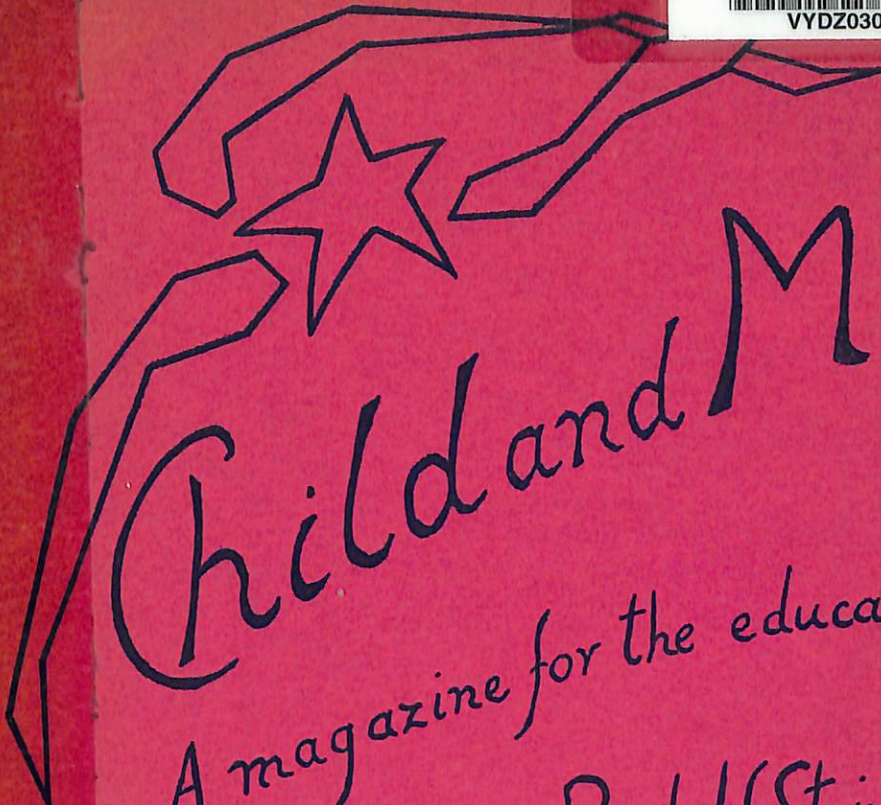


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CHILD AND MAN

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The Teaching of Natural Science

IT is the task of the historian to allow the facts and personalities of history to tell him the story of the evolution of humanity. This story will be true in so far as the historian does not impose his own particular theories upon the phenomena of history. In the same way the educationist must learn his art from an unprejudiced observation and study of the development of the growing child. Teaching and Education must accord with the needs of the child at every moment of his life. Educational theory, however clever, which is not based on a deep insight into the child's nature—and how little the many complicated methods in use to-day are so founded!—can only have the most harmful effects.

The development of the child as he grows to manhood runs a parallel course with the evolution of mankind through the ages. The changing consciousness of every single child during his school years is a recapitulation in miniature of the changing consciousness of humanity from the earliest time until the present. Rudolf Steiner has shown us the truth of this in all detail.

Our modern scientific age is the product of a certain way of looking at, and thinking about, the world, which is of comparatively recent origin. This kind of intellectual thinking, which is dependent on our sense impressions, and logically

builds up one thought on another, really arose when men began to turn their attention to the world of external physical phenomena. We see this thinking first being applied in the study of the movement of the heavenly bodies made by Nicolaus Capernicus, who wrote his great work, *De Revolutionibus Orbium Coelestium* in 1543. Since then this scientific thinking has striven to penetrate more and more into the realms of physical phenomena, and in this connection the names of men such as Galileo, Descartes, and, above all, Isaac Newton, come at once into our minds. Now in the soul life of the child intellectualism has no place before about the age of fourteen. Previous to this there is very little understanding of the law of cause and effect which is the basis of all scientific theory. That kind of thinking which is the way of thought of the physical sciences begins to manifest itself at about the age of twelve and only comes fully to light after puberty. It is, therefore, just at this time that lessons in the physical sciences begin—Sound, Light, Heat, Magnetism and Electricity, Chemistry,* etc. But it has been said that the thought structure on which our modern understanding of the phenomena of physics and chemistry rests is still foreign to the child at this early age, so that it is not the underlying Law which he needs to learn. If, however, we bring before children the pure phenomena themselves in descriptions and in experiments, such a presentation entirely accords with their inner need. “Up to the age of puberty the nature of the human soul is such that it needs ‘to behold’; whatever, therefore, we want to convey to the child—either for his upbringing in general, or with the purpose of increasing his knowledge in any special subject—we must make it highly imaginative and highly concrete.”†

Let us now consider a few examples taken from the early lessons in Physics in illustration of what has been said.

Sound

At the age of twelve the children are introduced into the world of physical phenomena through lessons in Sound. The

* See *Child and Man*, Vol. 1, No. 2, p. 5 et seq.

† Rudolf Steiner in a lecture on Education, June 1922.

child's experience of music is the bridge across which the teacher leads him; for by such an artistic approach one is working with the whole nature of the child at this time. Among other things the children will be shown a monochord, i.e. a long gut or wire string stretched tightly over a hollow sounding-box. By moving a bridge along the length of the string different musical notes may be obtained by plucking or bowing. The children will soon find that the note given out by a plucked or bowed string has some relation to its length, that the shorter the length of string used the higher the note becomes. Those who play the violin will know that the fingering depends on the same principle, that the length of the strings being altered by the position of the fingers gives rise to the different notes. In the piano the notes are ready-made by many strings of different lengths. Now one may proceed to show the children that there is a simple and definite numerical relationship between the note produced and the length of the string. If a string is sounded, and its length is then halved and again sounded, the first higher octave of the original note is obtained; if it is again halved this shorter length gives the second higher octave, and so on. Or if we take two lengths of string in the ratio of 3/2 (say 12 inches and 8 inches long) and sound these together we shall get the harmonious interval of the fifth. In the same way the lengths of string may be found for all the notes of the diatonic scale. The following are the ratios of the lengths of string corresponding to the different musical intervals:

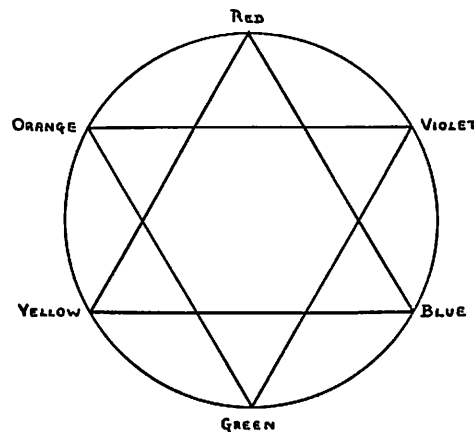
Note	C	D	E	F	G	A	B	C
Interval from C ..		second	major third	fourth	fifth	major sixth	seventh	octave
String's length ratios	1	$\frac{9}{8}$	$\frac{5}{4}$	$\frac{4}{3}$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{7}{4}$	2

Now it will be noticed that the more harmonious the musical interval the simpler is the ratio of the length of the strings giving the interval; the ratio corresponding to the octave is 2 : 1, to the fifth, 3 : 2. On the other hand the discordant intervals of the seventh and of the second have the least simple number relationships—15 : 8 and 9 : 8 respectively. This

relationship of the length of the string to the tone produced also provides a very good exercise for the children in working with fractions.

Light

One must again endeavour to treat this subject artistically. There is no question in the first lessons of speaking of the wave theory and the like. The teacher must appeal to the immediate experience of the child and let the phenomena speak for themselves. The naïve experience of the child in this sphere is in the world of colour, and in his painting lessons too he has learnt how to use the different colours in an artistic way. He has already an inner experience of the qualities of yellow, of red, of blue, and now in the physics lessons one may build on this. There are many experiments one may put before the children. If we gaze for a moment at a bright red circle of colour on a white back-ground, and then look away, we see a green circle. The eye has created this complementary colour, as it is called. If we have a bright green before us the red is called forth. Similarly, blue will create yellow, and violet, orange as their respective complementary colours.



This may be represented diagrammatically as shown, the opposite colours being complementary. Reading round the circle gives us the arrangement of colours in the rainbow, Violet, Blue, Green, Yellow, Orange, Red. Again one may speak of how the eye reacts to a bright light on the one hand

and to darkness on the other. When darkness is presented to the eye it demands light, and vice versa. All this will give the children the feeling that the eye is, not only a "camera" which records impressions but that it is at the same time creative. In the words of an old mystic:— "If the eye were not sunny, how could we perceive light? If God's own strength lived not in us, how could we delight in Divine things?"

Another important phenomenon in the sphere of colour which the children will have experienced is the difference in the appearance of the sun at midday and at sunset or sunrise; or, again, the more extreme contrast of the sun seen through a clear atmosphere and through a fog. The colourless light of the sun as seen through a clear atmosphere becomes yellow, red, and even deep ruby-red when observed through the misty air of evening or early morning or through a dense, fog-laden atmosphere. One may then do experiments to illustrate the same phenomenon. A beam of light seen through clear water becomes reddened if the water is made semi-transparent by stirring lime into the water. The same effect may be obtained by passing a number of sheets of drawing-paper in between the source of light and the observer.

The opposite phenomenon is given when we are looking at a distant hill or mountain through a sun-filled atmosphere, for then this distant landscape appears a deep blue. Here we observe darkness through a light-filled transparent medium. The blueness of the sky is again due to the same cause, for we are gazing into the darkness of infinite space through an atmosphere illumined by daylight. When this atmosphere is very clear or rarefied the sky appears intensely blue (e.g. from a high mountain). From the valley the sky appears lighter owing to the greater density of atmospheric vapours nearer the earth. In their painting lessons the children will have experienced that the colours Yellow and Blue are polar opposite in all their qualities. Now they will understand how yellow is related to light and blue to darkness. Yellow is light slightly darkened down, blue is darkness irradiated by light. In green we have the balance between these two polar colours yellow and blue. Again, if yellow is enhanced or intensified it goes to orange and then to red. If blue is enhanced it becomes indigo and then violet.

The following table will show further the qualitative nature of these two colours:

<i>Yellow</i>	<i>Blue</i>
Action	Negative
Light	Shadow
Brightness	Darkness
Strength	Weakness
Warmth	Coldness
Proximity	Distance
Repulsion	Attraction
Affinity with acids	Affinity with alkalies

These examples taken from the teaching of Sound and Light may serve to illustrate the words of Rudolf Steiner quoted earlier in this article.

After the fourteenth or fifteenth year the child's relationship to the world around him undergoes a change. "To behold" the phenomena of the universe is no longer sufficient for his inner needs. He now wishes to *reason* about these things. The teacher should now approach the scientific subjects more and more from an intellectual point of view, studying cause and effect, bringing mathematics into relation with science and so leading to the quantitative treatment of scientific phenomena as well as dealing with the qualitative aspect. Rudolf Steiner in the same lecture already quoted continues as follows:—"But quite suddenly at the period of transition into the next phase of life (i.e. from the fourteenth or fifteenth to the twenty-first year) there arises in the human soul the urge to reason about the things with which it is faced; and the teacher—who should be well aware of this change—must try to satisfy this urge and, when speaking of these things, must show how each fact will increase in meaning in proportion as it is understood in its relation to other facts. On the whole one may say the following: It is necessary that at the moment when the child reaches puberty we arouse in him a very great interest in the world around him. Our lessons, our education in general, must proceed in such a way that the growing child will recognize the laws and principles underlying the life that goes on around him, its causes and effects, its intentions and aims. Riddles must arise in the youthful soul—riddles about the world and its phenomena. For with the setting free of the

astral body, forces* are set free for grappling with such riddles; and if such riddles do not arise, these forces will seek expression elsewhere—and that is what generally happens with the youth of to-day. They will reappear in the form of instincts—first the lust of power, and secondly, erotic instincts. Lack of interest in the world around him will turn the human being upon himself and make him brood over all sorts of things within him. Now, the age between the fourteenth, fifteenth, and twenty-first year is the most unfavourable for such occupation with oneself, and therefore at this age the awakening faculty for reasoning—which, as has been said, is the true expressions of these forces—should be directed towards a grasp of the connections and relations that hold everywhere in the world around us. Just let us observe the joy experienced by children of this age when we draw their attention to the why and the wherefore of things, when we widen their outlook in this or that direction, when we seek connections—when we take our start, for instance, from the smallest incident in their experience and relate it to occurrences in the widest spheres. Indeed every opportunity must be seized to do so; it can be done in any lesson, whether it be 'mathematics' or 'religion'—for it is by this means that the faculty of reasoning is roused and stimulated."

In this later period of school life one may bring before the children the theories of Science, for, as we have seen, the consciousness of the child is now of such a kind that it can grasp and comprehend these things. The thinking faculty of the child is now related in an elementary way to the thought structure which is at the basis of our modern science.

Nowadays children have access to a great mass of popular scientific literature. Many so-called children's books give great prominence to modern scientific achievement and to the theories of science. But what to the real scientist is still only theory is, in these popular writings, put forward as *a fact*. As an example of this, one may take the following extract from the *Children's Encyclopædia*:—"We must understand that colour is caused by waves of light of different lengths which can be taken up by certain structures in the eye—" . . . "Light consists of waves of ether—" . . . "And we

* Forces of thought and judgment (A.R.S.).

have still, moreover, to study the great discovery of our time that light is really electric, which means that we cannot really understand it unless we study all kinds of electric waves."

Here the wave theory and the electric-magnetic theory of light are spoken of as though they were no longer theories, but proven facts. This is typical of the quite erroneous ideas children get from such popular magazines. In our work as teachers we must take care to guard against this, and to discriminate in our teaching between fact and theory. Children who are taught such theories as facts in their younger years will never be free in their observation of life when they are older.

Thus we see that in the science lessons the children first "behold" and experience the phenomena of the world around them, and that only later do they come to an understanding of these phenomena, through the study of cause and effect. Nowadays it is strongly the point of view of many parents and educators that everything must be explained and made reasonable for the young child, just as though he were an adult. But if we want to educate according to the needs of the child (and only such an education can be worth giving to body, soul and spirit), we must take as our general principle: First experience, then understanding.

A. R. SHEEN.

First Lessons about Plants

FLOWERS play their part in the very earliest stories told to the youngest children as the hiding-place and the cradle of fairies; but they are flowers which are naturally invested with all the varied qualities of human beings. Children look up to the proud hollyhock, are shy with the timid violet, laugh at the "saucy little red-caps" and the mischievous poppy, and welcome the brave buttercups and daisies when they come in field and meadow to tell of the approach of summer. From the Norse Tales they hear of Frigga enticing the hard-working shepherd over the rugged, dangerous rocks in order that she may give him the seed of the little blue flax to be woven later into linen. From Greece they hear the story of Mercury directing Ulysses to the magic flower which will

destroy the power of Circe. So that in many ways flowers have been present in their lessons before the age of ten or eleven, when they begin to learn what they are proud to call botany. A child, especially a melancholic child, loves to make use of new words and to turn the meaning of them over in his mind.

Now comes the joy of "looking at" the many plant growths in their various homes, of discovering the varying degrees in which they are dependent on their Mother Earth, on the sun, the rain and the winds. It is often astonishing to see how much has been noticed, even by children brought up in towns, of the homes, needs and ways of many growing things. But it is most important that children shall preserve that truly human relationship to the plants which they felt instinctively at an earlier age—that they shall not come to look on flowers as "objects." A beautiful and living way of introducing to young children the development of plant life through its various stages is suggested by Rudolf Steiner in one of his Courses of Lectures on Education.

Take first the fungus with its helpless, dependent habits, unable to gather its own food from the air around it, relying entirely upon the tree or stump on which it grows. The children will delight in comparing it with the baby at home, unable to fend for itself, waiting for its mother to bring it all it needs. One little girl, after learning about these babies amongst the plants, in illustrating her botany book, painted two pictures side by side, a number of fungi growing under a tree, and a cradle with the curtains drawn that the baby might be in the dark, for she had noticed that fungi frequently grew in the woods, away from the bright light of the sun.

And now the baby begins to grow and we go on to the Algae and make delightful excursions into rock pools and deep seas, finding seaweeds of many kinds and colours, often holding on to the rocks while they peer all around them, a little older in their habits than the mushroom, but still very young. And the children are very happy in telling of their experiences by the sea and of the various places where they have found seaweeds for themselves.

Mosses and ferns then have their turn, mosses showing by their green colour that they are in advance of the mushroom, and ferns still loving shade, but spreading out their

beautiful leaves with a certain gentle mischief and letting themselves be seen and loved like little children of three making lovely shadows as they dance over a lawn.

What a different feeling comes when the next step is taken, the step that leads from ferns to cone-bearing trees, to the conifers—the pine—straight and strong with its far-reaching root enabling it to stand against the buffeting of wind and weather. Here is the picture of a child away from the protection of home, standing up in a world from which it is learning its own lessons. But there is another aspect of the cone-bearing trees, an aspect to which children of this age are very responsive—they listen eagerly and with the reverence that the story brings with it to the Legend of the Cedar Tree. The Tree of Life, standing on the border of Paradise, watched with sorrow when Adam and Eve were driven forth. Later when Seth found his way back to the Tree, one of its seeds was given him, a seed which, planted on Adam's grave, grew into a magnificent cedar. Long, long ages after this cedar was felled at Solomon's command for use in the Temple at Jerusalem, and again, after the passage of long ages, wood from the cedar had its share in the Cross on Golgotha. Of itself, too, there comes to the children's minds all that they connect with the Christmas Tree, and they find themselves with joy led by their botany lesson to the thought of Christmas.

I once saw a picture in coloured chalks drawn by a very thoughtful boy after he had been learning about conifers. It was of a forest of pines, very dark (for a boy of his age, he was unusually aware of the darkness in life), and through it there went a path of gold right up to the sun—a marvellous revelation of the understanding that comes through a child's feeling.

After the conifers come the monocotyledons and the dicotyledons, fine words again for children to munch and crunch. They are eager to tell of the many sword-shaped leaves they have noticed, and they love to distinguish between the straight, parallel veins of these leaves and the network of the veins in the dicotyledons. Many botanical terms become familiar during the first period of botany, while some are left until later. The calyx (chalice), with its sepals forming first a protective covering and then a cup to hold the flower, is a beautiful study within the reach of children from ten to

twelve, whereas the work of the pollen, the germination of seeds, fascinating as they have been made by innumerable teachers, really belong to the understanding of older children. Before fourteen they need to think of the plants and trees in connection with the earth, influenced by rain, winds and heat, or by dry stillness and cold. Indeed, children should always be led to think of the whole plant, root, leaf and flower, to see in imagination the roots spreading under the ground, the halo of perfume and colour which surrounds the blossom.

One way to help the children to feel how the plant belongs to the earth, after the first introduction to familiar plants compared to the growing child, is to give a picture (in words, which the children will quickly translate into a picture in colours) of the tundra with its stunted trees, spreading outwards instead of upwards, as though held down to the earth by a mighty magnet, willows big enough to bear only two catkins, and other trees in similar proportions. Let the next picture be of a tropical forest where the growth is rampant and luxurious, where seeds vie with each other to find a place where they may grow high in the air on branch or tree trunk, a little plant, maybe, flowering high up on a hospitable tree, and scattering its petals into the dank dark of the forest below. At once the children will feel the effect of the heat and the damp on plant growth and they will be prepared for the magnificent forests of the temperate zone, where trees are neither held down too much by a magnet from within nor too much drawn up by that mysterious outer force which works in the Tropics.

This change in the vegetation spread over the surface of the earth can also be observed by ascending some great mountain such as Mount Kilimanjaro, where the whole story from Tropics to Pole is seen in miniature; for, starting from the tropical growth of Africa, the climber passes through a temperate zone and finally meets with the dwarf-like plants which belong to the cold regions near the Poles.

There are many legends about flowers and many stories telling of their healing properties, and it is good that these should form part of the botany lessons, preparing the children for the wonderful relationships between plant and the human being, of which they will learn later.

What a marvellous picture Goethe gives in his *Faust* of the

magic of the rose. Faust is dying. All around him are devils, ready at the command of Mephistopheles to seize the soul of Faust as soon as it leaves his body. They are surprised by a shower of rose-petals so potent in their effect that they all creep back to Hell, scared and miserable; and while Mephistopheles is impotently raging, the soul of Faust is borne away by a company of Angels.

There is no need to show pictures of flowers to children or to place the blossoms in the schoolroom that they may be able to copy them. If they are taught about plants as they grow, dependent on what they draw from the earth, and on what is brought them by wind, rain and sun, they will make most beautiful pictures of their own, in which the flower is no isolated flower, but part of all the world of nature that surrounds it.

E. G. WILSON.

The Human Limb System

THERE are two opposite ways of considering the form and composition of the human body. In the first it is thought of as an instrument of survival, conditioned by the necessities of its own continued existence on the earth; in the second it is regarded as an instrument of spiritual expression, conditioned by the need of spiritual faculties to incarnate and express themselves in the sphere of physical matter. The first method of regarding the body is that of Natural Science, and its modern exponent is Sir Arthur Keith; the second is that of Spiritual Science, or Anthroposophy, and its protagonist is Rudolf Steiner. Arthur Keith holds that the spiritual faculties of man arose by a kind of accident through the reserve of brain power with which man was intended to meet the emergencies of physical survival. Rudolf Steiner worked throughout his life to establish in scientific detail that imagination of man which could say of him: In *Form* and Apprehension how like an Angel!

It is of course true that whenever there is an interpenetration of matter by Spirit, whenever Mind is working as a formative force on matter, there are two points of view to be considered, and the question of *use* may be answered from the

physical or spiritual standpoint. To take a crude example: a man who wishes to investigate the nature of music may begin by examining the works of a piano; or he may endeavour to experience spiritually the forms of music and the qualities of its notes and tones. You cannot say that the man who examines the piano is wrong; for there is a sense in which the piano creates and conditions the music. But there is a far more important sense in which Music creates and conditions the piano; and the man who has grasped that sense and that importance may be pardoned for sometimes feeling some impatience with his fellow who only examines the piano, however careful and painstaking his researches.

It is not very different with the consideration of the meaning and origin of the members and organs of the human body. If we ask: for what are the human teeth? the obvious answer is, to bite with. If we ask: for what are the human legs? the obvious answer is, to go from one place to another. In fact one might ask all the questions which Little Red Riding Hood asked the Wolf, and give all the answers which the Wolf gave to Little Red Riding Hood, and not one of them could be said to be a *wrong* answer. Yet these are not always the important answers; and the strange thing is that the important answers are sometimes the direct opposite of the unimportant ones, and yet both, at their different levels, are true. For the important thing about the human teeth is not that they bite, but that they are comparatively so little adapted for biting. They do not constantly grow, as they are worn out, like the teeth of a rabbit or a mouse; they are not again and again replaced like the teeth of a shark. The Wolf could say of his fine long teeth: "All the better to bite you with!" But if it had been her true grandmother whom Red Riding Hood had found under the bedclothes, what could she have said? Probably she had no teeth, or such as she had were ground down to useless stumps.

In the same way the important thing about the human legs is not so much that they carry the human body about, as that they are *not* adapted for carrying to the same extent as are the legs of a horse or of a frog; of the human arms and hands that they are so little calculated to serve the physical needs of the body as compared with the claws of a tiger or the prehensile hand of an ape. Indeed, it is precisely through this reserve of

forces, the fact that his organs are not carried to their logical conclusion, as Dr. Steiner has shown, that man is able to develop in life his spiritual powers. His unspecialized hands, his undeveloped teeth,* can become instruments of spiritual perception. His limbs are not only instruments of motion, they are the expression of one of the greatest of human faculties. Without his limb system man could not have developed his life of *Will*.

The intimate connection between the act of Will and the human limbs must be a matter of personal experience and common observation to everyone. Who has not instinctively planted his feet more firmly on the ground (put his foot down, in common language) when called upon to make some important decision? Who has not contrasted the firm step and broad gestures of men of determined will, with the feeble, uncertain movements of the irresolute? But what has not been understood, until the patient investigations of Dr. Steiner brought light on the subject, is the working of the human limbs as one part of a threefold system penetrating the whole human body, and the way in which the life of the human soul in childhood is centred in turn in each part of that threefold system, beginning in the earlier years with the limbs themselves.

For it would be altogether wrong to consider the limb system alone as separate from the other members of the threefold human organization, from the rhythmic system and the head-nerves system, or as bearing to these other systems merely the external relation of servant to master. On the contrary the limb system penetrates every part of the body; it can only be separated from the other systems as one note of a chord may be separated from the rest for some special consideration. In this respect the system of the body shows an exact correspondence with the faculties of the human soul of which they are the expression. An act of will (for example) is in many respects the exact opposite of an act of thought. Yet in every process of thought there must be an undercurrent of will; every form of willing must be penetrated by some element of thought, on however low a level. The *Willing* must always enter to some extent into *Thinking*; and the limb system—the system of the will—has its representative in the human head. That repre-

* An article on the teeth will follow in a future number of this magazine.

sentative is the human jaw, which is not a mere organ of mastication, but is of infinite importance for human spiritual life.

This close connection between the limbs and the jaw was once demonstrated in a very pathetic way when Dr. Steiner was in England. Some parents brought him a child who had some difficulties in its speech and asked his advice. He soon brought to light the fact that some years previously the child had developed the habit of biting its nails and finger-ends so severely that at last they had felt themselves compelled to tie its hands down. The child had therefore failed to develop its natural freedom of movement, and in course of time the mobility of the jaw had been affected. The remedy for such a child was not to exercise its jaw, but to recover by movements of the arms the freedom which it had lost. For in children especially all defects of speech are best corrected by suitable eurhythmy exercises with the arms and legs—the larger movements of the limbs reflecting themselves (sometimes with extraordinary rapidity and effect) in the smaller movements of the jaw. With adults, too, it is interesting to observe how closely the character of a man's speech and thought corresponds to the way in which he walks. And much again can be seen of the quality of a man's thought in the set of his jaw. It is impossible to imagine an incisive thinker, a man with a strong *will* element in his thinking, except as the possessor of a firmly set jaw, which will again bear its relation to his whole limb system.

Coleridge's thought is torrential, tempestuous, choleric; Wordsworth's, calm, tidal, phlegmatic. It is recorded that the latter liked to compose his poems walking gently on a level path; the former rushing down steep declivities or breaking his way through thick undergrowth.

Such a method of considering the powers of man in relation to the threefold organism of his body is of especial importance in the education of children for the following reason: Whereas the adult enjoys all his powers in their full fruition together, the child develops them, builds his life in them, in a natural rhythmical succession. A child of a few years old (genius being excepted) does not solve mathematical problems, he is too preoccupied with the movements of his limbs. From the

moment he wakes to the moment he goes to sleep his arms and legs are in a perpetual motion, and without this motion he could not build up his strength of will. If the adult who always says "Sit still" to the child could have his way (fortunately he very rarely does, because a child has generally a much more vigorous will than an adult) the child could not develop a strong character in later life. Nothing is so important for the child during the first six or seven years of his life as that he shall be free to develop the right kind of limb activity.

But it must be the right kind of limb activity—it must spring (if this expression may be used) from the heart of the limb system itself. The system of the head and nerves penetrates into the limbs no less effectively than the limb system into the head. It is the function of the nerves, radiating from the head as their centre, to incorporate a certain element of thought in the limbs. So that the human hand, for instance, may be used as an instrument of thought rather than as a member of the limb system proper. A clock-maker or a draughtsman *thinks* with his hands; a sawyer or a hay-maker *wills* with his hands.

It is one of the troubles of modern childhood that children, especially in towns, see less and less genuine limb activity for them to imitate, and in imitating to develop their own life of will. It is very instructive to compare two children, one of whom is pretending to drive a team of horses, and the other a motor-car; the former shaking and pulling at the reins, cracking his whip of string, and imitating in his cries of "Whoa!" those deeper tones of the voice which rise from the lower part of the body, with all the strength of the human will; the latter clutching an imaginary steering-wheel, buzzing through his teeth in imitation of the engine, and occasionally pinching an imaginary horn and uttering a "Toot-toot"—feeblest and most nervous of sounds! The former child is living in movement, the latter only in idea. Nor is it only in their surroundings that modern children are unfortunate. The characteristic toys they are given to-day are toys to develop the intellect. The child who uses his hands to fit jig-saw puzzles together, or to build with Meccano, or to construct with any of the hundred and one kinds of wood or metal segments which abound in children's toy shops, is working with his nervous system no less truly

than if he were set to solve mathematical problems or crossword puzzles. Only he is developing that intellectual quality in the sphere of the limb system, instead of directly in the system of head and nerves. In schools, too, a great deal of teaching apparatus is often brought to little children—boxes in which they can fit letters together to make words and many such devices—which are only calculated to develop the intellectual element in a child's movements.

Parents and teachers, however, who have once grasped the importance of the limb system as an expression of the human will, must endeavour to work in precisely the opposite direction. So far from bringing the thinking element, which belongs to later years of life, into the limb movements of young children, they will endeavour to bring the will element into the thinking powers of later life. In this respect, above all others, education must become a corrective, a healing, for the tendencies of the age. To speak in an example, a boy of seven years has been taught arithmetic considerably beyond his years, and the sums he does are both neat and accurate. He is a very quiet boy, and is found to have much less capacity than the average child for making pictures with chalks or water-colours. He shrinks from creating a picture of his own and would like to have something to copy. One day his teacher notices that, as the children march round the room counting some table, he cannot keep step with the rhythm of what he is saying. Taken later by himself, he cannot count his own paces as he walks, or the treads of the stairs up which he goes; his will, the system of his limbs, has never brought its movement into his imagination and thinking. Yet the judgment, the conclusion of thinking, arises from the will element in the thought, and if children do not develop a firm *grasp* of things in their limbs when they are young they will hardly develop a grasp of thought when they are older, the realities of life will elude their thinking. So that (if arithmetic may be taken as a typical example) the wise teacher will see that all counting and reckoning grows out of movement as the trunk of a tree grows out of its roots. That little children should jump and run and skip and clap as they count, forward and backward, is far more beneficial for them than to do bookwork sums, when they have not yet sucked the honey out of their age, developed to the

full that strength of will which only their earlier years can give them. There is a pretty story told of Isaac Newton as a boy bringing his limb activity into his mathematics. During the great storm which raged over England at the death of Oliver Cromwell, he wished to measure the force of the wind. This he achieved by first jumping as hard as he could *with* the wind, and then *against* it. The difference between the two distances he jumped gave him the means of making the measurement he desired.

When teachers and parents begin to look upon children in their development with a more artistic eye, they will find quite different standards for measuring their progress than those which now obtain. They will not ask of a child of six or seven (before the change of teeth), Can he read and write, and do this or that kind of sum? Rather they will look lovingly at the way he walks and plays. Are his hands capable? Does he move with a swing, rhythmically? Do his feet seem to grasp the ground as he walks? If so, they will be happy in the knowledge that he has laid the foundation of a strong character. But if his movements are weak and agitated, if he trips excitedly more on his toes than on the whole of his feet, if his actions are checked and paralysed (as they not unfrequently are with modern children) by his ideas, if his complexion is "sicklied o'er with the pale cast of thought," then they may be sure that, unless help is given him, he is in danger of growing up nervous or irresolute.

This education of the limb system, of the "limb-man," is not of course confined to the first seven years of life, although it is then of paramount importance. It must be continued into the second seven years of childhood, when the life of the rhythmic system, the life of feeling, should preponderate; and into the age after puberty when the intellectual powers are awake and alert. But it is in this education of the limb system, in the first place, and of the rhythmic system in the second, as well as of the intellectual powers, that the answer lies to the modern problems of education. For the question, How shall my child be educated? becomes of ever-increasing importance for all classes of a modern society. On the one hand there is the deep and true feeling that every child should be helped to enter into the spiritual and cultural heritage of humanity, to

realize and develop itself as a Spirit, as an Ego. On the other hand there is the experience that the education which has endeavoured to lead children into this heritage has often seemed unfit to them for the necessary tasks and occupations of life. Hence arises a characteristic desire that education should be more technical, that children should learn the elements of a trade or commerce. But what is needed for a child's spiritual and cultural life is not really in opposition to the practical demands the world will make of him. For, as the more far-seeing industrialists recognize, what industry needs is not children trained in technical processes which, as likely as not, will be out of date by the time they come to put them into practice; but children with an all-round capacity for undertaking whatever task the changing conditions of life may present them with. And when children are educated in such a way that their limb activity is fostered in their younger years, they are indeed preparing the will to enter into their thinking in later years, but at the same time they are becoming inventive, resourceful, adaptable in their limb activity itself. Hence it was that, although his methods of education are founded on a purely spiritual science, Dr. Steiner always claimed that the objects of those methods was to produce *capable* men and women. The foundation of that capability lies in the fostering of the will, in the right education of the human limbs.

A. C. HARWOOD.

Address to the Children at the Opening of a New Term

DEAR CHILDREN,

DURING the last few days of the holidays I met several of you, and all whom I asked said how pleased they would be to come back to School. But if I had asked you at the end of last term whether you were looking forward to your holidays, you would have said: Yes, we are. That seems rather strange, does it not? that at one time you look forward to your holidays and at another to your term at School. I will tell you why that is. While you are sitting quite still on your chairs listening to me speaking, you are all doing something:

you are doing something so important, that if you stopped doing it you would not sit on your chairs for very long. You all know what I am thinking of—it is your breathing—your breathing in and your breathing out. But there are many kinds of breathing in and breathing out, and to realize this you need only think of your own daily life. In the daytime you are awake, and you breathe in experiences of all kinds; at night you sleep, you sleep on your experiences, you breathe out. From another point of view you might say that in the daytime you breathe out and at night-time you breathe in new strength and vigour for the coming day. Indeed, in all the world around us there are these two sides in life, the breathing in and the breathing out: in the alternation of spring and autumn for instance, or of summer and winter, and so on.

Now holidays and term time are also like a breathing in and a breathing out—only that they are different for children and teachers. You children breathe in during the term, when you learn all kinds of things, and in the holidays you breathe out, you play and run around and come into touch with the outer world. But for us teachers it is just the other way about. We breathe in during the holidays and breathe out during term time; and now I am going to tell you how and where I have been breathing in during the holidays. I went to another country, where there was a lot of sunshine, and I visited the Waldorf School in Stuttgart; but I did not go alone, I took with me one of the children from this School who is now a pupil of the Waldorf School. One bright Sunday afternoon I went up to the School, where we saw a great crowd of people, grown-ups and children, all streaming into the School. We came into the big hall, of which the stage alone is probably bigger than our eurhythmy room, and when the hall was quite full, so that many people even had to stand, the curtain was drawn and we saw and heard music, recitations, eurhythmy and other things just as we have in our assemblies at School.

There was some beautiful part-singing by quite young children, and there was an orchestra of small children not older than eleven or twelve, consisting of flutes, violins, clarionettes and several other instruments, and the children played so well that it almost sounded like a big orchestra.

When I heard and saw all these lovely things and saw the

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enthusiasm which the people had who were in the room, and how they enjoyed what the children were doing, I thought to myself—what a wonderful thing it is that I go into another city and into another country—and I might choose many other cities and countries too—and there I would find children doing similar beautiful things. But I had another thought as well, I looked round and saw all the people, and I looked on to the stage and saw so many children, and then I imagined our School and the people and the children at an assembly, and it seemed to me that we were like a child and that the Waldorf School was like a big man. Now you children do not say to yourselves: "I am a child to-day, to-morrow I want to be a man," nor do you say, "I am only a child to-day and I shall not be any bigger to-morrow." By to-morrow you will have grown just a tiny bit, and it is growing a little every day which in time will make you into men and women. In the same way we must think of our School. We are like a child to-day, but we will grow steadily, each of you children and all of us as a School. And now I want to say just one thing which may help you in this growth.

If you look out into the garden you will see how everything is beginning to grow green. It is much later than usual, and in some European countries the green growth has not even begun. Gradually more and more plants will come out, and if you go down to the field you will see the apple-trees in full blossom.

Their flowers will soon fade; they will grow brown and shrivel and become smaller and smaller; but just below them a tiny, round, green ball will appear, which will grow and grow until in the autumn it is a big round ripe apple. Whenever you look at an apple you will see at one end the stalk where it was attached to the tree and at the other end a shrivelled-up little flower, so that you may always remember that what you are biting into was once upon a time a flower.

But apples are not the only things which nourish you: there are all kinds of other fruit, potatoes and all sorts of vegetables coming at different seasons of the year; and man lives and is sustained by them so that he may work in the world. God prepares for you the fruit and the vegetables that you may be nourished and live; but that is not all, for, as we saw at the beginning, there are always two sides in life, there is always a

breathing in and a breathing out. Here, too, these two sides are to be found: for just as God prepares the fruit that you may be nourished, so do we prepare a nourishment for Him. By our deeds of love, our deeds of beauty, our deeds of truth, we prepare nourishment for the Gods. And with this thought I would like you to begin your work in the new term.

A. W. KAUFMAN.

Verses

*From a Masque performed by children of the New School,
Midsummer, 1931*

O MAN, what art thou then?
The earth that bears thy tread
Thou think'st it could not will
But be so dumb and still,
The footstool of thy deed.
Yet would it undergo
For thee and thee alone
Gladly to be a stone,
And suffers woe on woe.
O man, what art thou then!

O man, what art thou then?
The plants that give thee life
Thou think'st they cannot feel
The spurning of thy heel,
Thy sacrificial knife.
Yet they thy strength uphold
With joy that in their death
Thou drawest thy earthly breath,
And know a bliss untold.
O man, what art thou then!

O man, what art thou then?
The beasts that throng thy hand
Thou think'st could not devise
But be so humbly wise,
And rest at thy command.

Yet has their Spirit sought
To be in kind subject,
That thou mightest go erect
And have at will thy thought.
O man, what art thou then!

O man, what art thou then?
The stars that crown thy head
From out the deeps are heard,
The Suns await thy word,
What hast thou answered?
Speak, O thou man, and take
The summons of thy hour,
Awake thy sleeping power,
All things shall then awake.
O man, what art thou then!

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