

A COUNTING CHIMPANZEE.

Remarkable Exploits of an Innate of London's Zoological Garden.

Nature prints an interesting paper read before the Zoological Society of London by Prof. George Romanes, F. R. S., and from it the following extracts are made:

"The female chimpanzee which has now been in the society's menagerie for six years has attracted general notice, not only on account of her peculiar zoological characters, but perhaps still more on account of her high intelligence. This is conspicuously displayed by the remarkable degree in which she is able to understand the meaning of spoken language—a degree which is fully equal to that presented by an infant a few months before emerging from infancy, and therefore higher than that presented by another brute, so far, at least, as I have met with any evidence to show. Nevertheless, the only attempt that she makes by way of vocal responses are three peculiar grunting noises—one indicative of assembling or affirmation, another (very closely resembling the first) of dissent or negation, and the third (quite different from the other two) of thanks or recognition of favors. In disposition she is somewhat capricious, though on the whole good-humored, fond of her keepers, and apparently never tired of a kind of bantering play which, off and on, she keeps up with them.

"A year or two ago it occurred to me that I might try some psychological experiments on the intelligence of this animal. The circumstances in which she is placed, however, did not prove favorable for any thing like systematic instruction. Being constantly exposed to the gaze of a number of people coming and going and having her attention easily distracted by them, the ape was practically available for purposes of tuition only during the early hours of the morning, before the menagerie is opened to the public, and, as a rule, I did not find it convenient to attend at that time. Therefore the results which I am about to describe do not, in my opinion, represent what might fairly have been expected under more favorable conditions; if the chimpanzee could have been kept as a domestic pet for a few months (as I kept the Cebus kindly lent me for the purposes of psychological observation by this society) there can be no doubt that many much more interesting results might have been obtained. Nevertheless, it appears to me that even those which have thus far been obtained are worthy of being placed on record.

"Having enlisted the intelligent co-operation of the keepers, I requested them to ask the ape repeatedly for one straw, two straws or three straws. These she was to pick up and hand out from among the litter in her cage. No constant order was to be observed in making these requests, but, whenever she handed a number, not asked for her offer was refused, while, if she gave the proper number her offer was accepted, and she received a piece of fruit as payment. In this way the ape was eventually taught to associate these three numbers with their names. Lastly, if two straws or three straws were demanded, she was taught to hold one straw or two straws in her mouth until she had picked up the remaining straw, and then to hand the two straws or three straws together. This prevented any possible error arising from her interpretation of vocal tones—an error which might well have arisen if each straw had been asked for separately.

"As soon as the animal understood what was required and had learned to associate these three numbers with their names, she never failed to give the number of straws asked for. Her education was then extended in a similar manner from three to four and from four to five. Here, for reasons to be presently stated, I allowed her education to terminate. But more recently one of the keepers has endeavored to advance her instruction as far as ten. The result, however, is what might have been anticipated. Although she very rarely makes any mistake in handing out one, two, three, four or five straws, according to the number asked for, and although she is usually accurate in handing out as many as six or seven, when the numbers eight, nine or ten are named, the result becomes more and more uncertain, so as to be suggestive of guesswork. It is evident, however, that she understands the words seven, eight, nine and ten to betoken numbers higher than those below them; for if she is asked for any of these numbers (*i.e.*, above six) she always gives some number that is above six and not more than ten; but there is no such constant accuracy displayed in handing out the exact number named as is the case below six. On the whole, then, while there is no doubt that this animal can accurately compute any number of straws up to five, beyond five the accuracy of her computation becomes progressively diminished.

"It is not necessary—indeed it would be unreasonable—to suppose that in this process of 'counting' the ape employs any system of notation. We know from our own experience that there is counting and counting, *i.e.*, distinguishing between low numbers by directly appreciating the difference between two quantities of sensuous perception and distinguishing between numbers of any amount by marking each perception with a separate sign. The extent to which the former kind of computation can be carried in the case of man has been made the subject of a careful research by Prof. Preyer, of Jena. His experiments consisted in ascertaining the number of objects (such as dots on a piece of paper) which admit of being simultaneously estimated with accuracy, and it was found that the number admits of being largely increased by practice until, in the case of some persons, it may rise to more than twenty. But of course in the case of a brute it is not to be expected that such a high degree of proficiency even in this non-itative kind of 'counting' should be attainable. The utmost that could here be expected is that a brute should exhibit some such level of ability as is presented by a young child, or by those savages whose powers of accurate computation do not appear to extend further than numbers which we write as units. It was in view of such considerations that I did not attempt to carry the education of this ape beyond the number five, and the result which has attained subsequent endeavors to teach her numbers as high as ten is, as previously remarked, exactly what might have been anticipated. It may here be added that in the only records with which I am acquainted of animals exhibiting any powers of numerical computation these powers have not extended beyond the number five."

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