

FROM CHILDHOOD TO ADOLESCENCE

At the opening of his seventh lecture, Dr. Hall called for a number of teachers to take the stand to assist him in an experiment. Seven young men responded.

The doctor arranged them side by side and requested that they join hands. He then took his place on the right, also joining hands with the column. Directing all to close their eyes, he asked that as soon as each should feel the pressure of his left hand, he would convey the pressure on to the next; the last one was to throw up his right hand, as soon as the signal should reach him.

The audience became intensely interested in this experiment, and there was profound silence when Dr. Hall, throwing up his left hand, set the impulse in motion. One could see it travel—up one arm, down another, and across the eight countenances. In some it moved fast in others slowly.

The experiment was repeated, and this time the impulse occupied four seconds in the transmission, or an average of one-half second to each man.

The interval elapsing between the moment that an impression starts for the brain and the moment it reappears in action, is technically called reaction time. It varies with different organizations, some being swift, others slow. It also varies according to the length of the nerves through which the impulse passes.

This fact is illustrated in various ways. An impression is begun at the big toe, for instance, and discharged at the tip of the middle finger of the opposite hand. This is the longest circuit. The shortest is that of the eye, which in the act of winking, reacts with almost incredible swiftness.

By appropriate experiments, we can ascertain accurately the rate at which energy moves along the nerves. Mental action is by no means instantaneous, it takes time. And each man has his own time, which is called the personal equation. For delicate observations, as in astronomy, it is necessary to know the observer's reaction time—his personal equation—which must be deducted from the time at which he records the taking place of the event. The average reaction time, the time between seeing and recording an occurrence, is about one-tenth of a second.

Dr. Hall described various experiments for testing the time of thought reaction, that is, the time it takes for an impression to set going an associated idea. He told the teachers that he would ask each to try the experiment of shouting back to him the first idea suggested by the word he should give. He then named "Cat." Most shouted "Dog." Some "Rat," others "Mouse." He then named "Boy," and the replies were much divided in kind and in time, "Girl," "hat," "freckles," "barefoot" being some of the various notions suggested.

The lecturer then related some amusing confessions that had escaped his pupils by such tests. On one occasion when he shouted the word "glass" confident that it would suggest window, one respectable young man surprised him by responding "beer."

Mechanical contrivances for measuring and determining nearly all the relations growing out of mind-activity have been invented of late years and are now in use in psychological laboratories. One of these demonstrates that the head grows heavier when engaged in thought, thereby incidentally justifying the metaphorical light-headed, empty-headed, as applied to one who never thinks.

This is the method employed: A man in a quiescent state of mind is laid on a board in such a way that his body exactly balances on a pivot. He is then given a problem to work out. Gradually his head begins to sink to the ground. Weights are placed on the other end at his feet until his body balances again, and thus the heft of his thought is ascertained—which it is needless to say, is the weight of the extra amount of blood caused to flow to his brain, by reason of the exercise going on there.

The question of reaction time is directly related to methods of teaching. The present lecture concerns itself with that most enigmatical period in a child's life, the period between eight and twelve years of age. Less is really known of it than of any other period. The pupil after the age of eight, ceases in a sense to be a child, yet he is not a youth. Very little outward growth marks this period, but there is much activity. Development proceeds by involution. The body grows complex, and there is great differentiation of the tissues.

This is the best age in which to teach a foreign language; that is, if the natural and only complete method be followed, which is the ear and mouth or conversational method. Psychologically, this may be called the short circuit method, and is peculiarly adapted to children. The long circuit method, that of the eye and finger, in other words, the grammar and written-translation method, whatever be its merits for a later age—and they are doubtful at any age—is not suited for this period of mind growth.

From eight to twelve is the golden age of verbal memory, and should be made use of in giving the child a complete and accurate vocabulary of the objects it has come in contact with. It is also an age of great interest in cosmology. Now is the time to teach the central facts concerning the sun, moon, earth and stars, and whatever of nature myth and legend it is necessary to know in order to interpret literature.

Some one has said that if Homer be not read in the original before the age of fifteen he can never be appreciated—the heroic flavor will be gone. If this be a fact—and there seems good reason to believe it—the ancient classics should come earlier in the curriculum. The present tendency is to put them off till we have but blunt tools with which to delve into them.

If the physical basis of life has not been respected in the kindergarten and primary grades, the years from eight to twelve will be characterized by various diseases. Eye and ear troubles are extremely common. Chorea or St. Vitus dance, and curvature of the spine are also of frequent occurrence. The latter promises to be obviated to a great extent by the introduction of vertical penmanship.

Teachers should not be in haste to insist upon the use of the reasoning faculties. There is still so much to be learned which is best taken on trust, that we may well wait the natural unfolding of the rational powers. So, too, care should be taken not to destroy the naivete of children. Do not disillusionize them. Life will become prosaic soon enough, even if teachers take no hand in it.

By way of illustration, take a few striking objects of nature—the moon, for instance. From a scientific point of view it is the deadest of all things. No animal or vegetable life exists upon it; during the twenty-eight odd days and nights which constitutes its single day, the temperature varies between six or seven hundred degrees above zero, in the sunlight, to five hundred degrees in the shade. It is a worn-out planet, too lifeless to figure

in the imagination even as a grave yard of what may have been.

But to children what object is more full of poetry, what object is so well adapted to stir the beauty emotions and awaken the sense of the sublime? Is it not a poor exchange, then, to rob the heart of this stimulating object, in order that we may, as we suppose, enrich the head? Let it first serve its mission in the domain of feeling; it will only too soon reach the prosaic level of the domain of fact.

The same argument holds true of the many pretty stories, in history, such as Washington and his hatchet, John Smith and Pocahontas, Romulus and Remus, and the heroic tale of William Tell.

The grim, fact-gathering historian is no doubt able to shatter all these dear baubles of childhood; and will, have no fear, succeed in doing so ere life becomes utterly prosaic. But in the mean while, keep him out of the school room, as you would keep out one who is bent on stealing the food that is to nourish the heart-life of your children.

[The following passage from Carlyle (Sartor-Resartus, chap. 10), though not given in the lecture, is so aptly to the point last discussed that I take the liberty of quoting it:

"The man who cannot wonder, who does not habitually wonder (and worship), were he president of innumerable royal societies, and carried the whole Mekanique Celeste and Hegel's philosophy, and the epitome of all laboratories and observatories with their results, in his single head—is but a pair of Spectacles, behind which there is no Eye. Let those who have eyes look through him, and then he may be useful.

"Thou wilt have no mystery and mysticism: wilt walk through thy world by the sunshine of what thou callest truth, or even by the hand-lamp of what I call attorney-logic; and 'explain, all, 'account for' all, or believe nothing of it.

"Nay, thou wilt attempt laughter; whose recognizes the unfathomable, all-pervading domain, of mystery which is everywhere under our feet and among our hands; to whom the universe is an Oracle and a Temple, as well as a kitchen and a cattle-stall—he shall be a delirious mystic; to him thou, with sniffing charity, wilt prostratively proffer thy hand-lamp, and shriek as one injured, when he ticks his foot through it?—Arner Teufel!

"Doth not thy cow calve, doth not thy bull gender? Thou, thyself, wert thou not born, wilt thou not die? 'Explain, me all this, or do one of two things: Retire into private places with thy foolish cackle; or, what were better, give it up, and weep—not that the reign of wonder is done, and God's world all disembellished and prosaic, but that thou hitherto art a dilettante and sandblind pedant.'"]

Religion is the central fact in childhood, and no educational system is complete that neglects the cultivation of it. Because of the much-vaunted separation of church and state, American schools have suffered what no after study or incidental religious training can compensate. The time to impress upon children the central facts of the spiritual life and man's relation to Deity and to his fellowman, is now—now when the mind is so constituted as to take many things on trust. This is the period of faith, and faith is pre-eminently the basis of religion. If the attribute be neglected now, it will not grow and become the inward monitor that it should be through life.

Attempts have frequently been made to agree upon fundamental principles that could be taught alike to children of all religious denominations