of diet of man can be deleterious to his welfare. For example, the Eskimo lives largely upon meat yet does not contract gout. Meat increases the heat production very greatly and is a comfort producing food in cold weather."

Illustrating the accuracy of animal appetite, Dr. Lusk said that experiments had shown that animals instinctively choose foods that are best for them. Rats, offered a perfect synthetic diet deficient only in one of the vitamins, abandoned it for a diet to which the missing vitamin had been added in the form of slight amounts of a watery extract of yeast.

Why people generally liked meat, was, he said a question which science had not yet been able to answer since it had been repeatedly shown that health and strength could be maintained without it. The appetizing flavor had been shown not to explain why it was so desired.

"A diet low in protein and in calories depletes the protein reserves of the cells, as was frequently in evidence during the war. The ingestion of a

goodly quantity of meat under these circumstances certainly results in a large retention of protein by the hungry cells accompanied by a sense of well-being. Who can answer the question 'What is meat?' We know that it is relished. We remember poking fun at the tomato as nothing but flavored water colored red. And now we know it contains three important vitamins. While we cannot explain meat, we must respect its appeal to human beings. It certainly is not injurious The ordinary mortal has little to fear if he plans his diet to conform to the moderate dictates of his appetite.

READING REFERENCE - McCollum, E. V. The Newer Knowledge of Nutrition. New York. Macmillan Company, 1922.

HOW FAR AWAY IS THE POLE-STAR ?

By Isabel M. Lewis,
U. S. Naval Observatory.

Polaris, the Pole-star, is the most widely-known star of the northern hemisphere. Many who know nothing else about astronomy are able to point out the north star with the aid of the Pointers of the Big Dipper. Polaris is also the one star in the heavens with which school children are supposed to have a speaking acquaintance. Sirius may be the most brilliant of the stars, Antares, so far as is known, the most bulky, and Alpha Centauri the nearest, but it is Polaris that best serves our needs, and so most to be desired as an acquaintance.

A generation or so ago it was generally stated that the distance of Polaris was about 40 light years. This would place it among the nearer stars such as Vega, Aldebaran and Capella. The best available determinations of the parallax of Polaris, upon which the distance depends, now indicate that the Pole-star is approximately 200 light years away which corresponds to a distance of about 1,200 trillion miles. Just what do these figures mean to us? The light from a star 200 light years away takes 200 years to travel to the earth though it moves with the velocity of 186,000 miles per second. If it were possible for us to send an airplane to Polaris at the neverceasing velocity of 200 miles an hour about seven hundred million years would pass by before it would cover the distance. By that time both the sun and Polaris would have moved to far distant regions of the universe and would possibly have become non-luminous bodies.

Though the distance of Polaris is now authoritatively given as 200 light years with an uncertainty of not over ten or fifteen per cent. at the most we may still think of Polaris as a comparatively near star in a universe in which stellar distances run into the thousands of light years on the average. Any star within five hundred light years of the sun would be considered to be a member of our own local star cloud in the Milky Way, and, we might say, a rather close neighbor.

The parallax of a star, that distressing little angle so difficult for the astronomer to measure by the direct method and so difficult for the layman to comprehend is, we may say, the angular separation of earth and sun as viewed

from the star in question. It is how big a base line of 93,000,000 miles, the distance from earth to sun, would look to an inhabitant of a little planet encircling one of these stars, if he had a telescope powerful enough to show the earth as well as the sun. Such a telescope would have to be inconceivably more powerful than any known to man. Even at the distance of Alpha Centauri the largest planet of the solar system would be hopelessly lost in the rays of the star which would represent our sun.

The parallax of Alpha Centauri is 76 hundredths of a second of arc. It is the greatest known parallax. A star at a distance of one light year would have a parallax of one second of arc but no star is known to be this close to the solar system. The parallax of Capella, 55 light years away, is about .06 seconds and that of Polaris is about .016 seconds. These angles represent respectively how much each star would appear displaced in the heavens if viewed first from the earth and then from the sun 93,000,000 miles away. They represent also how far apart the earth and sun would appear to be in angular measure if it were possible to view them from the star in question. Is it little wonder that the astronomer meets with many difficulties in his attempts to measure these minute angles upon which the distances of the stars in miles or light years depend? Direct measurements of these small angles have been obviated to a great extent in recent years by the development of new methods for finding the distances of the stars.

LEAP YEAR RESTRICTION SUGGESTED

Girls of the year 3600 A.D. will be deprived of one of the privileges their remote grandmothers of the present day are said to enjoy if a suggestion made in the interest of an accurate calendar by Dr. Charles F. Marvin, chief of the U.S. Weather Bureau, should ever be carried out.

He calls attention to the growing error in the present or Gregorian calendar adopted by most of the civilized world more than three centuries ago. The error, which amounts at present to 468 thousandths days, is due to the fact that the calendar assumed the length of the year to be 365.2425 days when it is really 365.24231545 days and growing shorter by about half a second a century.

The present calendar omits three leap years in 400 years. Dr. Marvin suggests that it be continued until 3200 A.D., when the error will amount to nearly one day, and that subsequently five leap years in 600 years be omitted. Such a calendar would run until the year 17600 with an error of less than one day.

SUNSPOTS

If you stir an open fire in a grate and bring fresh coals to the front, it gives out a warmer glow. It is the same way with the sun, says Dr. C. G. Abbot, in charge of the astrophysical laboratory of the Smithsonian Institution. The so-called sunspots are produced by a stirring of the sun's outer layer. By comparing measurement of solar radiation with photographs of the sun he has found that there is an increase in heat radiated by the sun on the same day that sunspots form, grow or are brought into view on the visible disk of the sun by rotation.

WHY IS "WHITENESS"

Whiteness is caused by the structure of materials which are actually transparent. Snow, white porcelain, bird feathers, flower petals, fish bellies, milk, paper, and white paint, all get their "whiteness" in this way, physicists have found. When transparent substances are divided in many fine particles, the white light which strikes them is scattered by their multitude of surfaces. Ice, for instance, is colorless, but chopped ice looks white. Ordinary white paint is a suspension in linseed oil of fine particles of solids known to be colorless and transparent in mass.

TOTEM POLES

On top of one of the grotesquely carved totem poles of the Alaskan Indians there is the figure of a white man in stove-pipe hat and frock coat. The art of totem pole carving consists almost always in the representation of animals and the part they played in the old myths. But the totem pole represents a certain Indian's claim to fame; either based on his own experience or founded on his ancestry, or both. It is a sort of combined distinguished conduct medal and coat of arms. In this case, and old woman belonging to the house in front of which the pole stands was the first person to see a white man. The figure representing what she saw was accordingly put on her pole .

A housewife in Washington recently wore a pedometer while doing her work and found that by a better arrangement of her kitchen she could save over fifty-four miles of needless travel in a year.

About ninety per cent of the school slates manufactured in large numbers in this country every year are used in foreign countries.

Lead is the most valuable mineral in the Pacific Northwest.

Nine-tenths of the total duck and goose population of North America are reared in Canada.

Reinforced concrete is to be used to prevent the collapse of the great tower of the Strasbourg Cathedral designed in 1439.
