occurrence of this colloidoclasia being dependent on a change in the equilibrium between vagus and sympathetic tonus which occurs in these individuals.

There is, however, another fact of considerable importance. An abnormal response to postural change was found in 87% of the psychotics. This response was purely a vaso-dilation. It was not possible, however, to influence this reaction by adrenalin injection.

In view of the reversal of reaction in response to ingestion of milk by adrenalin, these results with postural change would appear paradoxical if the reactions have the same origin. It may be that the ultimate result may depend upon adequate adrenalin dosage, or that in postural reactions one is dealing with a simple vaso-dilatation and simple volume circulatory disturbance, whereas in the hæmoclastic reaction there is probably a second factor of the nature of a colloidoclasia.

This work has been conducted in the Central Laboratory of the London County Mental Hospitals, Maudsley Hospital, and I would express my indebtedness to the Director, Dr. Golla, for his helpful criticism and advice, and to Dr. Mapother and his medical officers for facilities to examine their cases, and to the volunteers from the hospital staff who have provided me with normal controls.

## References.

(1) *Journ. Ment. Sci.*, July, 1925.—(2) *Brit. Med. Journ.*, 1925, p. 914.—(3) Feinblatt, *Journ. Amer. Med. Assoc.*, March 3, 1923.—(4) Wilson, *Brit. Med. Journ.*, 1922, ii, p. 1061.—(5) Glaser, *Med. klin. Berl.*, 1922, ii, p. 331.—(6) Schiff and Stransky, *Deut. med. Wochenschr.*, 1921, p. 42.—(7) Cullen, *Journ. Biol. Chem.*, 1922, lii, p. 502.—(8) Hawkins, *ibid.*, 1923, lvii, p. 493.—(9) Widal, *Presse Méd.*, 1920, ii, p. 893.—(10) Schiff, *C. r. Soc. de Biol.*, 1921, lxxxv, p. 40.—(11) Stocker, *Zeitschr. f. d. Gesam. Neur. u. Psychiat.*, 1922, p. 79.—(12) Tinel, *Journ. de Méd. et de Chir. pratiques*, 1922, p. 84.

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## *Suggestions on the Psychology of Mental Deficiency* (1).

By Hubert C. Bristowe, M.D.Lond., Medical Officer to Yatton Hall Institution for Mental Defectives, Somerset County Council.

In his *Creative Evolution*, Bergson sets out to prove the thesis that instinct and intellect tend to develop along parallel lines, and that instinct only develops at the expense of intellect, and intellect only develops at the expense of instinct. Though this appears to me to be undoubtedly correct, it does not include the complete truth. For I find on studying the matter more deeply that intellect

(1) Being the Presidential Address to the Bath and Bristol Branch of the British Medical Association, June, 1924.

is in fact developed from instinct, along with its twin sister morality, and whilst the development of morality is not inconsistent with the development of instinct, yet intellect and instinct are incompatible.

To appreciate correctly the antagonism of these two, it is necessary clearly to understand what instinct and intellect are. I think it would not be incorrect to say that in its earliest form instinct is pure reflex. Take a unicellular animal: a touch leads to its contraction at that spot so as to escape a potential or actual danger, or to close round a particle of food. Or take a simple multicellular animal, we find a touch which leads to reflex movement in a single cell communicated to all the other cells, and the animal closes, perhaps on a piece of food, and perhaps on nothing—an act of escaping a danger by withdrawal. As we ascend in the animal scale, we find that instinct becomes less obviously reflex, though the reflex nature can generally be traced. Eventually we find in the animal a number of movements and acts for the preservation of the animal or the perpetuation of the race, which on careful examination are seen to be purely automatic. We may perhaps put it that in the higher animals instinct is a racial memory unconscious in character, but essentially automatic or reflex. Intellect commences with the growth of a voluntary inhibition of instinct: the power to decide that instinct may be at fault, and does not necessarily conduce to the safety or happiness of the individual or the future welfare of the race. Once the individual has learned that instinct is not infallible, the power of deciding in favour of or against instinct becomes acquired, and judgment and freewill will follow almost automatically to a greater or lesser extent.

Since intellect is in its essence the inhibition of instinct, it follows that intellect supersedes instinct, which it tends to destroy; and that the more automatic actions become, the less hope there is of the growth of intellect. Hence the antagonism between the two.

There appear to be two primary instincts, and two only, one of which is egoistic, and the other racial. The egoistic instinct is concerned with the preservation of the individual, the racial with the preservation of the race. From the egoistic instinct I hope to show that intellect develops and from the racial, morality. These two instincts are also to a great extent antagonistic; selfishness is at constant war with altruism, and I think it is not far from correct to say that one of these instincts tends to develop at the expense of the other. I have spoken of these two instincts as primary, but in strict accuracy the egoistic instinct is the elder of the two, and is at its commencement a purely reflex action.

In order to understand how these two primary instincts have developed, and how, as I hope to show, morality and intellect are the natural growth from these two instincts, it is necessary to trace their development up through the lower animals to the human race.

In those lower animals that are devoid of a differentiated brain, we find that the racial instinct is often far more strongly developed than the egoistic. I must perforce leave out of consideration unicellular animals, and others that reproduce themselves by fission and budding, and pass on to some instances where the instinct is so impelling that the race is preserved at the expense of the individual.

There is very little sign of this instinct in the scale of life lower than the insects. The oyster, for instance, lays its eggs, which are washed away in the current of water, and then developed into oysters or lost as the case may be, whilst in the case of the scallop the eggs actually hatch in the shell of the parent, but the young pass into the sea, and after a short life of movement and liberty, settle on their final resting-places. There appears to be but little instinct here. Some insects are only a little better: they lay their eggs in such a place that the young may obtain nourishment, as on the plant on which they feed, or on a dead body, where they can find suitable nourishment, and having performed their allotted task, die and leave the young eggs to nature.

But when we ascend to the bee, the wasp and the ant, we find the racial instinct very highly developed. We will take the honey-bee as our instance. There are the male or drone, the female or queen, and the immature spinsters or workers. The workers, who conduct the business of the hive, appear to take no interest in the individual, except in so far as it conduces to the preservation of the race. They feed the queen and drones, and wait on them until their destiny is fulfilled, and then they sting them to death or otherwise destroy them. On a sunny day the drone seeks the queen on the wing and flies higher and higher, and the one that flies highest mates with the queen, his abdomen splits open, and he falls a corpse to the ground, whilst the queen flies home with his abdominal contents trailing behind her as an oriflame, as Maeterlinck poetically puts it. The drone has obeyed the racial instinct even at the destruction of his own life. And what of the queen? Is her future a much happier one? She simply becomes an automatic egg machine, a prisoner in the hive, and the slave of the workers. All her joy of life ceases that she may continue the bee race. The life-histories of the wasp and ant are other cases of altruistic lives.

When we get to the Arachnidæ or spiders we still find a similar altruism, though in this case mixed up in a curious way with the egoistic instinct. The male spider has not got a much happier outlook on life than the drone. As soon as he has fertilized the eggs, his spouse, thinking his life's work is finished, makes a meal of him and effectually puts a stop to any possible attempt at conjugal infidelity in the future. She, as I really think she deserves, gives up her own life after laying her eggs, and never sees her own progeny —another case of that blind impelling instinct which leads to the destruction of the individual that the race may survive, and however powerful the egoistic instinct may be in these cases, it is subservient to the racial.

We next pass on to the vertebrate animals, and we find in the eel very much the same life-history that we find in the spider. The eels we are accustomed to see in streams, ponds and ditches are all spinsters; the male remains in the estuaries. When the spinster eel has become tired of single blessedness, or more accurately, when impelled by instinct, she seeks the male in an estuary, and there mates with him. And, as is the case with the spider, she, having no further use for him as a spouse, makes a meal of him, perhaps her last, and swims out to the mid-Atlantic ocean, where she lays her several million eggs, and dies, herself exhausted by the effort. Once more, impelled by instinct, both male and female lose their lives that the race may continue.

I wonder whether this habit of spouse-eating has any relation to the act of kissing, and the bride simply eats the bridegroom in an access of affection! Who is there that has not heard a devoted young mother, in a transport of love, declare that she "could eat her baby!" With such instances of instinctive immolation on the altar of the race, can we be surprised that Tennyson exclaimed in his "In Memoriam":

> "Are God and Nature then at strife?
> That nature lends such awful dreams,
> So careful of the type she seems,
> So careless of the single life."

As we ascend higher in the animal scale, we find that the racial instinct becomes more and more tempered with egoism. The ego makes itself felt, and recognizing its own value, refuses to rush blindly to its own destruction in order that the race may continue.

There are, of course, many instances of animal racial instincts which do not appear to be so definitely reflex, but look more like a process of natural selection (though perhaps natural selection is after all reflex in origin). Take the following very interesting example: There is a bird of the ostrich family living in S. America

called the rhea. The hen lays six eggs, and then the cock bird drives her off the nest and sits on the eggs himself. The hen may lay one or two more eggs, but no notice is taken of them. About one week before the eggs are due to hatch out, the cock bird deliberately destroys three of these eggs. The three broken eggs are rapidly covered with flies, and it is on these flies that the newly hatched birds feed. As the animal scale ascends we find the altruistic instinct is somewhat changed in character. The animal no longer blindly accepts destruction for the benefit of the future race—for a generation yet unborn—but is still willing to accept death in order that the young or females of the race may be preserved. We have here the well-known instances of the mother fighting to the death for its offspring, and the male of a herd fighting for the female and young. The racial instinct has become more one of preservation of that which is, than of that which may be. In some instances, and I think they are of a higher type, we find what we call the herding instinct, the instinct of binding the individuals into a body, band or tribe for mutual support and preservation. And we find the racial instinct still very much in its primitive form, the willingness to accept injury or death for the good of others—the herd.

It is in this form chiefly that it is found in the present evolutionary stage of humanity. The instinct which impels men to join in families, tribes and countries for mutual support against a common enemy. The *esprit de corps* of regiments is a good instance of that instinct which teaches men that it is not their own individual life which matters, so much as the honour and success of the body of which they are members. To digress, I would ask, when a body of men have been taught to value their own lives highly, their value as fighting men becomes greatly lowered, and it is not until further and higher education has re-valued them more accurately that they again become efficient soldiers. If from any reason this racial or altruistic instinct is wanting, or if it is perverted, moral qualities do not develop properly in the individual, and this want of development is not peculiar to the human race. The following instance is interesting even if it is not conclusive. I have for some years kept ducks in my orchard. A couple of years ago I was rather annoyed that my grain bill should exceed the yield of eggs to a larger extent than usual. One afternoon, as I was walking round my orchard with my gardener, I watched the ducks. I noticed that one duck was not with the flock. My gardener told me that he had noticed for some time that she had been keeping aloof from the flock. I went down to the water to see her, and as she walked up from the pond she stopped and picked up something and ate it. It was an egg. She had been guilty of an offence

against the duck race. I fancy she knew it, and was ashamed, and so kept to herself. But, of course, it may have been that the other ducks avoided her as a sinner against their racial lore. After her death—an untimely one—my supply of eggs was raised to normal.

To my mind this is a clear case of perversion of the racial instinct, and its recognition by the bird or birds concerned, or both. There is one point I must now make quite clear, and that is that I definitely omit from the category of racial instinct the sexual instinct, and place it under the head of egoism. It is in itself a definite and personal endeavour to transmit the personal characteristics and qualities to the individuals of the future race, and is not in itself altruistic.

When we take a broad view of the racial instinct and trace it up from its impelling commencement, we arrive eventually at morality. For what is morality but that impulse which should be in all to preserve the race of which we are members, and to do nothing that can imperil the future health or existence of the race or its individual members? And it is from this racial instinct that the highest altruism is developed. All that is most beautiful and unselfish in life, that we are accustomed to attribute to saints in our own frail human race we find—as we might expect—most highly developed in the females. It follows, then, that if morality develops from the racial instinct, the want of that instinct means the absence of morality; if congenital, moral imbecility; if in adult life, moral insanity.

The egoistic instinct commences very early in the scale of nature, and is, as I have already said, in its essence reflex. This reflex act we find not uncommon in the vegetable world, as, for instance, in the case of the sundews and the sensitive plant. In the first instance the leaf closes over its victim, which is digested, and nourishes the plant. The latter only shrinks from the touch, and we find that reflex acting more slowly in the case of trees and plants which seek the sunlight at the expense of their fellows.

In the lowest animal forms this egoistic instinct is distinctly reflex in nature, as I have pointed out already in the case of the unicellular animal, or animal, without a differentiated nervous system, and even when we ascend higher in the animal scale and come to those animals with a differentiated nervous system, but without a differentiated brain, as in insects and all invertebrates, we find the instinct of self-preservation is reflex rather than purposeful. No intelligent brain assists in the movements, and where such actions are reflex, it is difficult to believe that pain as we understand it can exist or that it is anything more than inconvenience.

Shakespeare was scientifically in error when he said :

> "The poor beetle that we tread upon
> In corporal sufferance feels a pang as great
> As when a giant dies."

The means of self-preservation differ very greatly according to the physical characteristics of the individual animal. The lower animals simply contract, as the amœba and sea anemone; others, such as the oyster or scallop, simply close their shells; whilst the periwinkle and the snail, together with an animal much higher in the animal scale—the tortoise, withdraw into their shells, and, as far as possible, shut the doors behind them. Other classes of animal by leaving a portion of themselves in the hands of their captors escape into safety. The brittle star-fish breaks off its arms if interfered with. The lobster and crab, when the battle of life becomes too strenuous, leave a claw behind in the clutches of the enemy, and the lizard will leave its tail in its captor's hands. These acts do not show any individual intelligence.

The day-flying insects, as we may so often see, in their attempts to attain liberty, fly towards the light, and not infrequently in their vain attempts batter themselves to pieces against a transparent medium such as glass. Here we have the stimulus of light on the eye leading to reflex movements which cause the insect to fly towards it, and this act being only reflex, is very liable to error. The insect is unable to adapt itself to altered circumstances. The action is reflex in character and shows no trace of intelligence. Another method of trying to escape from danger is the well-known one of shamming death, or in the higher animals of "freezing"—that is of crouching motionless in a definite attitude so as to assimilate with surrounding objects, and become inconspicuous. By these methods the individual escapes destruction, either because he is unnoticed, or because his enemy will not feed on dead animals.

Perhaps one of the commonest of all acts of self-protection is flight, which may just as easily be from an imaginary danger as from a real one. Not infrequently the animal, such as a horse, may flee from an imaginary danger and encompass its own destruction by running into a real one. In vain we seek for the germ of intelligence, but cannot find it. They are automatic acts in the presence of real or imaginary dangers, and are merely reflex. The animal is unable to distinguish between the real and false danger and cannot inhibit its own reflex act. We look from instinctive act to instinctive act and try to find in them a ray of intelligence, and at times we think we discern a gleam or faint flicker, but on further investigation we generally find that that gleam is only a "will o' the wisp" which slips from our grasp just as we think

we have got it. One instance of what I mean will suffice. The Adelic penguins of the Antarctic congregate in special breeding-grounds, and during their residence, impelled by instinct, perform certain acts some of which may be disastrous to the hatching out, and to us appear certainly stupid. But towards the end of the breeding season they go in flocks to the edge of the ice, and before plunging in for their swim, they try—as in a game—to push one of their fellows into the sea first, and when one has got safely in, the rest follow. Is this instinctive or intelligent? The fact is the waters swarm with sea leopards—their deadliest enemies—and it is by this means the waters are proved to be safe or otherwise. But to answer the question satisfactorily, we should have to find out whether the same game would be played—for unquestionably they do play games, and enjoy them—in such perfectly safe waters as the London Zoo. We find more intelligence in the dog than in any other animal. But consider him well, and without prejudice. In his natural state he lives by hunting with the pack, and that pack is led by a definite leader. And the pack, as in the hounds of the day, hunt by means of their scent. That is, the dog uses his nose—a very well-developed organ—for his hunting. Now, after innumerable years of domestication, has he got very far away from his original hunting instincts? Is his master much more to him than a glorified leader of the pack? And though in most instances he now lives apart from the pack, does he alter his essential habits? Nature has provided him with excellent eyes and ears, but he still prefers to use his nose and find his way by scent rather than by sight. And here is the point. He has been unable to evolve reason that the methods of the pack are not suitable for modern conditions of civilization. One result often witnessed, unfortunately, is that a dog will run across a crowded thoroughfare with his nose to the ground, exercising its hunting instincts, and is killed or seriously damaged by a passing vehicle. Had he been able to reason, he would have used his eyes and his ears, and probably have escaped unhurt. I wonder how many years or centuries it will take for intelligence to tell him when to use his eyes and ears in preference to his nose!

Although I have spoken rather disparagingly of the intellectual powers of animals, we can see even in them the germ of intelligence, and that germ is most clearly seen in the young of animals, when the brain is still impressionable, but with age that germ of intelligence seems to decay.

And what is this germ of intelligence? It is curiosity, the natural and healthy curiosity of the young animal, and this curiosity springs from the instinct of self-preservation, and though reflex to

a large extent at its commencement, it forms a basis on which intelligence may grow, curiosity itself grows upon the instinct of self-preservation. A young, healthy animal is full of curiosity—it looks into every nook and corner of the place it is living in. He will jump away from anything that frightens him, and will make use of anything for its own purposes, however simple those purposes may be. He lays up in his brain facts he may be able to use later in life. He does, in fact, add to his store of instinct certain facts which he makes instinctive use of in adult age. His own memory adds to his racial memory. No one can, with any stretch of the imagination, call the sheep intellectual, but yet the lamb is a most inquisitive animal, and in infancy adds to his store of useful facts for use in adult age. But so soon as infancy is past, he is content to lead the colourless life of his parents, taking no interest in life beyond his own comfort.

Take the puppy again—how inquisitive it is: it appears to want to make the acquaintance of everyone and everything within reach. Is this good to eat? Is that good to play with? But in this case curiosity does not entirely cease with age, and it continues to acquire facts, though to a smaller extent until ripe old age at length supervenes. But yet, in spite of this curiosity and what it learned from it, it is unable to inhibit those reflex or automatic acts which are instinctive.

Although intellect is in essence the inhibition of instinct, that power of inhibition is only acquired by an evolutionary process, which process starts from curiosity. Curiosity is the dawn of intellect, and without curiosity to build on, intellect could never have had birth. To trace the growth of intellect from curiosity we must consider what is the next step in evolution. The next step, in order, seems to be memory—the capability of storing up in the brain the experiences of the past. This memory—I mean conscious or semi-conscious memory—undoubtedly exists in many of the higher animals, but it is far more powerful in the young animal than in the old, and just as with the human being, the memory for recent events becomes blurred in old age, and finally almost lost; so we find more markedly in animals that memory for recent events hardly appears to exist after the childhood of the animal, and in this way animals differ from man. Memory becomes automatic, and does not appear to be combined with any reasoning power. A young horse, for instance, can be trained in a way that an old one cannot be. He may be taught not to shy at a piece of white paper, but who will undertake to train an old horse to take no notice of it? In my early days of motoring I had to draw up for nearly every horse I passed, and it is only

about fifteen years ago that I had to dismount from an ordinary bicycle for the sake of horses in Pembrokeshire. The lesson was not taught them in early life, and they could not acquire it in later years. All horses of the present day in this country have been trained from early age. In the animal world, then, as distinct from the human, we do not appear to be able to get much farther. We find the first gleam of intellect in the curiosity of the young, and the memory of the facts obtained by means of that curiosity, and it is to the human being that we must now pass for the next stage in the development of intellect, which appears to me to be the power of forming an abstract idea. We have no reason to suppose that an animal is capable of forming such an idea. Indeed, so long as the mother hen has a brood of chickens, or ducklings for that matter, she appears not to be able to distinguish between thirteen and two or three. She cannot count, and abstract and even concrete figures do not appeal to her. It is left for the mentally healthy human being to realize the abstract, and to draw at will mental images of past scenes or objects no longer present. We cannot, of course, put ourselves into the position of the animals, but their acts and behaviour do not lead us to suppose that they have this faculty. The keystone of the whole intellectual arch is voluntary inhibition of the various instinctive impulses—the faculty of choosing in the case of two or more instinctive impulses which shall be adopted and the faculty of deciding against acting on any instinctive impulse. We might almost call this reflex. When in the lower animals two or more contending instinctive impulses are operating at the same time, the impulse which is the strongest is acted on, and the others are inhibited by this strong impulse. And we might, perhaps, not improperly say that in the case of man the use of reason may be, after all, only the application of a stronger impulse to inhibit action arising from a weaker one. This, of course, opens up the whole question of free will, a question which cannot be discussed here. There is still one higher faculty belonging to the human being, though its existence has been denied —that of creating in its own brain *de novo* ideas which are not made up of past memories, and perhaps it is here that some forms of genius may lie.

I must go back for a while to the healthy human child. He has very well-marked curiosity. There is a restless inquiring into everything, an endless fund of questions which is often very difficult even to the highly educated parent or teacher. The child stores up in his brain a vast mass of facts which may or may not be of use to him in later life. He is able later to call up images of the facts observed, either at will or in response to some outside stimulus, and

he can utilize according to the view he deliberately takes of their value. He is a reasoning animal, who can decide for himself what instinctive impulses he shall obey, which disobey, and which divert into other channels for his own uses. He is an intelligent and may be intellectual animal.

I now propose to turn just for a short time to the mentally deficient, and see to what extent these views may be applied to them.

There are two main classes into which mental deficients may be divided—moral and intellectual. It does not at all follow that a moral deficient is intellectually wanting, or that the intellectual deficient is lacking in moral qualities. These two forms of deficiency cannot, therefore, have a common origin; and it appears to me that they are due to an absence or deficiency of one or other of these two primary instincts—racial and egoistic. That for some reason or other, the race memory or perhaps more accurately, either the afferent or efferent portion is involved in the instinctive reflex, wanting.

There are many cases of moral deficients, who in all other respects are normal and are well able to earn their own living, and may even possess a high standard of intelligence. But they cannot be made to understand that they must not do as they like with their own bodies, nor why they should not possess their neighbours' goods. The life and comfort of others is immaterial to them so long as they can satisfy their own desires. They do what they like without regard to the interests of others. The altruistic impulses are wanting, and the egoistic instinct, no longer held in check by the altruistic, runs riot.

As I have tried to point out earlier, the racial instinct is the parent of all morality. And morality is in itself that instinctive guidance which is necessary for the well-being and continuance of the race. The problem of intellectual deficiency is very much the same when we have excluded cases of gross physical maldevelopment, such as microcephalics, Mongolians and deficiency diseases such as cretins; it appears that the egoistic instinct has been partially or entirely interfered with in its transmission from the parent stock. Let us now look back on the qualities which go to build up intellect, and we shall find that the lower the mental grade the more of these qualities are lacking.

There is first of all the statutory idiot, who is unable to take any care of himself, cannot feed himself, protect himself, or make his simple wants known. We find in almost all except the higher grades an absence of curiosity, the child may indeed walk round, touching objects, especially if of a bright colour. But there is an

absence of that bright questioning curiosity which we are accustomed to find in a healthy child; and it is often considerably less than we see in a puppy or even a lamb. From curiosity memory is developed, and memory in these cases is very deficient and at times wanting, and often little more than instinctive. Even in higher grades we find that peculiarly human quality, the power of grasping an abstract idea, is almost always lacking. A child will constantly fail in the simplest arithmetical addition, unless the question is in terms of oranges or apples. Then a fair amount of accuracy may be expected.

But I have never yet been able to trace in the mentally deficient that inhibitory power which is almost synonymous with wisdom.

What an insult to a healthy child of four to compare its intellect with that of a mental defective of 16! It is impossible to make a true comparison of this sort, though it may form a useful basis for practical work. Between the degraded statutory idiot and the high-grade deficients we get every type. The lowest is incapable of taking the smallest care of itself, and lacks every instinct which is common to the human being and even to the lower animals. As we descend from the highest grades of deficiency, we first notice the lack of reasoning power, *i.e.*, the lack of the power of inhibition; lower down the scale we find an incapacity to grasp abstract ideas, and then curiosity becomes more or less wanting and finally all power of self-protection.

Moral deficiency is, as one would expect, always present in the lowest mental degenerates.

To sum up, then, morality develops from the racial instinct, and perversion or absence of that instinct leads naturally to the perversion or absence of morality. Intellect develops from the egoistic instinct, and perversion or absence of that instinct is the cause of want of growth of the intellect. I have purposely avoided touching on the domain of metaphysics and questions too wide for a paper of this sort. I have also avoided using words of recent introduction into the literature of psychology; as they tend to confuse rather than elucidate the problems before us. I do not pretend to have made any fresh additions to the science of psychology, but have attempted to commit to paper certain explanations of the problems which I have so often before me, and these explanations have forced themselves on my mind whilst studying mental deficients.