HUMANIZING THE APE

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The opinion seems to persist among certain contemporary psychologists that a sharp qualitative demarkation between the behavior of man on the one hand and the behavior of infra-humans including the anthropoid apes, on the other hand, is an established fact. The strength of this view is evidenced in part by the recent controversy involving the doctrine of instinct and the support which this conception continues to receive from some quarters, especially with reference to the interpretation of the activity of animals. It is the object of this paper (*a*) to point out in this connection an aspect of comparative work with higher primates which appears to have been thus far overlooked, and (*b*) to propose a technique of investigation which will take account of this new factor. Our general thesis is that despite the evidence which indicates that the anthropoid apes are inferior to man in behavioral potentialities, it is quite possible that a radical change in experimental procedure would definitely remove many of those qualitative distinctions that are frequently thought to exist.

1. The Effect of Environment

Without recourse to further introductory discussion, we may point the way to the initial arguments to be considered by the following question: What would be the outcome if a human infant, the child of civilized parents, were placed in the environment of the jungle or in some similar situation, and allowed to mature in these surroundings, without language, without clothes, and without the association of other humans? Fortunately it is not necessary to rely entirely upon speculation to answer this question, for a number of cases are on record of the discovery of 'wild' children, who have been reared from an early age with little or no human

contacts.[1] Although not all such instances are perfectly authenticated, the facts in some of them are established beyond a reasonable doubt.

One of the earliest of these children to attract scientific notice was 'Itard's wild boy' who was found in 1798 by a group of French sportsmen (**13**, p. 137). The child seemed to be fully ten years old, but he was unable to talk and had been living, so far as could be ascertained, on whatever provender he could find in the forest. He was taken to Paris and after a long period of relatively ineffectual training was pronounced mentally deficient.

The Kasper Hauser case, another notable example, is doubly important because there is no question of its authenticity. This boy, who has been variously regarded as a royal pretender or as an heir to some princely German house, was apparently put out of the way by political schemers of his time. He was confined alone in a dark cell so small that he could not stand upright till he was 17 years old and was fed on bread and water throughout this period. No one saw him except his keeper. When found in 1828 he could walk only with the greatest difficulty and scarcely knew how to use his hands and fingers. He could not understand what was said to him, was able to speak only one sentence, and was ignorant of the most elementary facts of everyday life. He possessed, however, a remarkably keen sense of smell and a capacity to see in the dark far surpassing that of the average person. Intensive educational training was only partially successful because, according to Tredgold (**19**, p. 301) "the prolonged isolation had wrought an effect upon the brain cells from which they could not completely recover."

Of a number of more recent instances, the 'wolf children' of India are probably the most striking. Two of these children, one of whom is presumably still living, were found as recently as 1921 in a cave inhabited by wolves (**16**). Their ages were estimated at two and eight years respectively. When discovered, they had no language responses and could

[1] According to Murphy (**13**, p. 137) about a dozen such foundlings are known to history.

not walk upright, but instead crawled about on all fours. They ate and drank like dogs, making little or no use of their hands in these activities. The younger of the two died sometime after removal from the cave and the other, a girl, was kept in the household of a Christian missionary, who named her Kamala and who undertook with the assistance of his wife to provide her with a special course of education. At the completion of four years of this training Kamala could speak no more than 40 words and still uttered strange animal-like howls at night. Efforts to break her of the habit of pouncing upon and devouring small birds and mammals had not been successful. Although the child eventually learned to walk, she is reported never to have learned to run.

Instead of supposing that these children were congenitally feeble-minded as has usually been done, I submit that originally they probably possessed an entirely normal equipment of reactions—otherwise survival against the terrific environmental influences would have been impossible. On the strength of this view, it would seem that they had made natural and adequate adjustments to their surroundings. They seem, in fact, to have developed responses which were particularly suited to their immediate contacts. Those placed with wild animals *learned* themselves to be wild animals in a literal sense of the word. When suddenly transplanted, therefore, to a highly organized society which was entirely foreign to them, they had no adequate responses available and were as a result stigmatized as feeble-minded.

Their inability to acquire the desired kind of behavior even with careful training is assignable to the fact that they had advanced to too mature an age to uproot the fundamental habits so basically entrenched by earlier experience. This explanation follows readily from the recognized importance of the very early years in psychological development. Watson, Kantor, and others have held, in fact, that the baby at birth represents virgin soil which can be cultivated by special training in any direction. Criminals and geniuses are made, therefore, by a genetic process, rather than born. One does

not necessarily need, on the strength of this assumption, to conclude that all feeble-minded children, like criminals and geniuses, are feeble-minded as a result of deficiencies in training. Certainly congenital defects prohibit normal development in a great number of cases. With the perfection of efficient methods in clinical psychology, however, a large percentage of children previously diagnosed as feeble-minded have been proven to be sound in all respects except in equipment of acquired reactions. If discovered at an early enough age the 'inherited' deficiencies of these individuals have been satisfactorily corrected through specialized education, although this has not been possible if they have persisted too long in their original habits. 'Wild' children, according to this view, should be regarded as feeble-minded only to the extent that higher animals raised under like conditions might be expected so to be.

2. Experimental Support

Even if one accepts, however, the necessarily great influence of genetic factors, does not the mass of experimental data from animal psychology definitely *prove* the ape inferior to humans? Much of the available evidence appears, indeed, to have been interpreted in this direction. Yerkes, however, who has probably done more work with anthropoids than any other contemporary psychologist, has recently remarked (**31**, p. 191): "It is indicated by current research . . . that behavioral adaptivity is qualitatively similar in man and in anthropoid ape. . . ." Some few comparisons in which the environmental preparation of the humans has been no different from that of animal subjects (anthropoid or otherwise) point strongly as well to a similarity rather than a difference in the abilities studied. Thus Alpert (**1**) has shown that young children behave much like Köhler's (**10**) chimpanzees in solving similar problems. Hicks and Carr (**7**) have demonstrated that man possesses little if any superiority over rats in learning to run a maze; Warden and Baar (**22**) have found that birds as well as humans are subject to the Müller-Lyer illusion; and Gesell (**6**, p. 344 *ff.*), who tested an

adult street monkey of the species *Cebus sapajous* with his standardized tests for infants, discovered many similarities to the behavior of young children. Witmer (**24**) in fact, at one time examined a trained theatrical chimpanzee, Peter, in the Psychological Clinic of the University of Pennsylvania. The ape was not only able to perform many simple tests commonly employed with children, but even went so far as to imitate the tester in writing the letter 'W' on the blackboard—a problem which so far as is known was in every aspect new to the animal. This anthropoid, whose age was probably not more than five or six years, was considered by Witmer to be equivalent on a human scale to a low or middle grade imbecile.

Evidence is indeed not entirely lacking to show that it is possible for primates under certain conditions to perform at least one elementary psychological test more proficiently than humans. A recent study by Tinklepaugh (**18**) who worked with one *Macacus cynomologus* and three *Macacus rhesus* monkeys in a modification of the delayed reaction experiment, brought out the surprising fact that these animals were frequently superior to the experimenter and to various observers who entered the laboratory (p. 205). Comparative studies with two twin boys four years and nine months of age showed furthermore that the children exhibited behavior strikingly like that of the monkeys in similar problem situations.

3. Objections to Previous Investigations

There are two serious criticisms which may be brought to bear, it seems to me, against nearly all experiments upon the behavior of apes which have thus far been attempted:

1. Since these have been chiefly of the analytical type, *e.g.* concerned with the study of special abilities such as sensory discrimination, memory, insight, learning, *etc.*, they have necessarily been undertaken with animals at least sufficiently mature to be independent of maternal care. It is doubtful, in fact, if anthropoids have ever been employed for genuine experimental purposes at ages much under two or three

years. Hence the most formative period in these animals' lives has been spent with others of their kind in the acquisition of typically infra-human modes of response. How could they ever be expected under these conditions to develop basic reactions which were not predominantly of an animal nature?

2. A much more significant and generally overlooked point, however, is that without exception the laboratory animal is treated by the experimenter, and by all others with whom he comes in contact, essentially as an animal. Although elaborate precautions are taken to eliminate 'secondary cues' during the performance of the tests, *primary cues* of the most disturbing sort are entirely overlooked outside the test periods. The animal is never given a chance to learn human behavior. Everything is against him from the start. He is kept in a cage, in a characteristically animal environment, or he is led about on a chain or leash. He is fed like an animal, must sleep like an animal, and is gaped at and teased by curious bystanders. He may even be poked with a stick to 'see what he will do.'

Under the most favorable circumstances he is seldom used for experimental purposes for more than two hours a day. At least seven-eighths of his waking life, therefore, is consumed in typically infra-human surroundings. Yet all our psychological conclusions regarding his behavior are based upon the short interim of experimentation and fail utterly to take this longer period into account. If the animal can learn laboratory tricks in one-eighth of his time, must he not learn a very great deal in the other seven-eighths even though no specific effort is made to motivate him by hunger or punishment? A conservative inference would be that he is not only permitted to continue in his animal ways by such a procedure, but that he is forced by *environmental circumstances* to remain upon the animal level. Could one honestly anticipate anything different from normal human children reared under like conditions, experimented upon in the same manner, and similarly caged when not being tested?

Even those splendid experiments which have done more than any others to bring out the highest types of behavior in

the highest types of animals, *e.g.* Hobhouse's (**8**, p. 235 *ff.*) and Köhler's (**10**) studies of chimpanzees and Yerkes' work with chimpanzees, orang-utan, and gorilla (**25, 27, 28, 29, 30**) are all subject to these specific criticisms. Considered in the light of their own limiting conditions, their results represent outstanding contributions to the investigation of anthropoid behavior, but as studies of the comparative psychology of humans and animals—and as such they are frequently interpreted—they seem to have ignored completely factors of vital importance. Indeed, the objections of the *Gestalt* psychologists to earlier experiments with animals (**9**, p. 167 *ff.*) may with some stretching be turned against their own work. Thus it may be said that although Köhler took account of the configural responses of the apes to his experimental situations, his findings are invalid for comparative purposes since he failed to consider the larger *Gestalt* of which the experiments themselves were only a minor figure.

By analogous arguments it can be shown that the anthropoids of Kohts (**11**) and Cunningham (**3**), which were primarily household pets, could never have risen above typical pet behavior, since the responses integrated by the environment and by the reactions of humans with whom they came in contact were essentially 'pet' responses.

4. The Genetic Method of Approach

The animal as well as the human must be definitely regarded as a product of its surroundings. There is no justification for ascribing to either a special immunity from environmental influences. Such meager evidence as we have, moreover, points decidedly to the fact that if the environment of an animal is changed sufficiently, *and changed at an early enough age*, entirely different behavioral characteristics will result. Thus Scott (**15**) and Conradi (**2**) have demonstrated that birds of various species reared with those of other species develop—not the song peculiar to their own kind—but a song like that of the foreign birds with whom they have been reared. The teaching of growing canaries to sing popular melodies has, in fact, since these classical experiments become

a well-established business (**12**). The young are kept from all musical sounds except those of the tune to be acquired, which is played to them several times a day—usually upon a phonograph. Most birds readily develop faithful reproductions of at least one melody which thereafter becomes their characteristic song.[1a]

An example of similar type is afforded in the case of the pedigreed German police dog, Fellow, whose master made a point of treating him more like a human than an animal from earliest puppyhood. According to statements of Mr. Jacob Herbert of Detroit, owner of the dog,[2] Fellow was constantly with human companions who verbally directed, instructed, and encouraged him. Never was he whipped. His environment so far as was consistent with social propriety was that of a child instead of a dog.

Fellow was able to understand, as a result of this development, an astoundingly large number of words and to respond to them in such a way as to remove all doubt of his thorough comprehension. He appeared before the Galton Society and the American Psychological Association and was examined many times by competent animal psychologists. Several detailed reports of his activities have been published by Warden and Warner (**20**, **21**, **23**). According to the view set forth in this paper, the dog himself is not to be regarded as inherently exceptional. It is his 'education' which has been so.

Here then is an animal, lower in the phyletic scale than the anthropoid, which displays surprisingly human characteristics as an outgrowth of its near-human environment and treat-

[1a] Z. Y. Kuo has very recently reported a study (The genesis of the cat's responses to the rat, *J. Comp. Psychol.*, 1930, 11, 1–35) in which he reared several groups of cats in different environments, some having rats as cage companions while others had only other cats. Of those which lived with the rats none ever killed a rat of the same species with which it was raised, although ample opportunity was afforded. On the other hand, the members of a group which lived only with cats but which were permitted to see their mothers kill rats, all themselves became rat-killers by the time they attained the age of four months. This author holds that if there exists therefore an 'instinct' in cats to kill rats, there must also be an 'instinct' to love them.

[2] Mr. Herbert is neither a psychologist nor a biologist, but a layman—and a great lover of dogs.

ment. The apes, consequently, which are morphologically closest to the human species, should be capable of much more striking development. Their long period of infancy and their length of life are similar to those of man; their hands permit them to perform many human tasks; their nervous system is markedly superior to those of birds or dogs.

5. A Proposed Experiment

Suppose an anthropoid were taken into a typical human family at the day of birth and reared as a child. Suppose he were fed upon a bottle, clothed, washed, bathed, fondled, and given a characteristically human environment; that he were spoken to like the human infant from the moment of parturition; that he had an adopted human mother and an adopted human father. Suppose further that he were placed in a baby carriage and wheeled; that he were given selected playmates—young children who would be reared with him—who could be counted on to treat him as an equal and not as an inferior or as an animal; that he were taught to walk on his hind legs as the human child is taught; and similarly that his education and his environment were modified, as he grew, in accordance with the standards of human society.[3]

Under no circumstances should the subject of such an experiment be locked in a cage or led about on a leash. Under no circumstances should he be fed from a plate upon the floor. The criterion for his treatment should be without exception the same as that of a human. Throughout his upbringing his mistakes should be carefully and persistently corrected as are the mistakes of a child.

The experimental situation *par excellence* should indeed be attained if this technique were refined one step farther by adopting such a baby ape into a human family with one child of approximately the ape's age. Genetic case studies of the two individuals could then be undertaken, supplemented

[3] The general plan for an experiment of this type is by no means original. As far back as 1909 Lightner Witmer wrote (24, p. 205) "I venture to predict that within a few years chimpanzees will be taken early in life and subjected for purposes of scientific investigation to a course of procedure more closely resembling that which is accorded the human child."

by such comparative tests as it seemed feasible to make throughout their development.[4]

Possible results to be achieved from this type of investigation can only be imagined. Theatrical apes have been taught remarkable performances. We know already that many of them eat like humans, dress and undress themselves, ride bicycles, skate on roller skates, smoke cigarettes (apparently with a relish) and understand a large number of human words. But these activities are learned as mere stunts which are performed only at stated intervals under very special conditions. They are not made integral and necessary parts of the apes' lives. The theatrical animals furthermore, like the experimental ones, are kept in cages or chained much of the time. Their respective environments, again, are predominantly those of an animal world.

6. Would Human Speech Develop?

Although the majority of investigators seem to regard human speech as quite beyond the capacity of the anthropoid ape,[5] it is to me not entirely inconceivable that under the genetic process outlined, systematized language responses—at least in rudimentary form—would be found to develop. Observations of chimpanzees have shown that they possess without special training a fairly well organized 'emotional language' and that they employ in many cases sounds which appear to be specific to particular behavioral situations.[6] It has long been known furthermore that the anatomy of the vocal mechanism of the higher apes is enough like that of man to permit the possibility of human speech. In fact, the reports of careful investigators indicate that the cry of the newly born orang-utan or chimpanzee is hardly distinguishable from that of the human infant.

If then during the process of uttering some infantile wail the ape baby in the human environment happened to close its lips, it would, quite by accident, pronounce the word 'ma.'

[4] It would probably not be practicable, however, to continue such an experiment after the organisms had reached the age of five or six years.

[5] *Cf.* the many references to this topic in Yerkes (26), Chaps. 13 and 24.

[6] *Cf. e.g.* Yerkes (32).

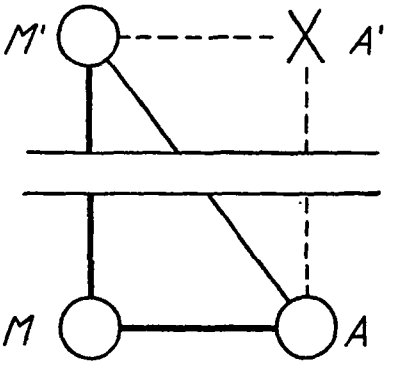
Its adopted parents should, however, at this point markedly *increase the stimulation* as is done in the case of a human child. Their activity would be characterized by picking up the infant, hugging and fondling it, repeating the word 'ma' to it many times with perhaps additional exclamations of 'Baby's first word!' Ultimately this method, which is almost universally practiced with the young of the human species, might lead in the ape as it does in man to the voluntary use of the sound 'ma' to indicate the female person who acts in that capacity. By various extensions of this procedure the word 'da' and the names of simple objects could next be learned. The same painstaking effort and corrections which are directed toward the acquisition of language responses in the child would, of course, be necessary in the case of the anthropoid.

Unless the ape is lacking in a motor speech area, as some authorities contend, there is a reasonable possibility, it appears to me, that under the proposed technique it might develop human speech in the same natural manner that it is integrated by the child. Witmer (24), Garner (5) and Furness (4) in fact, have all reported cases of articulation accurately imitative of human speech in trained anthropoid apes. The latter investigator not only succeeded in getting an orang-utan to utter the two words 'papa' and 'cup' but to say these words, so he believed, both intelligently and meaningfully. The progress in the speech training was, however, slow and laborious, but this again can be accounted for on theoretical grounds by the too-mature age of the animal at the time its education was undertaken.

7. A Valid Basis of Comparison

The present relative position of civilized man and the ape and the proposed plan for equating extraneous influences are schematically indicated in the accompanying diagram. Here M′ represents man as developed on the highest environmental level. M then indicates the original basic man evolved within the lower stratum of uncivilized surroundings. The point A on the parallellogram may serve for the ape who

grows up in a situation similar to that of the man, M. The resulting organisms, whether M or A, apparently differ but little, as we have tried to show throughout this paper. That comparisons which have heretofore been made, namely, those between civilized man, M′, and the ape, A, are spurious, however, should now appear from the diagonal M′A, since



two variables, one of which has previously gone unconsidered, are present in such a comparison. The first of these variables is the difference in organisms, and the second is the difference in training or environment. It remains, however, to complete the figure by means of the experiment outlined. The resulting organism, A′, reared upon the same environmental level with M′ then becomes comparable to civilized man with the same degree of validity that A and M are comparable at the present time.

8. Possibility of Negative Results

There can be little doubt that the conceptions upon which the foregoing remarks are based are fundamental. It would be presumptuous, however, to attempt any theoretical interpretation of proposed results before those results, whether they be of value or not, have been attained. It may not be amiss therefore at this point to note that the writer subscribes to no particular theory as a possible explanation of the differences which are supposed to exist between the capacities of man and the infrahumans. Although it may

appear from a perusal of these paragraphs that a defense for radical environmentalism has been propounded, such is by no means the object of this report. If undue emphasis seems in fact to have been placed upon environmental factors it is only because the project outlined is more favorably presented from such a position and because one of the chief desiderata has been to point out the importance of extraneous developmental influences.

I fully appreciate furthermore that in presenting arguments intended to emphasize what to me appears to be the importance of this proposed investigation I have subjected myself to possible criticism on the grounds of gross anthropomorphism. In order therefore to give adequate weight to the opposite side of the case we list below a few fairly obvious morphological and physiological distinctions which suggest possible differences in behavior between the ape and the child even though environmental factors are equated as completely as possible.

(*a*) The first and most significant of these is the considerably smaller brain size of the anthropoids.[7] Upon the assumption of a close correlation between neurological development and behavioral capacity, the ape might thus at the start be expected to be inferior to the human in tasks of any complexity.

(*b*) The relatively longer and stronger arms of the anthropoid, it may be supposed, would lead to greater aptitude in climbing than that possessed by the human. To the extent that it became necessary to curb this supposed tendency to climb more in one organism than in the other the upbringing of the two would necessarily differ.

(*c*) None of the anthropoid apes possesses the *opposable thumb*, with the power of bringing the thumb against each of the fingers, which is so well developed in man (14). Probably this would result in differences in manual dexterity. The greater facility with which the ape manipulates objects with its feet could be readily eliminated, however, by the use of shoes.

[7] F. Tilney (17, II, p. 567) reports that the chimpanzee brain occupies about one-fourth the volume of the human brain.

(*d*) If the orang-utan were selected for an experiment of this kind, a further structural distinction is to be pointed out, since this ape when walking erect steps on the outside of its feet, curling the toes inward. The chimpanzee and gorilla, however, tread on the soles of the feet like man.

(*e*) The somewhat more rapid rate at which the anthropoid infant begins to crawl and stand is also to be remarked. It has been maintained that an ape of one year is about equivalent in physiology and behavior to the human baby of twice that age. The period of adolescence and the growth of the permanent teeth, however, suggest that the ape during later childhood is in advance of the human by an interval variously estimated at from two to four years. Giving the human baby in this experiment a year's advantage in age would do much to balance this inequality.

(*f*) Other less apparent distinctions would doubtless appear when direct comparisons could be made.

It is entirely possible, therefore, that the findings of the proposed investigation would be predominantly negative in character. I cannot believe, however, that this would seriously vitiate its significance, since either negative or positive results should be of some importance not only to psychology and education, but to biology and sociology as well. Some light in addition should be thrown by this means upon the ancient controversy between the environmentalists and the hereditarians. If demonstrable differences in behavior existed at any given stage of training, and if the environmental factors had without question been held constant throughout that training, then the conclusion that the differences were due to native influences would be well-nigh unimpeachable. It could be maintained, should such results be secured, that the ape, given full opportunities to acquire a complete repertoire of human reactions, had progressed only part of the way.

9. Summary

The chief points which we have endeavored to bring out in the preceding sections may be summarized briefly as follows:

1. There is some evidence which indicates that human children, if kept throughout the early impressionable years in surroundings similar to those of wild animals, develop permanent behavior traits which are more like those of animals than of humans.

2. Comparative psychology, however, seems largely to have overlooked the tremendous rôle played by environmental influences upon captive wild animals before they are captured and brought to the laboratory. It is probable in fact that anthropoid apes have rarely if ever been obtained for experimental purposes at young enough ages to preclude their already having acquired basic infrahuman modes of reaction.

3. A further criticism which may be levied against most experiments with the higher primates is that the experimenter and all others who observe captive specimens, although meticulous with reference to the elimination of 'secondary cues' during laboratory tests, are likely to introduce unwittingly *primary cues* of a seriously disturbing nature when experiments are not in progress. The effect of this extra-experimental stimulation may be not only to stamp-in existing animal reactions, but even to integrate in the animals many additional responses of the same character. The current practices of confining anthropoids in cages most of the time and of leading them about on chains, must certainly be conducive as well to typical infrahuman activity.

4. We have suggested that procedures of this sort are at least partly responsible for the failure to elicit more human-like behavior from anthropoid apes. Such factors may therefore be regarded, it appears to us, as invalidating in large measure those conclusions which infer that the ape is *naturally* inferior in various capacities to man.

5. Since it is manifestly impossible to impress upon a human subject environmental influences identical to those of captive animals, we have proposed as a fair experiment which will permit a valid comparison of the behavior of these organisms that an infant ape be adopted *at birth* into a human family and be raised, not as a pet, but in all respects exactly

as a child. It has been suggested furthermore that the ideal situation would be to bring up the anthropoid with a human baby of about the same age, so that genetic case studies of the two individuals would be possible.

6. How far the ape would develop in these surroundings is of course a matter of conjecture, but the possibility cannot be denied that if this animal is at all capable of acquiring human speech, it would probably do so in a situation of this kind.

7. We have also tried to consider at some length the opposite possibility, *viz.*, that the outcome of this genetic investigation would be chiefly negative so far as the animal subject is concerned. In either event it has seemed to us that the results attained would adequately compensate for the difficulties to be encountered in such an undertaking, since the findings of an experiment of this nature, regardless of its outcome, should be of considerable scientific importance.

Arrangements for the carrying out of an experiment of the type outlined with an anthropoid ape and a human child are at present being formulated. If the plans can be satisfactorily consummated we hope to be able through later papers to report the progress of the work.

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