

Memory.

MEMORY is the power to learn, to grow mentally in response to functional activity, to profit from experience, and so to become intelligent. It has its counterpart in the power to develop physically in response to use. Its evolution occurred especially among the higher animals, and was accompanied by a general retrogression of instinct. Nevertheless, at least four new instincts were evolved, each of which incites to learning, and without which little or no intelligence could develop, no matter how great the capacity to learn.

(1) The parental instinct incites to the protection and training of offspring. It wanes when offspring are fit to fend for themselves.

(2) The instinct of sport impels the individual to develop both body and mind in exactly the right directions. Thus the kid climbs and butts, and the kitten stalks and pounces. This instinct wanes as the individual reaches maturity and ability to battle for existence. It lingers longest in human beings who remain capable of some mental development even to old age. But the character of human sport gradually changes from those contests of strength and endurance which developed the boy to those which merely maintain physical development, or else are pure contests of skill and wit. Thus the mature man ceases to wrestle, and amuses himself instead with golf, bowls, cards, and the like.

(3) The instinct of imitation incites the individual to learn (from the examples furnished by his companions) how to act and what to think. It often works in combination with play (for much play is mimicry), and wanes in the individual even more swiftly and in a greater degree than the latter. While it persists in strength the individual is termed "plastic." It is best developed in man, who learns through imitation not only such habitual actions as walking and speaking a language, but also the habits of thought, the general outlooks on life, the ambitions, and the emotional convictions as to what is true and right that distinguish the community (or section of it) in which he is reared, savage or civilised, Christian or Mohammedan, Catholic or Protestant, lowly or exalted, and so on. In this way he fits himself for life in that particular environment. Thus, mainly, is fashioned what is termed his "character," his general mental disposition. As the twig is bent, so the tree grows. Hence the importance of good homes, companions, and schools. As this instinct wanes the character sets. The same kind of things are no longer learned, at any rate to the same extent and with equal facility. Compare language as learned by a child and by an adult. It follows that the traits created by imitation tend to be very stable, for they are not afterwards displaced by others of the same kind. The boy becomes the father of the man.

(4) The instinct of curiosity impels the individual to seek for, and learn from, evidence. Unlike imitation, it persists with relatively little diminution even to old age. To it (and to labour) the individual owes the main part of his mental development after childhood, his intelligence, his reason. It creates, not sentimental, but intellectual convictions. Since it persists during life, the ideas acquired through it tend to be unstable—apt to be displaced by others which seem founded on superior evidence.

(5) Apart from instinct, man, especially civilised man, has invented labour, to which he is impelled by the intelligence created through his memory, and from which he learns to become yet more intelligent, efficient, and laborious. Thus, as indicated by Prof. Goodrich, in the mental, as in the physical, world

each stage of development furnishes the basis for the next until full development is achieved. Labour commonly lacks the pleasure and interest which accompany the instinctive activities. Thus, while men never delegate the latter (*e.g.* eating, sporting, and love-making) to others, they often delegate the labours to which they are prompted by intelligence. Like play and imitation, but unlike curiosity, labour tends to create habitual "physical" dexterities—which are really mental, for the (subconscious) mind co-ordinates the muscles. On the other hand, the intellectual traits created by labour resemble those created by curiosity.

We are concerned especially with the products of imitation and curiosity. All the rest of the "make-up" of man's mind is relatively simple and obvious. His instincts, few in number and definite in character, are identical in kind for all men. At most this man or this race may have this instinct or that (*e.g.* the sexual or parental) more or less developed than this or that other. Again, all men except idiots are eminently educable. They differ in capacities for learning, but yet more in the way in which the capacity is used. Apart from play and labour, the results of which are glaringly obvious, men learn only through imitation and curiosity; and accordingly as they acquire more, through the one than through the other, their characters are shaped and the fates of nations decided. Here must the parent and the pedagogue learn or be impotent. Here must the man of science labour, or charlatans and fanatics will for ever dominate the body politic.

The mental traits created by imitation and curiosity differ sharply. Not only are convictions derived from example very stable, but they are tinged with emotion, and even passion. The reverse is the case with those derived from evidence. Compare moral and religious convictions, which belong to the former category, with business and scientific beliefs, which belong to the latter. A religious and ethical system may conflict daily with common sense (*i.e.* evidence), and yet persist for a hundred generations. But the knowledge and ideas acquired through curiosity change in every man with every year. When men believed on grounds of faith (*i.e.* through imitation) that the world was flat they burned dissentients; to-day, when they believe on grounds of fact (*i.e.* on grounds of evidence) that it is round, they are contemptuously indifferent. Every missionary knows the ease with which the children of non-Christians may be trained to his beliefs and ideals, and the difficulty and danger of trying to convert adults. A child who is taught that honesty is right will for ever hold that opinion; an adult taught that honesty is the best policy may easily change. If there be such things as absolute right and wrong, the human mind is incapable of knowing them; for the conscience, chameleon-like, is a product of imitation. Thus at different times and places everything, from promiscuous sexual intercourse to rigid abstention from all intercourse, has been held holy, or permissible, or damnable, and conscience has pricked men correspondingly.

The traits created by imitativeness—habitual emotions and ways of acting—resemble closely the instinctive emotions and actions. Thus men and horses walk, men and ants are social, men and bees defend their communities; but while the men have learned, the others have not. The love of a human mother for her baby is instinctive, that for her mature offspring is habitual; yet the one passes insensibly into the other. Did we not know that the children of Mohammedans could be trained to other beliefs and ideals we might think the fanaticism of the adults instinctive. So closely do habitual actions and

emotions resemble their instinctive prototypes that they are often thus described—as when a woman shrinks from untruth or a caterpillar, or when a boy dodges a blow. Habits are, in fact, pseudo-instincts; they have the same function; they are substitutes. Unlike real instincts, they are not infallibly useful, but, on the whole, they are superior, for they fit the individual to his particular environment, and, since they may change in future generations otherwise than by slow processes of natural selection, may be improved more rapidly.

On the other hand, the traits created by curiosity bear no resemblance to instincts. They are intellectual, not emotional. In the little child the two instincts work hand in hand, but in the adult they are often opposed; for the traits derived from imitation (faith, right belief, and morality, as we term them in ourselves; bias, prejudice, fanaticism, and superstition, as we call them in others) may prevent the development of those traits which curiosity should bestow—as is best seen among savages, creatures of custom and emotion, who, following from age to age in the ancestral footsteps, add little to their command over nature. Among modern civilised peoples the ecclesiastical mind is especially a product of imitation, the scientific mind of curiosity. Consider how unlike they are, and how different all societies trained mainly through imitation (*e.g.* medieval Christians and modern Mohammedans) are from those trained through curiosity (*e.g.* ancient Greeks and the more “enlightened moderns”).

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Walaeus and the Circulation of the Blood.

It has been my good fortune to come across two epistles written by Johannes Walaeus (1604–1649), professor of medicine in the University of Leyden in the year 1640. The two epistles occur at the end of Bartholini's “Anatomy,” published by Nich. Culpeper, Gent., and Abdiah Cole, Doctor of Physick: printed (in English) by Peter Cole; London, 1665.

Walaeus was greatly interested in the discovery of the circulation of the blood by Harvey, and in order to confirm it performed a large number of experiments on dogs, cats, rabbits, and monkeys. Having arrived at the conclusion already reached by Harvey, that the blood does not move itself, but is driven, he asks the questions “How is it driven?” and “What is the mechanism?” The answer is given in these two epistles written by Johannes Walaeus to his friend Bartholini, the professor of anatomy at the University of Copenhagen, and is as follows:—

“And that the Blood is driven by the *Vena Cava* into the right Earlet of the Heart, I have manifestly seen in the dissection of live Creatures: for in all motions of the Heart, the first beginning of Motion is so or no, because the Cava was knit to the Earlet [*i.e.* Auricle] and the Heart, we cut the Heart and the Earlet quite off in living Dogs, at the *Vena Cava*, and we observed, that even then the *Vena Cava* did a very little pulse, and at every time did send forth a little Blood. And therefore the *Vena Cava* hath certain fleshy fibres, for the most part about the Heart, which elsewhere you shall not find in *Vena Cava*. Now the motion of the *Vena Cava* is most evident near the Heart.”

Writing in 1913 Sir James Mackenzie says: “Until very recent times no definite remains of the sinus

venosus had been found. Keith and Clark have described a small node of tissue—the sino-auricular node—at the mouth of the superior vena cava. This tissue consists of fine, delicate, pale fibres faintly striated.” In the same year Dr. (now Sir Thomas) Lewis tells us that “the wave of contraction starts in a small and newly discovered mass of tissue the sino-auricular node, which lies embedded in the upper and anterior end of the sulcus terminalis.”

On the subject of auricular fibrillation Walaeus is also very interesting for he tells us that “the Impulse into both Earlets and into both Ventricles happens at one and the same moment of time; save in Creatures ready to die, in which we have observed that both Earlets, and both Ventricles do not pulse at one and the same time. But when the Blood is thus driven into the Ventricles of the Heart, the Heart hath no motion evident to the Eye, but putting our Finger upon the Heart we perceive something to enter into the Heart, and that the Heart becomes fuller, which also Harvey hath observed. Yea, we have observed that the Earlet hath pulsed seventy, sometimes an hundred pulses before any motion of the Heart followed.” Somewhat similar observations had, however, already been made by Harvey (“De motu cordis et sanguinis,” 1628, Chapter IV.).

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Transcription of Russian Names.

SOME 35 years ago I made in the columns of NATURE the proposal to adopt for the transcription of Russian names a few letters from the Bohemian alphabet. My letter was submitted to the authority of the editor of the Journal of the Chemical Society (for I was at that time Abstractor of that Journal for Russian literature), but he did not agree with my proposal, though later he accepted it for the Journal.

I beg to repeat my old proposal; for a great part of Russian scientific life is concentrated in Prague, and the Bohemian mode of transcription has, moreover, been accepted by philologists and by many geographers. Bohemian is now the State-tongue of an independent State. It is necessary to introduce only the following few letters: č = tch, ď = dj, ě = ye, ch = kh, ň = nj, š = sh, ť = tj, and ž = zh (joli); á = long a, and if you add the Bohemian ř which has two pronunciations: rž and rš, you can pronounce also all Bohemian names.

The following comparison between the old and new mode of spelling shows that the latter has also the advantage of a great economy in printing:

Tchitcherine (12)	= Čičerin (7)
Zhemtchuzhnyj (13)	= Žemčuzhnyj (9)
Mendeleeff	= Mendělějev
Konj (4)	= Koň (3)
Tatjana (8)	= Taťána (6)
Pushkine (8)	= Puškin (6)
Djadja (6)	= Ďáda (4)
Metchnikoff (11)	= Měčnikov (8).

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