ANTICIPATE THE SCHOOL.

SUGGESTIONS FOR THE TREATMENT OF CHILDREN.

BY THE EDITOR.

CHILDREN are imitative, and their souls are built up by the impressions which they receive. Every single experience, every observation of older folks, especially of elder brothers and sisters, of parents, of nurses, and generally of all belonging to the circle of their acquaintances, exercises a powerful influence in the building up of the character of the child.

The first impressions made on a child's mind are especially important, as they form the basis of all later impressions and remain for a long time, and sometimes forever, the standard by which they are measured. Should we not, therefore, exercise the greatest care, and instead of leaving the first mental impressions of children to accident, see to it that they are throughout correct?

The first education of babies is, upon the whole, left to uneducated nurses, who sometimes have not the slightest idea of the sacredness of their trust and know very little of the right treatment of infants. They are oblivious to the significance of the fact that whatever they do and say, whatever error they commit, whatever example they may set, is impressed upon and perpetuated in the little souls in their charge.

COUNTING.

A little boy of about five years was in the habit of counting 1, 2, 3, 5, 7, and he stuck to this habit. He was told that he omitted 4 and 6, and he probably understood the correction, but whenever he began to count he fell back for a long time into his old habit of counting the numbers wrongly. The reason was that by accident he had learned the numbers in the wrong way and it stuck to him.

Another little child always called a seagull in his picture-book a swallow, for he had been told so by his nurse, and got irritated when contradicted, insisting even to tears again and again on its being a swallow. By and by, however, he relented, but even then he continued to say, "This is not a swallow, but a seagull," and only in time did he drop the negative expression and knew and declared without any irritation that it was a seagull. Such trouble originates by a little mistake, and shall we not be careful in laying the foundation of a human soul?

As to counting, I would say the easiest way to teach it is to count the steps by walking up or down stairs. If this be done patiently again and again, the child begins to listen to the numbers and will very soon begin to accompany each step with its proper number. The first mistake should be avoided, and my experience is that children will, without the slightest trouble, learn to count first to 12, then to 20. When they have learned to count to 20, they are prepared to count to any number up to 100 or more. The third step is an intellectual step, by learning to understand the function of the decades 30, 40, 50, etc., which are, however, clearly grasped as running parallel with 3, 4, 5, and so forth.

Before an attempt can be made to count the steps, a preliminary exercise might be the frequent repetition of 1, 2, 3, which can be practised on various occasions; for instance, when turning off or on the electric light, or by playing peekaboo, etc., whereby the order of the three numbers impresses itself mechanically upon the memory of a child. Then proceed to counting fingers and toes, and only when the first five numbers can be repeated without difficulty, proceed with counting other objects.

One peculiar phase in learning how to count is marked by the child's ability to stop at the right time. Children first acquire the mechanical memory of saying 1, 2, 3, 4, 5, etc. When they are shown five spoons or five chips or other things of any description and are requested to count them, they begin to count mechanically without being able to stop at the right time. It indicates a more advanced degree of mentality when the child possesses a perfect parallelism between the names of the numbers and the things which, by being pointed at, are to be counted. The process of counting has reached its maturity when a child learns to stop at the proper time. In the beginning the tendency will predominate that whenever the child begins to count, it will count the whole series of numbers as far as it knows them; but the relation between things and the series of word-images of the numerals is easily established by stopping the child and summing up the situation by saying: There are five spoons, there are five chips, or whatever it may be.

In the case of practising counting, as in all other instances of memorising, we must consider that a great number of mechanically impressed memories will subsequently render the conscious and intelligent manipulation of the ideas connected therewith easier. The subconscious memories which have been early acquired, form a very valuable capital which will never fail to be most serviceable. As children now are commonly educated, they have either no such mechanically impressed memories in their minds, or their impressions, be they numbers, images of things, or other conceptions, form an irregular conglomeration which will rather serve to bewilder than to help them when the years of school-life begin. A healthy development of mind is possible only when our subconscious notions are distinct and clear.[1] This can be accomplished by rendering as definite as possible the first sense-impressions, which precede the formation of more conscious and more intellectual operations.

NATURAL SCIENCE.

Use every opportunity in life to teach children the elementary facts and truths of the sciences which in later life will be of use to them. Familiarise them as much as possible with instructive observations. Teach them through the eye a knowledge of facts that will serve as examples of important scientific truths. Convey your first instruction by merely showing something, by making experiments, etc., but beware of superadding too quickly the theories invented to explain the facts, and if you mention them characterise them at once as hypothetical. Let the experiment speak for itself and remind the child of similar or analogous experiments and experiences.

Some of the simplest experiments in physics can be repeated in the nursery. Let the children lift an inverted glass from the bottom of the bathtub above the surface of the water; let them dip the inverted glass together with the air into the water: or take a toothbrush stand, with a hole in its lower edge and let the water run forth, whereby you can point out that the parabola of the outflowing streamlet is proportionate to the pressure of the water inside the vessel. Then close tightly with your hand the top of the

[1] The terms *clear* and *subconscious* do not exclude one another. An idea or a sense-impression may be quite distinct and correct in its details without fully rising into the field of conscious attention.

toothbrush stand filled with water, in which case no water will come out, or perhaps only a few drops will drip down.

Make the children see the depth which blocks of wood require to float, let them compare blocks of different densities, and you will soon help them to discover for themselves the law that the weight of a floating body is equal to the weight of the water which it displaces.

Set the children to thinking why empty vessels, although made of porcelain or iron, will float, while they will go down when filled with water.

Further, the children who know that steel is heavy will take delight in seeing a needle float that has carefully been placed upon the surface of the water. The experiment will succeed more easily if the needle is dipped in butter. The cohesion of the particles of water among themselves is strong enough to carry little bodies such as needles, if they are smooth enough not to break the connexion of the surface which acts like a thin film. Small pieces of wire netting (such as is used for window screens), especially if lightly coated with paraffin, will also float, but a pin goes down, for its head will tear the film.

Again, on some occasion or other place a coin into a tub, or perhaps better into a dish or a mug, and let the children look at it from a given place where the coin is hidden behind the rim. Then fill the tub with water and the coin becomes visible on account of the refraction of the rays of light which produce the picture. Then put a spoon into the water and call their attention to the deflexion of the image.

A piece of the wire netting of window-screens is also useful to show the children the inside and whole make-up of a flame, by repeating all the simple experiments which are made in a lesson on physics.

When you take a walk with the children after a rain, show them the little streamlets, which are typical of rivers and their tributaries in their work of excavating river-beds and valleys.

Make electrical experiments with the silk samples for mamma's dresses, by rubbing them with the bottom of a glass, and watch the threads when approached twice successively by various objects, as by steel knives, silver spoons, the hand, celluloid or gutta percha, and glass. Comb their hair or your own beard in the dark when the air is dry, and let them see the sparks, and listen to the crackling noise of this baby-thunderstorm in papa's whiskers.

Show them the so-called illusions of the senses in which our psychologists take so much interest, and let them measure the distances which, though they are equal, appear different.[1] It will interest the children, and they will wonder how their judgment is misguided. If you have a color-wheel repeat now and then for mere amusement color experiments and show the effects of contrast.

Whenever you buy presents for children bear always in mind the instructive feature of games and toys. Children are by nature anxious to learn, and they will themselves prefer playthings which serve to educate them and teach a lesson. A toy through which a child becomes familiar with a physical law of some kind is the best investment you can make and will, if properly used, amply repay the cost. Little steam engines, dynamos, motors and mechanical machinery of all kinds, pumps, fountains, etc., are now cheap enough to be the toys of the poor as well as of the rich. Of course the parents must not let the children work the steam engines themselves, except in the presence of their elders, with all necessary precautions, and should at once call attention to the danger of explosions connected with steam engines, and after one or a few practical trials should simply use these dangerous toys as models for instruction.[2]

FACTS NOT FANCY.

There is a vicious habit now in vogue in the kindergarten which superadds to the facts of nature the imagination of fairy tales. If you wish your children to acquire a sound conception of reality and a sense for genuine poetry, you had better avoid this pseudo-fiction of the nursery which only distorts nature and detracts from her intrinsic beauty. Facts as they are, are in themselves sufficiently poetical and need not the false glitter of a fairy-tale imitation. This idea of carrying the romance of the fairy-tale into the realm of science only revives and strengthens the old metaphysicism which personifies abstractions and is apt later on to mystify the young mind. Thus we read in Arabella B. Buckley's *Fairy-land of Science*, a book which otherwise contains many good things, such sentences as these (pp. 12–13):

"Can you see in your imagination fairy *Cohesion* ever ready to lock atoms together when they draw very near to each other: or fairy *Gravitation* dragging rain-drops down to the earth: or the fairy of *Crystallisation* building up the snow-

[1] See *The Monist*, Vol. III., p. 153, and Scripture's *Thinking, Feeling, and Doing*, p. 187.

[2] We recommend to teachers *Hinrich's Elements of Physics*, Davenport, Ia., Griggs, Watson, and Day, a school-book based upon the right principle, that should be revised and republished with plenty of illustrations, Very suggestive are such instructive toys as, for instance, Thomas M. St. John's *Fun With Electricity* (New York City).

flakes in the clouds? . . . Do you care to know how another strange fairy, '*Electricity*,' flings the lightning across the sky and causes the rumbling thunder? . . . And have you any curiosity about '*Chemical action*,' which works such wonders in air, and land, and sea? If you have any wish to know and make friends of these invisible forces, the next question is

"How are you to enter the fairy-land of science?

"There is but one way. Like the knight or peasant in the fairy tales, you must open your eyes. There is no lack of objects, everything around you will tell some history if touched with the fairy wand of imagination. . . . The fire in the grate, the lamp by the bedside, the water in the tumbler, the fly on the ceiling above, the flower in the vase on the table, anything, everything, has its history, and can reveal to us nature's invisible fairies."

This is not the right way of making science poetical. The facts of nature are in themselves beautiful and need not the mythology of fairies created by a personification of scientific abstractions, the erroneously so-called forces of nature. The metaphysical assumption of forces which are supposed to work all the miracles of natural phenomena is the source of much confusion and should be carefully guarded against. If any personification be needed for the sake of imparting an additional interest to the stories of nature, speak of the actual things as living creatures. Speak of the water drop as expanding into vapor, as condensing in the cold air into a snow crystal, as falling upon the ground, as melting in the warm sun and running down hill, but do not people the child's mind with the fairies of crystallisation, gravitation, cohesion, electricity, and chemism. Teach children to see truth and beauty in the facts themselves, not in imaginary goblins and fairies. Make them watch the phenomena of nature and point out to them that all things are astir with activity and aglow with an eager disposition to do one thing or another according to circumstances.

FOREIGN LANGUAGES.

Acquaintance with foreign languages should be cultivated at an early age, by interesting the children in other nations. Teach children little German and French verses and phrases, only be careful that the pronunciation is perfect. Children catch the accent of strange sounds better than adults, and will reproduce them to perfection. According to the author's own experience, children take delight in listening again and again to little ditties and poems, and will soon begin to repeat them. It is advisable to practise such linguistic exercises before going to sleep and to rehearse on the next morning the recitations of the previous evening.

We recommend such poems as Lafontaine's fables in French, some of Goethe's, Schiller's, Bürger's, and Heine's poems in German, Æsop's fables in Latin, the Lord's Prayer in Greek, etc., etc.

It is also advisable to introduce now and then counting in other tongues, which may be practised in the gymnasium where the number of jumps or other actions can be counted, or in any other place with similar opportunities.

Children will pick up foreign sounds without difficulty, if parents or teachers limit their instruction to the sounds only and do not tax the minds of their little pupils with grammatical explanations. The sound must come first, and the sound alone; the sense of the sound should be understood, but an exact grammatical analysis of its meaning must not be given at the beginning, for grammar bores children and is apt to destroy the pleasure they naturally take in learning something about other languages. If children have learned by rote a number of pieces in a foreign tongue, when they have grown older and maturer they will be glad to know something about the construction of sentences, and a grammar lesson, otherwise so tedious, will then be welcome to them. Later on, a long time after they have learned to read and to write in their mother tongue, children may in school be taught to read and write the foreign poems which they have learned by rote in their younger years, and they will attend their French and German lessons in school with greater zeal than if they knew nothing of these languages.

It may be permitted to add here a few words concerning the dead languages which in Europe as well as in America are still taught in the old-fashioned way. The author of these articles has had experience in teaching Latin according to a more modern method, and, while engaged as scientific teacher at the Royal Corps of Cadets in Dresden, Germany, he succeeded within the space of one school year in making the pupils of the fourth grade (Quarta) as proficient in speaking and in writing Latin as were the best scholars of the first class (Prima) after a four years' course.

And how was this accomplished?

Simply by making the boys learn by heart every week a few lines of Latin prose or verse. First simple stories should be selected for the purpose, in the style of Æsop's fables, then passages from historians and orations of famous men. There is plenty of material in Livy, Cæsar, Cicero, and also in Seneca, and the verses of Ovid are as simple as the occasion requires. The scholars had first to render these pieces into Latin from an oral dictation which was given them in their mother-tongue. Their translations were corrected and their mistakes discussed. Copies of the passage had to be made until the whole piece was perfect, and finally it was recited before the class. This method of teaching Latin was in the beginning hard on some of the boys, but it grew easier with every new piece that was taught and learned. The oldpieces were constantly repeated, and all grammatical rules were discussed in connexion with the sentences which had thus been committed to memory. At the end of the school year the boys knew about forty Latin stories by heart and were thoroughly familiar with them. In this way they had a direct command over a number of phrases and had acquired an unusual readiness in their practical use of the language, a result which within so short a time had never before been accomplished.

While the best scholars educated in the old method were able to tell the rule and follow it, these boys built their sentences correctly without thinking of the rule and deduced grammatical rules from the instances which they knew by heart.

A teacher of languages must be very exact in the beginning,—slow but painstakingly correct in every particular; he must choose the best passages for committing them to memory; he must insist on a clear pronunciation and leave no doubt about the details of grammar and construction. There is no use in rushing the boys, or overburdening them with home-work. On the contrary, the teacher should render the labor of committing these pieces to memory easy by discussing their difficulties, which will afford ample opportunity to make the scholars read the sentences and repeat them as pronounced by the teacher. The facility which pupils gradually acquire in learning a language serves to keep their enthusiasm alive, until they know enough to allow a cursive reading of literature which will involve a more rapid progress in acquiring a general proficiency.

MATHEMATICS.

Mathematical instruction should begin very early, but do not begin with axioms, theorems, and long-winded arguments with their monotonous refrain, *quod erat demonstrandum*. That is death to the spirit of mathematics. Not only is the doctrine, that all mathematics rest upon axioms an error,[1] but to begin the first lesson with explanations of axioms is a blunder. Let children begin to learn geometry by *doing*, not by *reasoning*. Let the reasoning

[1] For further details on the redundancy of axioms see the writer's *Primer of Philosophy*, pp. 51 et seq.

come in as an incidental aid to construction. Let the purpose be that of achieving something, but never let the child do any reflecting or arguing for the mere sake of thinking.

Action is the mainspring of life. No interest can be taken in anything, except there is a certain aim to be reached. Thought must step in as the assistant to work. Thought that does not serve a purpose known to the child, will be felt as an oppressive tyranny. Arguments will bore the child that is induced to reason about things before it feels the need of reasoning. Parents and teachers must not presuppose but create in the child the desire for knowledge.

In order to lay a foundation in mathematics, parents and teachers should give the child paper and a pencil. Then let them make a ruler of the paper by folding it. The fold in the paper is called a straight line, and, if folded again so that one end of the straight line covers the other end, the new fold will cut the old fold at right angles. These definitions of straight lines and right angles should be introduced, not argumentatively, but simply by naming the products of the child's operations.

After this brief introduction, hand the child a pair of compasses, giving him due warning to be careful with the points. Let the child become familiar with this new instrument by drawing a circle and dividing the circumference with the radius into six equal parts; which will serve to make a number of figures of various forms and combinations, stars with curved rays, hexagons, equilateral triangles, and six-cornered stars.

Another time ask your little friend to draw a straight line and name one end for himself, the other end for his brother, sister, cousin, or friend. Then tell him to divide the line with the assistance of the compasses, and construct a boundary line at right angles.

Our pair of compasses is a good fellow. He has no head, no body, but two long legs and can pace off the way for us. By sweeping with the same span of somewhat more than half of the line from both its ends, we draw two intersecting circles, and there will be few children who will not at once jump at the conclusion that when a straight line is drawn through the points of intersection, the problem will be solved.

Thereupon let your little pupil draw an angle for himself and one or several parallel angles for his brothers and friends. This would be an appropriate occasion to reveal to him the secrets of parallel lines with their vertical, alternating, and correspondent angles. Their mathematical comprehension will now be mature enough to understand that an angle is not the surface between its sides, but their inclination, and that angles of the same inclination are equal.

Having divided a line into two equal parts, let the young mathematician divide an angle, which he will now easily accomplish.

All further work can begin to bear a more definite mathematical character. Let the child construct triangles from three sides, from two sides and one angle, from two angles and one side. Call his attention, without entering into details, to the fact that from three given pieces the other three not-given pieces are determined, bearing in mind an exception which leaves the choice between two possibilities; and also that triangles may be turned around.

The method of calculating areas can be taught to beginners by telling them the story of a farmer who exchanged his farm, which was in the shape of a square, for another one of exactly the same sides but with slanting angles. The former soon found out that there was less work in plowing and less seed-corn was needed, but that the crop too was greatly reduced. The man was no mathematician; he had allowed himself to be cheated. The solution of the problem will now be followed up with great interest and can easily be accomplished.

In a similar way let the children operate with circles for determining the nature and interrelations of tangents, sectors, central, and peripheral angles, etc., etc., and let them find the inscribed and circumscribed circles of triangles, the Pythagorean proposition, etc., etc. And all this can be taught in a kindergarten way, without ever resorting to arguments and demonstrations, but simply by setting the child to work and giving him a task to accomplish. When he has come into possession of a fair stock of mathematical knowledge, he will now and then go astray and become the dupe of some misconception. He will then be glad to become acquainted with methods of proof which will enable him to argue about his operations and to become sure that his constructions are right.

Arithmetic should in the same way be taught by setting children to work, i. e., by making them *do* something, by weighing, by measuring, and by comparing different lengths, areas, and volumes as well as different weights.[1]

In spite of its importance, mathematics is still one of the neglected branches in the education of the child, while much progress

[1] The Speer method is very commendable and deserves the attention of all teachers of arithmetic.

has been made in the primary instruction of drawing, painting, music, and physics, where better methods suggest themselves more readily. Mathematicians of high standing devote their energies to a furtherance of the most abstruse problems of their craft and have so far not as yet shown any ambition to come to the assistance of the kindergarten and primary schools.

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No attempt has been made here to be exhaustive; the writer preferred rather to be explicit in details, offered as samples, because if the principle be understood its application in the various branches of instruction will not be difficult.[1]

[1] The author would gladly add a review of the practical work that has been done in line with the principles suggested in this article and also a list of publications as well as other kinds of instructive suggestions on the subject, but he feels incompetent to do justice to this special branch, the history of education. He fears that he would either exaggerate the importance of, or be overcritical with, the work with which he is familiar, and overlook the significance of those educators whom he does not know.

Information as to methods employed and the results attained in various parts of the world will be gratefully received.