During the life of an individual, changes take place in some of these reflex acts. One reflex which we know as the Babinski's reflex is obtained by lightly stroking the sole of the foot. In a newly-born child this stroking causes all the toes to bend down except the big toe. This extension of the big toe is the Babinski's reflex. It occurs in infants until they are about six months old, and does not re-appear in adults except in certain cases when the nervous tissues become diseased.

Conditioned Reflexes.

Another way in which simple reflex behaviour may become modified is by the formation of what are known as *Conditioned Reflexes*. The secretion of saliva is a reflex process. It is ordinarily caused by the presence of food in the mouth. Under certain conditions, however, the very sight or smell of food may bring about the secretion of saliva, even thinking about a nice juicy steak will excite the salivary glands to become active. Here we have instances in which a stimulus, originally ineffective, which did not originally bring about a reflex response, has come to be effective in producing a reflex action. A substitute stimulus has thus taken the place of the original stimulus. This has come about by the frequent recurrence of the substitute stimulus along with the originally effective stimulus.

The response of *Fear* has been found to be elicited ordinarily in the native state by only a very few stimuli. Fear is undoubtedly inherited, but what one comes to fear is largely a matter of substitutory stimuli. Just what these stimuli are depends very much on one's past experiences. One child may become frightened of a thunder-storm through watching the behaviour of his elders; another may become afraid of dogs, after being overwhelmed by a too friendly dog. The fear of dark has a substituted stimulus.

Conditioned stimuli, however, may be rendered ineffective through training. Many foolish fears may also be transformed into more normal responses by substituting another response to the situation which brings out the fear.

Intelligence.

Our supposition of an era where life depended solely on reflex action is derived from our knowledge of changes which have taken place in comparatively modern times. Man is a superior creature. Compared with many other animals he is neither big nor strong. His organs are not very different from theirs. His needs, appetites, desires, are not in any way peculiar to himself. What is it, then, that raises him so much above the other living creatures and places him in his dominating position? Compare the brain of a human being with that of a horse, an animal weighing several times as much as he. What is the outstanding difference? The solution lies in the enormous development of the cerebral hemispheres in Man. His complicated brain enables the human being to communicate with his fellows by words spoken and written, and so to profit by the experience of many successive generations, to acquire great skill with his hands so that he may not only adapt himself to his surroundings, but, in addition, adapt his surroundings to himself. The cerebral hemispheres are provided in order that Man may act in an intelligent manner, and this intelligence acts as a rein upon all other behaviour mechanisms.

Instinctive Action.

We have now to consider another problem before our scheme of progress is complete. What is the main difference between the behaviour of Man and that of the lower animals living to-day? It is a very big step between reflex action and intelligent behaviour. Consider the birds. Is it not peculiar that a bird will carry out the complicated work of building a nest for the protection and care of its young without any previous teaching? Why do the wolves hunt in packs when to hunt in pairs, or even singly, would mean a bigger meal? Surely there is something in the behaviour of these animals which cannot have been learnt by them. How, then, has it been gained?

Just as certain bodily features are passed on from mother to child, so certain mental features are passed on from generation to generation. The inheritance of the *ancestral mind* usually called *Instinct* is readily demonstrated amongst insects. One generation frequently disappears before the next is hatched out, and in the latter instinctive adaptation to its surroundings is clearly evident and perfect of its kind.

It was not until the latter part of the nineteenth century that psychologists found that Man is an instinctive creature, like the older animals whom he resembles. Deprive him of his cerebral hemispheres and he at once has to rely solely upon his instincts. It is his highly specialised cerebrum, superimposed as it were upon the older parts of his brain, the basal ganglia, which constitutes the great difference between him and the higher animals.

The instincts which have served Man as an animal throughout his long struggle for existence are the essential fabric into which all acquired individual patterns of character and conduct are woven by his intelligence; the instincts are the driving forces behind all human activities. They are common to all men at all times, though they may vary in intensity in races and in individuals.

Now the question arises by what standard are we to judge a man? What do we mean by the normal mind? Normal is often taken to mean average. Thus we say that a baby is the normal weight at birth. One might say that the normal mind is the mind which resembles the average of those around it. Even this definition has its limitations. When a person can meet the demands made upon him by his material and social surroundings, then we say his mind is normal.

We have now seen the gradual evolutionary building up of the mind. We have seen how the behaviour mechanism has gone through various stages, resulting in the production of intelligent action. It is difficult to say if we have reached the acme of perfection. Is our brain to be surpassed in quality in the future? We cannot tell. It has been suggested that the average brain of modern days is not up to the standard. Even now we may be retrogressing. Perhaps it is the result of the mechanical age in which we are living.

Retrogression.

Under certain conditions of disease, however, retrogression can be readily demonstrated, and the scale whose ascent has covered millions of years is descended in a few months. Let us see what happens when dementia occurs in the human brain. The delicate cells of which the cerebrum is composed are attacked and destroyed by a poison circulating in the blood and lymphatics. How does the patient behave under these conditions? The nurse with any experience of these cases will tell you that there seems to be a general decontrol. The patient is slovenly, takes no thought for his personal appearance, flies into a passion, is greedy, and all that is highest and best in his mental make-up seems to be in abeyance. Is not such a man living a life of instinct? In the later stages of a disease such as dementia paralytica even instinct goes. The patient lies helpless and apparently out of touch with his surroundings, even the instinct of self-preservation has gone. He neither offers to feed himself or to protect himself from common physical dangers. The nurse who places the feeding-cup to his lips, however, can sustain his vitality. The swallowing reflex is present. A foreign body in his eye will still produce a winking. If the patient is not suffering from tabes as well, the knee jerk can still be elicited. Is not this patient living a reflex existence once more? And, lastly, just before death happily supervenes, there are still organs in this body working by chemical influences alone.

Here is the stage of tropism.

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