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W. Montague Cobb

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Number One

By W. Montague Cobb

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By W. MONTAGUE COBB

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Our Primate Heritage

Zoos, circuses and the photographer have familiarized nearly everyone with many fundamental resemblances in appearance and behavior between ourselves and the monkeys and apes. Comparative anatomy and allied sciences have not only described in elaborate detail the nature and significance of these similarities, but provided information as to the time of origin of the different groups and of their relationships to each other. It is considered reliably established that we and our fellow primates constitute a group of creatures which branched off from the mammalian ancestral tree over sixty million years ago. Our simian contemporaries are the descendants of ancestors, which in the very ancient past, got off at forest way stations from the slow evolutionary train which had its terminal in ourselves. These modern survivors embody the essential features of many phases in our own past history.

In view of this relationship, students of behavior have sought and found in the social life of our primate relatives, keys to the understanding of our own complex social life. All the major patterns of our behavior as affecting such vital matters as individual and group dominance, the relations between the sexes, family ties, the rearing of the young, and so on, are clearly represented in the life habits of fellow creatures which we have been wont to regard chiefly as sources of amusement.

Human behavior, in all its deeper aspects, may readily be seen to be the result of ancestral conditioning which preceded by millions of years not only the dawn of civilization, but the existence of man himself as a distinct species.

Cerebral Credits and Debits

The achievements of our civilization are rightly attributed to the unique capacities of our brains—brains which have devised an infinitude of material wonders ranging from giant telescopes, which search the far reaches of the cosmos, to electron microscopes, which explore the molecule; brains which have formulated great unifying philosophies and altruistic ethical concepts as liberal as the doctrine of the brotherhood of man and the principle of the Golden Rule.

We tend, however, to overlook the fact that the development and use of the higher powers of the brain have not yet suppressed that heritage

of strong passions and instincts from our pre-human past which may once have been useful in helping our ancestors to survive. On the contrary, the possession of higher intelligence can and often does permit more ruthless and ingenious exploitation of brutal urges than has ever been manifest in the animals endowed with them by nature for survival purposes.

Although man has had for at least ninety-five thousand years, and undoubtedly much longer, the size and development of brain and body which he has today, he has spent most of this time as a dweller in caves who worked with crude stone tools and was given to plunder, rapine, homicide and often cannibalism against his fellow man. Only within the last eight thousand years, by the most generous estimate, has this marauder become occupied with the matters which make for the development of civilizations. Yet despite the fact that man has employed the higher faculties of his brain in this direction for less than one tenth of the time he has had them, no investment ever known has paid such enormous dividends.

For an outlay represented by the use of his brain in civilized pursuits for the last eight thousand out of a possible more than ninety-five thousand years, man has gained in return: elimination or control of the major disease scourges; engines which convert to his purposes the incalculable energy latent in fuels and impounded water; rapid and efficient transportation and communication by land, sea, and air; a scientific agriculture and animal husbandry through which it would be possible to support the population of the world on an area half the size of Great Britain; in short, such conquest of his environment that he has overspread the whole earth and become the master creature on it.

One would expect that such profits from cerebral activity would produce an appreciation of the brain that would cause reason to be used for the solution of human problems, so that with means now at hand, man would organize his economy on a world-wide basis, limiting the population to numbers that would ensure a fair opportunity for every person born, and exchanging and distributing goods and natural resources so that there would be abundance for all and want for none. But this is not the case. Man perceives the benefits of his brain well enough but gives little heed to their significance.

His eight thousand years of civilized development lie like a thin, easily abraded veneer over the base wood of fifty million years of struggle in the raw. Man no longer needs for survival his great aggressive drives, but these drives have long wholly controlled his behavior, and the cerebral cortex, the highest part of the brain, has from an evolutionary standpoint only very recently begun to control it. This latest and finest, but also most delicate control, is frequently imperfect and easily dislodged. Thus, the blood lust rises easily at a prize fight,

larceny and assault must be guarded against in a blackout, and a groundless rumor can cause a lynching.

In future time reckoned in millions of years it is possible that the control of the higher centers of the brain over behavior may increase, because comparative anatomy shows a progressive tendency in this direction from the lower primates to man. But meanwhile what is there to prevent man, under the influence of primitive drives, from continuing to use his brain for the invention of newer and better instruments of destruction and eventually exterminating himself?

Education for Security

Universal education would appear most vital to any sure way out of the dilemma in which man finds himself today, of either solving his problems rationally or facing progressively more catastrophic wars as rapidly as the people can muster strength for them. Education might be specified as "priority number one" for human security.

All of the distinctive accomplishments of mankind are due to the use of the mass of gray matter called the cerebral cortex, which forms the outer covering of our brains. This portion of the brain is relatively larger and more highly developed in man than in any other animal. It functions as a super-control center, which, better than any other mechanism evolved in Nature, is able to organize impressions received from the outside, associate them with previously stored impressions, and on this basis determine our behavior, through controls which reach all the muscles of the body.

The remarkable extent of these controls may be briefly illustrated. A bird can fly and run in well-coordinated fashion after being completely deprived of its brain, because these muscular movements are initiated and regulated not in its brain but in its spinal cord. A lower mammal, such as the rabbit, can have the motor part of its cerebral cortex removed, and continue to engage in all the normal movements of its species, because its power of initiating muscular action resides above the spinal cord but below the cortex in a center called the *corpus striatum*. Damage to the human motor cortex, however, results in complete paralysis of that portion of the body under control of the area affected, not because the muscles cannot act, as proper application of an electrical current will stimulate contraction, but because the power of initiating their action has been completely transferred from the lower centers to the cortex.

In the struggle for survival, an organ like the cerebral cortex confers upon its possessors the tremendous advantage of almost unlimited adaptability. Highly specialized animals cannot survive except under the particular conditions for which their bodily structure fits them. The lion starves when there is no game, although other sources of adequate food might be available. The hippopotamus dies when his river dries up, because immersion is necessary to protect his ponderous hulk from the

heat of the sun. Man, on the other hand, has no specialized equipment such as flesh-shearing teeth and sharp claws, which, however efficient, restrict their owners to specific ways of gaining the essentials of life. Instead, with his advanced cerebral cortex and free unspecialized hands, man has been able to devise ways and means to survive under all kinds of conditions from the tropics to the poles and from the depths of the sea to the stratosphere.

But Nature has imposed upon man an exacting condition in endowing him with an organ of such potencies. He can enjoy the benefits of the higher brain only, in a general way, in such measure as he develops its possibilities by education.

The possession of his cerebral cortex by man may be likened to the possession of a Stradivarius violin by a gifted child. Each has an instrument of great perfection and possibilities. But as the child will never in adulthood be able to draw from the violin the music of which it is capable, unless he is properly trained and applies himself diligently and consistently, so the human cortex will never yield its full potentialities unless these are developed by educative processes.

Education is as much a biological necessity for man as food. The human being, born feeble and dependent, must become independent and able to fend for himself. In contrast with most other animals, natural maturing processes will not take him very far in this direction. He must learn from others, and what he learns about customs, institutions and values, determines in large measure his reactions toward everyday affairs.

Obstacles and Alternative

A general education involves the effective and impartial exposition of the facts about the world and its occupants. As concerns human welfare, no one need fear the results of such enlightenment, but there are obvious difficulties in its acquisition. In too many instances, our current formal educational systems, or the sum of experience comprising informal education, fail either to present an adequate selection of facts, to present an adequate selection truthfully, or to awaken an appreciation of the significance of what has been learned.

As learning is basically a voluntary process, a very large number of individuals are content to forego the rewards of intensive training of their gray matter and get along with a minimum of education. This can be done because most of the occupations of our day, be they in the assembly line or a swivel chair, do not make exhaustive demands upon our intelligence. Sir Arthur Keith has estimated that the average person in a job of which he has mastered the routine, does not use more than an eighth of the capacity of his cerebral cortex. Most people are willing to leave to others serious thinking beyond the scope of their personal affairs.

This is unfortunate for a democratic form of government, for where

people have not been trained to think for themselves and are not properly informed upon facts, they will be indoctrinated in specific directions, as are the populations of most of the nations of the world today, including our own majority and minority groups, and under the influence of false beliefs, may be led to do things which are highly irrational and against the common good.

The only alternative to truthful education as an instrument of social stability is force. Education operates through the higher brain which has only lately come into control of the body and its hold is none too secure. Force alone is respected by the much older and more strongly entrenched human drives. Because we know that these determinants cannot be adequately restrained by the further evolution of controls within the body in predictable time, the day cannot be envisioned when our police systems and other means of enforcing justice may be discarded.

Human Inertia

In addressing the future, patience with human inertia will still be necessary. If one ask why modern man waited as long as eighty-three thousand years to start using his brain in the directions which have led to civilization, when judging by what he has accomplished in the last eight thousand years, he might have achieved so much more, science can give no satisfactory answer. Undoubtedly the development of speech and the accidental discoveries of fire and agriculture were of primal importance to the beginnings of civilization and once their importance was sensed results were relatively rapid just as the development of our "machine age" has been. But one must believe that observations of fire and the fact that a seed will sprout into a plant had been made thousands of times before man would pay any attention. Resistance to change, which has survival significance in representing adherence to the tried and true, is very deeply entrenched in human nature, and is as conspicuous among the leading nations of the world as among the least progressive.

The Task Ahead

Clearly, the burden of extending the benefits of education rests upon those who are best aware of its value. Though the task is of first magnitude, it must be vigorously attacked if faith be kept with those who now give their lives.

Alexander Meiklejohn has aptly stated, "The roots of the Great War are not primarily economic; they are moral and intellectual. The fundamental issue is not one of conflict between nations. It has to do with the place of Reasonableness in human behavior. We are engaged in a struggle between the rival claims of Reason and Violence as principles which shall determine the relations of men, and of groups, one to another."¹

¹In *Toward Democratic Victory*. American Council of Public Affairs, Washington, D. C., 1942.

Reason cannot become a dominant force in human affairs unless men's thinking machines are properly nurtured in sufficient numbers. Means are available to effect this. Modern technology has made possible the efficient presentation of almost any idea at any level, duly adapted for age, sex or ethnic group.

To formulate scientifically and place in operation an objective educational program for all the world will require preparations and energy comparable to that now necessary for the military emergency, but it can be accomplished. Universal agreement on what every man should know is not conceivable or necessary, but the inculcation of an understanding of the nature of man as a living creature, and of the adequacy of world resources for human needs for indefinite time to come, would seem an extremely modest aim. Manifold knowledge from the biological and sociological sciences, which is continually being augmented, can be brought to bear on work of this kind and in the application, revision of many phases of extant educational methods will be involved.

Finale

Man is the current product of a long period of evolution which has resulted in his being able to get about on his hind limbs alone, and have his fore limbs free to engage in whatever activities he may choose. Free hands and the power of speech have enabled him so to improve the advanced cerebral cortex he inherited from tree dwelling ancestors as a master control organ of the body, that with the aid of certain fundamental discoveries such as fire, agriculture and the wheel in prehistoric times, and gunpowder, steam and electricity in recent times, he has become the dominant living creature on our little planet.

His future is largely in his own hands. In his higher brain he has an organ with which he can successfully solve all his major problems, but he cannot derive full benefits from this organ unless he educates it, a matter which Nature has left almost entirely up to him. There is no reason to believe that in the cosmic order of things there is a directive which requires that man must conquer his difficulties and go on to further ranges. Man may just as well become extinct as thousands of other species before him. No other creature, however, has had so much within its own power, the means of ensuring its own future indefinitely. Inasmuch as the majority of mankind has shown too little enthusiasm for taking measures necessary to utilize this power, it is up to those who are aware of the possibilities to keep their shoulders to the wheel.