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CHILD AND MAN

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CHILD AND MAN is a magazine for the education founded by Rudolf Steiner. It seeks to form a link with all those who are interested in this education, on the basis of an up-to-date and authoritative commentary on the development of the work in the schools.

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Keeping One's Wits about One

IN his presidential address to the 38th Annual Conference of Educational Associations, of which the Rudolf Steiner Educational Association is a member, Sir Charles Morris, vice-chancellor of Leeds University, called for a reassertion of human judgement and an education that will develop and sustain it. Such a demand is timely, for we find evidence at every hand of misjudgements or one-sided statements, which contain quite elementary errors and yet have been made by men who are reputed to be authorities in their line of study.

The increasing lack of a healthy judgement can be seen, for instance, in the interpretation of statistics. This is a very usual source of error, for it is fatally easy to assume here that all factors have been taken into account and that one necessarily has a larger view of a matter, just because one has been furnished with statistics involving large numbers, but which nevertheless only give a partial picture.

The complexity of knowledge nowadays has created the expert, who, cautious as he may be in his pronouncements in one field, can make appalling and quite elementary errors when forming judgements in another. A particularly painful example of this was recently afforded by a letter in the *Daily Telegraph*, where a scientist defended Christianity by saying that as evolution advanced a "sport" or "freak" initiated a new development at a higher level. This scientific "fact" is supposed to make a phenomenon like Christ perfectly credible and possible on the assumption that it cannot stand on any other basis. By an unusual arrangement of the genes - we are led to suppose - we were able to benefit from the consequently greater humanity and wisdom of a sublime teacher. Thus Christianity can be least served, nay utterly destroyed, by those who, lacking all judgement, rush in to defend her in their own way.

On the one hand, some people are refreshingly ready to listen to new views, to hear new interpretations of the world, but lack any real power of appraisal; and on the other there are those who, fearing this very lack of judgement in themselves, stubbornly refuse to change their traditional views of the world, lest they fall into error. It is not enough to imagine that judgement is only a matter of knowledge and thinking. It is also linked with feeling. It is the heart's answer to the question put to it. While the judgement can be trained to respect rational thought, the faculty itself is also intimately based on the emotions, on the heart's response. Thus it is a faculty which must be left perfectly free, must be protected and nurtured all through the formative years of schooling. Very often it is the simple and unaffected mind that possesses the healthiest power of judgement, for it is just the expert, with all his talents and his opportunities for concentrated research, who can go so radically wrong. He may well fail to see certain essential facts which must not be ignored, and yet are obscured by the welter of specialised knowledge. The ordinary

intelligent human being, who keeps his wits about him, may quite well recognise the omission, because he stands further away from the consideration in question.

There was no one who had greater respect for the scientist and the expert than Rudolf Steiner; but he did not hesitate to speak out clearly, not against their facts, but against their theories, when he found them in conflict with other facts, or when he found facts omitted which were essential to the result. Equally there was no one who had a greater respect for ordinary human judgement when it was applied without prejudice. He did not hesitate to leave all his own "expert" findings (for such indeed they are) to the mercy of that judgement, because he had faith in it too. He knew that there would be found men and women who could consider what he had to say without prejudice for or against it, and who would be able to find *their* way in it and through the welter of modern developments.

To help young people to find their way is the task of an education which is built on confidence in human judgement. It does not glorify the present at the expense of the past, nor does it consider traditional views as ipso facto sacrosanct; rather does it present the facts and appeals anew to the healthy human judgement to make of them what it can. For given freshness of vision and a sound and healthy, and above all complete and integrated human being, the judgement will speak out clearly enough, *even if the decision is sometimes to suspend judgement for the moment.*

Here is another task for education. But unless it is based on the firm faith in human judgement, and the willingness to allow that judgement to operate under the best possible circumstances, this task is vitiated from the outset. If this faith is lost, we open the doors to all the evils of regimented thinking and slogan shouting which we in the west have grown to hate and fear.

THE EDITOR.

TRAINING COURSE FOR TEACHERS

Autumn 1955 to Summer 1956

The Rudolf Steiner Schools Fellowship (in Great Britain) is happy to announce that there will be a new Course for the Training of Teachers commencing in the autumn of 1955. The Course will be under the general direction of L. F. Edmunds and will be centred at Michael Hall.

For further particulars, please write to the Secretary, Teachers Training Course, Michael Hall, Forest Row, Sussex.

Goetheanism and the Scientific Method

Michael Wilson

IN the remarkable essay "The Experiment as Mediator between Object and Subject" which Goethe wrote in 1792 he describes, gently and with great modesty, the principles which he believes should apply to any work of scientific investigation. First and foremost is the quality we now call objectivity. The pleasure or pain, attraction or repulsion, the use or harm which in the first place relate man to the things of nature, must be allowed no influence upon his judgment. The responsibility for the steps he takes is entirely his own, for he will not, as in ordinary life, find that a false step soon meets with its own correction. The very solitude which an artist requires for bringing forth his best creations is a hindrance for the scientist, who should work in a team and never withhold his results from others. He should not draw premature conclusions from experiment, and should emulate the mathematician in the rigour of his procedure. Objectivity, meticulous judgment, rigorous procedure, exchange of ideas and disclosure of results – these belong by any standards to the best precepts of Scientific Method. Where, then, does Goethe's method differ, and why should it have been so completely neglected, even denied, by all the scientists of fame who followed him?

The success of the scientific method which had begun with Galileo two centuries earlier was that the phenomena of nature, particularly those of the inorganic world, were beginning to be described in terms of relationships of number and measure, relationships which could be expressed as Natural Law, accessible to reason, and independent of authority. Movements of bodies – falling, rolling, swinging, rotating etc., – could be expressed and predicted in terms of distance, time and mass. Musical sounds were found to have measurable vibrations as their basis, expansion and contraction became a relationship of temperature, pressure and volume. Colours became measurable components of white light, and so on. These claims could be verified by experiment, and experimenting was open to anyone. The universe came to be thought of as a vast machine, and Man was discovering that he could begin to take it to pieces and find out how it worked. What could be more natural than to conclude that here was the kind of thinking that would unlock the secrets of the world, and what more tempting than to want to take nature to pieces down to the very last cog? Might it not well happen that Man would eventually succeed in getting down to the smallest, the ultimate cog, the universal atom, out of which the whole world was built?

For Goethe this attitude had no attraction. He had his own kind of acquaintance with Nature. He, too, saw that all the elements of nature are related, but he saw it in quite a different way. For him nature was a unity, a oneness in which everything had its place.

He did not look for the smallest unit out of which everything else was built up, but for the way in which everything was related to the highest, the ultimate all-embracing unity. He saw moreover that the only way in which Man can comprehend this unity is by first separating, differentiating, defining. Separating is the work, of the Intellect whereas re-assembling is the work of the Intelligence, the Reason.

The realisation of this last point leads us to the heart of the matter. The discovery that we can take nature to pieces and find the most wonderful and beautiful relationships and proportions between the various parts is no evidence at all that the completed works of creation were put together from the elementary parts in the first place. In the world of living things, we have only to follow the successive stages from seed to flower, from egg to chicken, to see that the reverse is indeed the case. Nature proceeds by processes of differentiation and selection. It is only Man who must construct from the parts to the whole. Let us look at this more closely. The architect, the engineer and to some extent the industrial designer too, if embarking upon a new design must start from the most general conception of the finished creation and the roughest freehand sketches, putting in first the main features and then gradually working down to the separate details. The builder and the manufacturer on the other hand, who have to execute the plans, must do the reverse, namely, first make the parts and then assemble them, and only as the final step, put the whole into working order.

As earthly beings we are so constituted that anything which we create out of our own forces cannot be translated from idea to reality without going through the stage of being "broken down" (a popular expression nowadays) into elements of manageable size. It is the same with our knowledge. We cannot create the great edifice of Science directly out of the Unity of Nature. We must first break down the vast natural events into separate processes, principles and definitions which have been sufficiently "abstracted" for our intellect to be able to grasp them. Only when we have been able to re-assemble them into their appropriate places and connections can we infuse them with the breath of life and begin to feel that we understand the workings of nature as she is.

The almost universal failure, against which Goethe protested with such vehemence, has been the failure to recognise that it is *we* who have made the separate pieces, whereas in nature everything is part of the unity, the totality. *We* have broken nature into pieces, and have then pretended that the pieces, as pieces, had been there all the time. All the single concepts which constitute our scientific language, such as distance, time, mass, temperature, wavelength, frequency and the like, are concepts which we have created in order to be able to describe and to predict with accuracy the behaviour of the things around us. And now we have got into the habit of talking about the world as if it really had been built up from these separate elements. The great

and thoughtful scientists have not been blind to this state of affairs, but I speak from my own experience when I say that the small boy entering his first lesson in Mechanics rightly feels that he has been cheated when he is fed only on the indigestible abstractions of statics which simply do not have any existence in the real world around him.

For Goethe it appeared highly unscientific and quite unforgivable to pretend to "explain" something that one *could* see and experience, by means of something that one could *not* experience. The idea that behind the curtain of our often unreliable sense impressions lies the "reality" of the objective mechanical processes which can be measured and calculated, was foreign and repulsive to him. His method was to use all his senses and all his presence of mind to observe, in patience and humility, the things he was interested in, and from the things themselves to learn the kind of thinking which was appropriate to the study of them. He would experiment, observe, and modify the experiment into all possible forms and variations in order to perceive the kind of relationship which existed between the various elements of the phenomenon. He would never forget that the experiment itself was his own deliberate creation, and not nature's deed at all. He would find out which conditions were essential to the appearance of the phenomenon and which could be discarded. The relationships as such were perceptible to his thinking, though not to his senses. But the relationships were certainly not arbitrary. They originated in the things themselves even though they had to be formulated in terms of human thought and speech. Therefore if he arrayed before his mind's eye all possible instances of the same phenomenon, it should eventually be possible for the essential nature of the phenomenon, the very kernel of it, to present itself to his consciousness. The form in which he experienced this he called the "Urphephenomenon". It was an almost direct inner perception, which he called "higher experience". His Urphephenomenon was the same thing that the intellect would formulate as a Law of Nature; but by refraining from making this formulation, and by allowing the Urphephenomenon to speak for itself, he avoided the danger of arbitrarily importing a type of thinking, a theory, which might not be in conformity with the nature of the phenomenon itself.

Let us try to follow the method in the study of Light and Colour, where Goethe's approach has been thrown into such sharp relief. At Cambridge nearly three hundred years ago Isaac Newton made his famous experiment with the prism. He made a small hole in his window shutters and allowed the narrow shaft of sunlight to pass through a glass prism so that an elongated blurred image of the sun, a "spectrum" of colours, was formed upon the opposite wall. He found that if he made the coloured rays to converge again exactly into one place, then the colours disappeared and formed a colourless white light once more. His conclusion was that the colours had really been present in the original light of the sun, and that all that the prisms had done was to analyse the white light into its component parts,

and then reunite them, much as a cake can be cut into slices, and the slices then put together again to form the whole cake.

It is a simple matter to repeat this experiment, and the results appear just as Newton described them. It is a very convincing experiment and should be done by all those who think that Newton was as dishonest an experimenter as Goethe made him out to be. Newton already knew that without the prism, he would get just a colourless image of the sun; with the prism the image appeared stretched out in length, the ends looking as if they were parts of successive images in different colours. I believe that anyone with any enthusiasm for describing an experiment in terms of neat mechanical concepts would at once come to the same conclusions that Newton did, namely, that he was dealing with a small patch of light in the form of an image, and that this was first broken up into colours and then re-assembled to its original condition. But that for two and a half centuries it should have been generally accepted that all the colours are in fact present in the white light when the eye sees that they are all absent, is a remarkable indication of the greater faith that was put in mechanistic interpretations than in the direct evidence of the senses.

If we proceed on Goethean lines we shall be unable to start from the image of the sun upon the wall without asking how it got there in the first place. We soon find that in order to have an image at all, even the hint of an image, some shutters or window frames are essential. By itself the sun simply does not produce images of itself. Therefore the hole in the shutter has played an important part and must be taken into account. But now comes the classical question as to whether the hole itself is the frame around, or the space inside. Evidently Newton, like the architect in Christian Morgenstern's poem about the lattice-fence, took out the space from inside the hole and built a great theory out of it. Our method does not allow this. We made the image of the sun by putting up a dark frame and leaving only a small hole, so we must not pretend that the image was there from the outset as part of the light. Also we see that the bright colours which appear when the prism is put in the way of the light always stick rigidly to the edges of the image. Whatever we do we can never separate them from it, and they always occur in the same order: red-orange-yellow, turquoise-blue-violet. One set belongs to one edge, and the other set to the other edge. If the sun's disc becomes obscured by light clouds, we get an indistinct patch of light with no outline, no edges and with very indefinite colours. We can modify the experiment in any way we like, we may define darkness as the mere absence of light if we wish to, but the pure fact which presents itself to our observation is that both image and colours only appear where there is an element of darkness meeting the light. Furthermore, in any given experimental arrangement, we find that if the red-yellow colours appear with one orientation of light and dark, then with the opposite orientation we are certain to get the blue

colours. We are compelled to think in terms of polarities, the first polarity being that of light and darkness.

In the type of experiment which Goethe made, it is not difficult to convince oneself that the fullest and most beautiful appearances of colour are where the light and the darkness are meeting each other on nearly equal terms, that is, where there is the fullest mutual interplay between the polarities. It would be hard to find a clearer exposition and application of these principles than in the modern processes of colour-photography. It has been my personal experience that once this Urphenomenon of the polar interplay of light and darkness has been seen and grasped, further and hitherto un-thought-of experiments suggest themselves in a surprising and fascinating way. Moreover, the basic experimental facts, all of which have been known and published for many years, re-arrange themselves quite naturally into a system, a plan, from which not only the practical laws of colour mixture and manipulation can be read off, but even the moral qualities of the colours as well. From this it becomes abundantly clear that the standard experiments which are used to illustrate the behaviour of light and colour are only those which arise from the school of thinking which Newton initiated.

But when we come to the exact quantitative experiments which gave rise to the wave-theory of light, experiments which were only beginning when Goethe was writing his *Farbenlehre*, we have to be careful not to be swept off our feet by the beautiful mathematical processes and proportions which are associated with the appearance of the colours. It is of course not possible to go into any of the technical details in a short article of this kind, and I can only say that if we remain true to our first Goethean principles, trying to read, from a multitude of experiments and phenomena, the intrinsic nature of the relation of darkness to light, never losing sight of the experimental conditions which *we* have imposed, then we can come to only one possible conclusion, and that is that the mechanical-electrical properties and the mathematical forms which are usually attributed to light as such, are in truth properties of *darkness*, of matter, which are impressed upon the light and revealed by it.

To some readers this may seem but a change of name, and without significance in practice. But it is a great deal more than this. Firstly, it is entirely in accord with the fact that the logical development of Newton's conclusions – the use of the spectrum as a means of investigation and measurement – has given us an immense amount of valuable information about the nature of matter, but practically nothing at all about the nature of colour. Secondly, it puts the study of colour into the place where it belongs, namely, the subtle interplay of light and darkness, in the region midway between the two extremes, and, what is most important, into the realm where we experience it every day in the colours of nature. Thirdly, and this points more to the future, it gives us an indication of the kind of thinking which will be necessary if we are one day to grasp the nature of light itself.

In making these statements I am not speaking in a vague and qualitative way, for I see that the kind of approach which I am trying to describe will involve the transformation of the very mathematics itself, so that it can become livingly orientated to the world of spiritual principles on one hand, and material principles on the other. The transformation will require tremendous labour, and will not be achieved overnight. But if we start with the simple principles which Goethe has enunciated in his essay, and follow them up along the comprehensive path of knowledge which Rudolf Steiner has built upon them, developing a new power of selfless perception and a new power of inner wrestling with our thinking, then we may hope that Goetheanism will give us a Science that touches the real problems of human existence, and a Technology which heals and does not destroy.

History in the Seventh Class

J. Darrell

IN the Seventh Class, when the children in our schools are in the year which at some point includes their thirteenth birthday, we teach them the history of the fifteenth and sixteenth centuries; thereby we pass over with them into the first phase of modern times, and study a past which is nevertheless part of their present. In these centuries began that intrepid adventuring into all unknowns which is the truly progressive characteristic of our modern age. Devotion to tradition, to established authority was no longer to hold uncontested dominion in men's hearts: in the same epoch in which men for the first time see the world clearly as an outer thing, the most personal forces of the human soul, the forces of the will, come strongly into play as never before. Over against the new experience of the death of three-dimensional space into the distant vanishing-point, there arises within man the equally new experience of an intimate centre of living power, radiating outwards into action on all sides; horizons are now seen as earthly limits, but as limits to be crossed. This is the hall-mark of our modern centuries, and if humanity at present seems to be losing its sense for true progress, this is surely because it has grown indifferent to its own original modern impulse: having crossed all the outer frontiers of knowledge, it halts passively before the inner, marking down the spiritual territory beyond as *Terra Incognita*, or even *Incognitabilis*.

The children in the Seventh Class begin in a sense to come level in awareness with the civilisation in which they are growing up; they begin really to be our younger contemporaries, in consciousness as well as in life. They feel this, and rejoice; they too, in their own development, are within the dawn-light of a new age, they too are to discover new lands and new skies, new joys and new sorrows, and to

feel within themselves the stirring of new powers ; for they are about to call their souls their own.

By the age of thirteen the growing child is on the threshold of puberty. The soul is entering ever more deeply into the physical organism, and in doing so sharpening the difference between the life- and death-processes therein. The productive and destructive forces in the body intensify their activity, the approach to the reproductive capacity being countered, for example, by the characteristic enlargements of the bony system. For the first time in its life the soul is to find itself exposed to that double stress of objective and subjective, of hardening thought and formless longing which it must overcome on its way to selfhood. Its Argo will best weather its Scylla and Charybdis if it wins a fleece of genuine gold, an ideal knowledge which is also art.

It is of very great importance that just when it is far enough forward in its own development to appreciate this Janus quality of the soul, but not yet really involved in the problems it gives rise to, the child should use its budding judgment upon it and acquire the seeds of a sense of proportion, a prophylactic perception, as it were, before the all-too personal, all-too critical sets in with full strength. This it attempts in the Seventh Class in its study of English, for example, when it considers the stylistic expression of the emotions of the soul, and it does it also in History.

In its first lessons on the fifteenth century, the Seventh Class realises that the winds of time have changed. Instead of the divinely inspired, divinely appointed Rishis and Pharaohs, or of such demigods as Romulus and Numa, all of them accepted and revered by their communities, they have to do with the country-girl, Joan of Arc, of the mariner, Columbus, of the monk, Copernicus, personalities who must stand up alone for their beliefs and achieve their tasks out of their own forces. Their birth gives them nothing, and the society of which they are members opposes and disowns their thoughts. As never before the children feel the significance of the free personality within the social life (which indeed had never before had such significance), of men who like Luther say, "Here is I ; I can no other". Joan of Arc must not only maintain her mission against all ridicule at the beginning of her sublime exploit, but at the end must die in defence of the revelation which inspired it. Columbus carries his purpose within him for twenty painful years before Queen Isabella secures him the means to fulfil it. These personalities, one and all, must work their way out of their social group in order, through their own conscious spiritual activity, to contribute towards the creation of a new society of mankind.

All that one tells the children of this maelstrom period has the quality of drama about it. Individual and world destinies are interwoven in sequences of immeasurable tensions and releases. Small wonder that Shakespeare was born in this age to become its revealing genius. It is an age whose history provides it with its own parables

on every hand : Joan leading the French under the banner of St. Michael against the English under that of St. George, Columbus in pioneer heroism sailing into the setting sun beneath the pilotage of a considered ideal, Copernicus removing the earth out of the heart of the universe and Galileo demonstrating what powers it has of its own. The significance of these things we leave to the children's own surmise ; it will dawn more fully upon them at a later time.

The clash between new and old was more severe at the turn of medieval into modern history than in any previous age : for hitherto all epochs had been alike in the basic conviction that matter is after all the product of spirit. Our modern age was to lose sight of this and to father matter, like some divinity, upon itself. This essential difference of mind has in the course of the last four centuries polarised human experience and social intercourse in all possible ways, and it is at the back of all the history we have to speak of to the thirteen-year-old child. It is this which has obliged the western personality to become so completely conscious of its isolated self, and which makes modern history of such absorbing interest to the pre-adolescent child. Everything threatens to run into one-sidedness of thought and all-sidedness, all-inclusiveness of personal and sectional claims. Copernicus' book on the planetary movements is put on the Index, despite his placatory dedication to the Pope : on the other hand Tycho Brahe is an exception among the newer scientists in combining with his entirely modern power of exact observation a feeling for that aspect of truth in the older astronomy. Luther asserts the justification of the soul through personal faith, but has very little patience with Calvin and his followers. The Portuguese Order of Christ – the transformed Templars – in the East and Christopher Columbus in the West take inspiration from their own names and seek to evangelize the new lands. But they have no interest in the thoughts which they now meet for the first time, and their successors, often as not, are concerned only with their own or the national enrichment. The cruelty of a Pizarro in his gold-lust or of a John Hawkins in his slave-trade began a sowing of dragon's teeth whose full harvest is still to be reaped.

And yet no partial picture of events and characters will help the children in their incipient judgments. The very men who practised or tolerated incredible cruelty and bad faith could also display the utmost courage and endurance, and by means of these qualities make world-discovery possible. A single point of view, after all, no more yields the truth than a single object of investigation ; the earth, unlike the moon, turns on its own axis as it moves round its orbit, and offers a useful methodic hint to the scientist who in his Copernicanism is prepared, so to say, to meet Ptolemy half-way !

From what has been said already, this period of history is clearly a unique object-lesson in the nature of the incarnating human soul. All true history, as Rudolf Steiner says, gives us self-knowledge, and in our modern age the self struggles to find itself in the isolation

of material existence, to transform and unite harmoniously what it first must receive through the bodily senses and what springs up initially as impulsive bodily will. It is an inspiration for the children in the Seventh Class to hear of Tycho Brahe and John Kepler in this connection. Tycho, an active, even choleric man – witness the loss of his nose! – schools himself into a patient observer of the stars, to obtain results which have been used right into our own day. John Kepler, a man of poor health and fortune, could so absorb himself in this world of thought that he wrestled with problems of planetary movement and the like for years on end. But beyond this, these two men worked together in wonderful harmony in Prague, Tycho supplying the sense-data, so to say, and Kepler digesting it with the boundless vigour of his thought. The fraternity of modern science was thus initiated, and an ideal element of an entirely new kind introduced into humanity.

But in science today fraternity is not enough; intense awareness in face of sense-phenomena must be achieved, if we are to make the necessary advance beyond what may be called that extensive awareness whereby so many unstable *mariages de convenance* have been made between facts and theories. Galileo provides us with a striking example of what Blake calls seeing through the eyes and not only with them, when his single observation of the swinging lamp brought home to him the law of the pendulum. If these things are impressively and understandingly described to the children, they will receive an invaluable stimulus for their own study of external nature later on.

In conclusion I would only add that the theme of opposites and the task of balancing them which runs through the history taught in the Seventh Class is not peculiar to that class or that subject. It is to be found in all the work in the school, of youngest and oldest alike, for it is the theme of creation itself. But each class has its own variation on the theme, and in the Seventh Class the recurrent, characteristic interval, as it were, arises out of the near approach to puberty with the help of the still active forces of childhood.

The adolescent child cleaves to the earth and studies it with soul powers which have both the warmth and the crystallinity of the earth within them; if wisdom is to light up in this study, it must do so as a sun from within the earth. The pre-adolescent child investigates the earth also, more deeply than ever before, but for him understanding is still borne to him by his teacher's words; he still lives in that westering sunlight which is common to all. His *Santa Maria* draws near to the New World with some wind from the old still in its sails.

Overheard during a boy's description of his visit to the doctor to have his chest examined – "... then he put his ear-goggles on and listened"

A Song of a Shirt

Alan Howard

"PERHAPS the most remarkable incident in Modern History," Thomas Carlyle makes his famous philosopher, Teufelsdröckh, say, "is George Fox's making to himself a suit of leather"; and though this revered founder of the Society of Friends is known to thousands today, perhaps very few know that the first thing he did when he decided to start on his life's mission, and in order to provide himself with one of the most essential needs of daily life, was to make himself a "perennial suit of leather".

In a similar way, and not unconnected with the theme of Carlyle's book, we might add, that one of the most remarkable sights in a Rudolf Steiner school is to see a group of thirteen-year old boys making themselves a shirt each; for one of the requirements of the handwork curriculum in our schools is that the boys, as well as the girls, shall have some experience of using a needle and thread.

And what an experience it is. There is, first of all, the natural reluctance to do "girls' work" to overcome. That done, there follows the profound, helpless bewilderment that falls on most of them, when they gather together and cut-out bits and pieces which seem to have neither rhyme nor reason. "This, you see, is for the collar; this, for the cuffs; this, the yoke"; and so on, the teacher explains. The bewilderment begins to transmute itself into a kind of awe, as they realize that somehow these bits of stuff have a name and a place in one of the most essential garments they are obliged to wear; and that all shirts have to start like this – although hitherto they had treated them as if they came moulded in one piece.

But as he begins to sew, he overcomes this initial bewilderment; and sits, head bent over his work, still muttering his complaints and expatiating on his masculine rights – interspersed with whispered witticisms about shirts in general and particular. Now and then he exploits new ways of pushing the needle through the stuff, and brings the desk top into play to force it through two or three folds, when finger and thumb fail. Nobody yells so loudly as a boy if he inadvertently pricks his finger; though nobody can look so innocent as he when his neighbour yells, and by his own suspicious movements and whispered comments you inform him that his neighbour doesn't need 'injections' – "and you use a different kind of needle, in any case". Sometimes, too, he diverts himself with the experiment of transfixing a bit of the skin of his forefinger with the needle, and starts a cult of self-mutilation of this harmless kind, which leads over to conversations about fakirs who stick skewers through their cheeks, and discussions about what sort of needles and thread surgeons use to sew up operations. But there is a fascination about sewing which gets them all in time, especially when they have grasped the elementary technique of backstitch and hemming; and the intricacies of button-

holing can even call forth real enthusiasm. You can work away at sewing at your own pace, and chat with your neighbor, too, or even indulge in a chain of thought utterly remote from the work – which is impossible in arithmetic, for instance.

Sometimes the more masculine temperaments try to undermine things by trying a little clumsy and pointless sabotage. They will bring out the two halves of the yoke gathered together with a couple of 'hop-skip-and-jump' loops of thread, and blandly enquire "What part do I sew now?". But a little firmness, with a good humoured enquiry as to how he'd like to wear something like that, and the loops are unpicked; and stitching of a somewhat less individual character begins.

The girls help tremendously at this stage, stitching away at their blouses and overalls as to the manner born; and though not all of them take advantage of their natural superiority, somehow they can't help 'looking the part' – and that has a sobering effect on the boys. Many a girl has won untold triumphs for her sex, and contributed much to a better understanding between the sexes, by taking advantage of a quiet moment to give a boy, quite tactfully, a little help; and so prevent him from having to consult the teacher too often.

But it's a long business. There is the periodical unpicking; and the terrible discovery that after nearly finishing one of the seams, you find that you stuck your needle too far through some distance back, and have been quite gaily sewing the tail most immodestly to the underside of the sleeve. And in spite of making generous allowances for all these things, and estimating them against the wearer's rate of growth, you invariably find that Boy has meanwhile outgrown Shirt. It needs all a teacher's diplomacy to know what to say to a boy, who suddenly decides to stand up, and hold his piece of off-white cambric shirt-wise in front of him, while he protudes on all sides, top and bottom as well; and amidst titters and guffaws, demands of all and sundry, "Just how do I get into this; and if I do, How do I get out of it?" A quick recollection of his family and relatives is often all one can do on such an occasion, in the hope of naming a brother or cousin who has not yet grown out of such a size, – or better, has not yet grown into it. "It will do for him", you say and the work is resumed.

But there are good 'needle-men' among the boys, as well as among the girls – quite as good, who take a pride in their work, who can turn as pretty a hem, or make a run and fell with the best. They, and the inducement of the sewing-machine ("Yes; if you'll just finish this by hand, you can do the rest with the machine") bring the others along marvellously; and the inexorable rule that garments must be finished, brings everything to a conclusion eventually. After they are washed (and – in spite of the fact that no one is allowed to start the handwork lesson with even slightly dirty hands – what washing they need; bleaching, would be a better word) and pressed, it is surprising how satisfactory they are.

Their destiny thereafter varies. Some are worn – by their owners, too, *and* in school; some are handed on to smaller brothers; some are preserved as 'museum pieces'; some are frankly disowned ("No! That's not mine! I did better stitching than that!") – and *that* from *him*, who was the most vociferous leader of the male opposition when it all began!; and others – well, it is to be hoped they find some kind of service somewhere.

But why, the critical reader is perhaps already asking, why must *boys* do these things – and especially when shirts nowadays are made by machinery? The answer to that is, quite briefly – in the making. Of all the things we use, and which serve us daily, how much do the majority of us know about them. Very little, indeed; and just because of that we have so much the less connection with the folk whose job it is to make them, or to serve us. The very foundations of social life rest, not as we sometimes think, on customs and conventions, but on a knowledge and an interest in the next man's contribution to the common welfare. And that contribution is chiefly in his daily work. We may not have – indeed we cannot have – time to know something about everything; but at sometime in our life to have experienced a little of what it means for *someone* to make some of the commonest necessities of our daily life, is of undeniable social value. Many a successful man has boasted that he started life "without a shirt to his back"; how many, who have been blessed with such an essential garment all their lives, could equally boast, "Well, at least I know something about how the thing is put together – front *and* back"!

The – hitherto – youngest member of the family was discussing the arrival of a new brother. "That makes six of us, now", he said. "Oh!" exclaimed one of his interested listeners, "your mother will have to get dinner for six every day". "No, only five, Robin" – the new brother – "doesn't eat proper food!"

* * *

To mark the importance of going from the Nursery into Class One, Michael's mother allowed him to wear the new clothes recently bought for him – but not, of course, without impressing him with the need for taking care of them, and reminding him of the money they cost. "Look at me, everybody!" he cried, when he arrived among his schoolmates; "I'm worth £5 this morning".

The Four Rules of Arithmetic

Dr. Georg Unger

(This article is written more especially for teachers, and is a continuation of discussions held at the last Easter Conference of the Rudolf Steiner Educational Association. Others, however, may find it quite interesting to follow some of the mathematical thinking involved in these elementary processes of calculation. Dr. Unger is a teacher of mathematics of considerable classroom experience, as well as a mathematician engaged in research. It is just because of the breadth of his practical and theoretical experience, that we are pleased to publish this article for a wider circle of readers. ED.)

A thorough understanding of the elementary arithmetical processes from a mathematical point of view facilitates the interpretation of Dr. Steiner's indications about arithmetic teaching in the first few classes. What is for instance the mathematical difference in the following problems:

1. A boy picks 20 apples. When he comes home he has 12 left. How many has he lost on the way?
2. A boy picks 20 apples and loses 8 on the way home. How many had he when he arrived home?
3. On the way home a boy gives 8 apples away. When he arrives home he has 12 left. How many did he pick?

It is important to distinguish between the "rule" which has to be used and the picture which the wording of the problem conjures up in the pupil's mind.

In the Problem 3 we have an addition sum. Note, however, how by the very way in which the problem is set, the sum is latent in the picture. It is there all the time in the background. Had we asked, A boy receives first 8 and then 12 apples, how many has he in the end? the sum 20 would have appeared as something external to the numbers 8 and 12.

Problems 1 and 2 seem to be the same problem, only with the numbers interchanged. In reality there is a distinction which adults have necessarily lost sight of. It is, in fact, that there is a quite real qualitative difference between $8 + 12$ and $12 + 8$. The result is of course the same in both cases, and the distinction is therefore blurred.

We have now come to the essential question: What is the nature of sum and difference, of product and quotient, quite apart from the pictorial content of a problem?

The first experience of number is not one of magnitude. Numbers are first of all experienced as the conclusion of the rhythmic process of counting. We count a class of objects using ordinal numbers; the cardinal number is the last ordinal number encountered in this way. This corresponds also to the historical development. Only

late in the 19th century, in the theory of "classes", was a cardinal number assigned to every class independent of the process of counting.

In practice, the addition of $12 + 8$ is merely the formation of a resultant class from the two classes 12 and 8. In immediate experience, however, the process $12 + 8$ is: Start at 12 and make 8 steps forward.

Addition is an enhanced counting. In the problems, 12 is a passive number, and 8 is an active number. We can now see the difference between the two questions contained in Problems 1 and 2:

$$12 + ? = 20$$

$$? + 8 = 20$$

In the first case we have to find how many steps have to be made from 12 to reach 20. In the second case we have to determine the starting point so that an additional 8 steps lead to 20. To bring out the difference between these two questions, let us call the active number "a", the passive number "p" and the result "r". Therefore $p + a = r$. So that is the first of our three problems we have to find out what "a" is, and in the second what "p" is.

Let us call "difference" (which really means - what is carried off; from the Latin di - ferre) the number obtained when 'a' steps are made backwards from the result. The answer to Problem 2 therefore, is: $p = r - a$; and the check is immediately obvious, namely: $p + a = r - a + a = r$.

We have become accustomed to solve the first question by the process: $a = r - p$. Here the check would be: $p + a = p + (r - p) = r$. We have therefore first to interchange the terms so that it is quite clear that: $r - p + p = r$.

There is therefore an elementary difference in experience in the two sums. In one case we are asked for the active, in the other for the passive number. The formulae given above show that this difference cannot be avoided except by interchanging the terms. We have therefore to do with two species in what is usually called subtraction. The one is a comparison as to magnitude between two numbers which are of the same nature, namely r and p. We have to ask by how much the one is bigger or small than the other. In the other species we start from two qualitatively different numbers, namely: the sum r and a number of steps a which have to be made backwards from r. The former is a comparison, the latter a proper subtraction. In adding $p + a$ we have a process which is more akin to the second kind of subtraction, subtraction proper, than the two kinds of subtraction are to one another.

These considerations are of the greatest importance when formulating problems. There are teachers who, for the reasons given above, aim at putting the numbers in addition - and even more so in multiplication-problems always in the same order. This is just the reverse of what should really be aimed at. It should be the task of the teacher to bring the pupils to a certain mobility in the number realm.

I shall purposely not give definite examples for class use. It seems more important to me to give the teacher the material which he needs to formulate the right problems out of his own experience. The summary below is therefore not intended as examples to be used directly in the class-room. By making up problems conforming to each one of the nine different ways in which addition and subtraction sums can be set, the teacher can experience for himself the moral effect of considering each one :

$p + a = ?$	Make 8 steps from 12. Where do you end up?
$p + ? = r$	How many steps are there from 12 to 20?
$? + a = r$	Where do we have to start so that 8 steps lead to 20?
$r \text{ subtr. } a = ?$	Count 8 steps back from 20.
$r \text{ subtr. } ? = p$	How many steps back from 20 lead to 12?
$? \text{ subtr. } a = p$	Where do I have to start so that 8 steps back lead to 20?
$r \text{ comp. } p = ?$	Compare 20 and 12 as to their size.
$r \text{ comp. } ? = a$	What is the number which, compared with 20, is 8 smaller?
$? \text{ comp. } p = a$	What number compared with 12 is 8 bigger?

News

Encouraging signs of the growth of interest in the Rudolf Steiner School Movement are coming in from many parts of the world. A definite attempt is being made in South Africa to found a Rudolf Steiner school in Johannesburg. A large sum of money has been given by a local industrialist, and a collegium of teachers is being recruited.

* * * *

Recently a public conference was held in Helsinki, Finland to initiate the work there. Experienced teachers from Stuttgart and Switzerland were present and gave lectures to enthusiastic audiences, and already three young teachers have come forward. It is hoped to open a school in the Autumn of this year.

* * * *

Several interested people in Canada are hoping to start a school soon, and we have been asked to put them in touch with any possible teachers who may be emigrating.

Recently, Mr. Querido, a teacher at Michael Hall, was invited to Paris to give a course of lectures on the education principles of Rudolf Steiner at a conference which had the support of several prominent public officials.

* * * *

The holiday centre at Musikfreunde, Avrona, Switzerland – already well-known to many of our readers – is making a new venture by opening a permanent mountain school there in May. This school is intended particularly for those children in need of mental and physical rehabilitation ; as well as for those who, after having finished their school career, are still uncertain about their future. According to the knowledge and ability of the children, the education will include science as well as languages, painting and music ; and working in the open air (garden, field and forest) will bring them into healthy contact with nature.

* * * *

We shall be pleased to receive and publish news of any developments of Rudolf Steiner education and schools anywhere in the world. Please get in touch with us if you know of any such developments.

Questions and Answers : 11

What is the content of the religion lessons in a Rudolf Steiner School ?

Parents who send their children to a Rudolf Steiner School often ask about the content of the Religion lessons.

There is no question of our teaching an anthroposophical world conception. In our religious instruction we strive to strengthen feelings of wonder and devotion and to awaken longing for what is beautiful and true. It is quite possible to give religion lessons which offend no particular sect and which at the same time have a deep content.

If we first consider the lessons given to the younger children from 6 to 10 years of age, we are here very much concerned with their relationship to the world around them. Little children are gradually finding their way into a beautiful and incomprehensible world which instinctively they feel to be beneficent but where they repeatedly suffer painful disillusionment. In religion lessons we need to strengthen their confidence in the good guiding powers of the world. This can be done by relating many of the old folk tales which, in picture form, show how difficulty and sorrow are trials by which the soul attains to fuller powers. The teacher needs of course to understand

the meaning of these stories if they are to have full weight. At the same time little children should hear tales which reveal to them the beauty of nature in its ever-changing forms. The teacher can describe the frozen seed unfolding into leaf and blossom, the confined chrysalis opening to free the winged butterfly in such a way that the children feel: The divine powers of nature are painting, revealing to man images of his own eternal being.

From Class III onwards the religion teacher works together with the class teacher. In their main lessons children learn the Old Testament stories followed by the Norse and Greek legends. These myths are all concerned with the same theme, namely, that there was a time when man lived in intercourse with the divine worlds; but he fell from his high estate and now he has to find the way back to his spiritual origin. Many stories can be told to illustrate man's working together with guiding spiritual powers.

From ten or eleven years onwards children can be roused to ponder more deeply the mystery of man's destiny on earth. Many biographies can be told to show how the pattern of life is woven from the interchange of external events and inner activity and how character can often shape events. Children can observe that what appears to be chance is often the manifestation of deepest wisdom. Historical personalities can illustrate how, at certain moments of time, man is able to serve the evolutionary powers shaping the life of his age. Bulwer Lytton's 'Harold' is a wonderful handbook for the religion teacher concerned with this theme.

Young children have no understanding for the meaning of the Christ event. The Christmas story and legends of the Jesus child should, of course, be familiar themes for little ones; but the content of the Gospels should be reserved until they are at least eleven or twelve years old. Children are only too readily prejudiced against the Gospel stories if they are accompanied by moralising. The main importance is to strengthen their feelings in connection with the central event of Christ's death and resurrection.

One approach is to bring the coming of Christ into its historical setting. The teacher can show how in the midst of the Roman civilisation with its stress on material force, there lived One who showed an entirely different set of values. A second approach is to make the Gospel stories speak for themselves with full power. For instance children can be deeply moved by a study of the Good Friday and Easter events when the different Gospels are compared. They come to realise that to one witness the most terrible fact was that Christ was utterly deserted; but to another the most wonderful moment was that the Saviour, who had been so deeply wronged, could say, "Father Forgive them for they know not what they do". Still another was able to experience the calm completion of the greatest event on earth which led to the utterance: "It is finished".

Then the children should be led to the resurrection story in its full joy. Thus their feeling life can be very much strengthened and deepened.

In the years after fourteen, scholars should be introduced to the greatest literature of all times. Then they come to realise the essential difference that Christianity has brought into the world. The Homeric heroes had superhuman power and courage, but they could not feel for the weak. In the mediaeval legend, Parsifal could not attain the Kingship of the Grail until he had healed the fallen Amfortas. The impulse to redeem is Christian and this impulse inspires the most beautiful literature of post-Christian Europe, the last lovely works of Shakespeare and the writings of Goethe. There is no question of teaching that one world outlook is right and another wrong. Truth has many facets. But with the coming of Christianity a new impulse has entered world history. The events speak for themselves; the pupils need to learn the powers of feeling and perception by which they can observe and find the truth.

Eileen Hutchins.

SPEAKING OF EDUCATION

(Contributions to this column welcomed)

Fivepence a day, or the price of a cup of tea and a biscuit, was what Professor A. V. Judges calculated, in his lecture at King's College on Monday, we each contributed to the cost of the educational system.

Times Educational Supplement.

* * *

So let the children read and listen to the New Testament stories in the same way as they read and listen to the stories of Greek mythology. And when they ask if the stories are true, they can be told that they are a mixture of fact and legend.

Mrs. Knight—B.B.C. Broadcast.

* * *

Five hundred and fifty boys of King's School, Canterbury . . . ceremoniously ate a two-hundred-weight cake. It took the head chef two days to bake and another 15 hours to ice. The boys finished it off in 12 minutes.

News Chronicle.

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. . . A heating system in each room can be regulated by the teacher. There are no pipes, but hot air is blown out of a cupboard which is lodged against the wall.

Ilkeston Pioneer.

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Teachers in Aarhus, Denmark, have prohibited chewing gum in the classroom on the grounds that it ruins the furniture. (Children customarily stick it on the back of the desks). In future all children as they enter the classroom will spit their gum into special containers.

Times Educational Supplement.

Teachers in Conference

THERE was a distinct note of challenge at the 38th Conference of Educational Associations in London this year. Sir Charles Morris, vice-Chancellor of Leeds University, started it in his presidential address on Education and the Family, by stating that in education today the parent has abdicated his responsibility. He tends, in the belief that the experts know best, to leave everything to them. But when one sees how the "last word" of the expert in one decade can be completely contradicted in the next, then the parent – whose own judgement has been undermined by them already in any case – is likely to become bewildered. He pleaded for a kind of education which would restore to the parent a confidence in his own judgement, so that although he might be lacking in expert scientific knowledge, he still had something in ordinary human wisdom which could help him in deciding between the experts. Philosophers, he declared, have given up teaching wisdom; especially that kind of wisdom which might help a man in his most general and useful role as parent.

He deplored the fact that very few young men have a desire to go to the university, where so much can still be done to lay the foundations of this wisdom. He himself would like to see every child already ambitious at eight years of age to enter a university later. The influence of his contemporaries on a youth in school or college is as powerful a force in education as the actual classroom teaching; and we must encourage our young people to take more part in this. If a boy isn't stirred aesthetically and intellectually by school or college, he doubted if he was likely to be so at all. Opportunities are needed by young people for that kind of discussion which the home doesn't give, and the factory or workshop can't. "We cannot", he added, "in this age, appear to our children to know everything – or even very much". The parent has allowed himself to be bullied by the experts into taking a back place, and the home as an educative force has suffered in consequence. We must evolve a way of education which will turn out good parents – that is, educated parents who will be able to take advantage of what the experts say without being overwhelmed by them.

The following day, Mr. H. Gebert of Michael Hall School took up the subject of the Comprehensive School in the light of Rudolf Steiner Education. He pointed out that a Rudolf Steiner school is by its very nature already a comprehensive school. It has no entrance examinations or selection tests, and it gives a general education to all children from Nursery age to pre-University entrance. After having shown that the fundamental factor in our modern life is science based on thought, which tends to dominate education, he proceeded to describe the development of the child through the successive periods ending in the change of teeth, the onset of puberty and the coming of age. He showed how these periods developed

respectively, the will, the feelings and the thinking; and that these features of the soul-life must give the cue to the kind of education pursued at that time. All children, he argued, go through this process of development, although the *intelligence* of the individual children may be widely different at any one stage. The intelligence of any particular child at any particular time is solely a measure of how far the individuality has incarnated in the child nature. If we work only with the standard of intelligence among children, then we are concentrating on what is different in them, and more and more we shall have to group them in specialized groups, until – we shall really need one teacher for each child. But if we work in line with the *process of development common to all*, if we appeal to the imitative faculty when the will is most marked, to the imagination when the feeling life is predominant, and to the thinking when the intellect is maturing, then we work with something which is fundamentally the same in all children; and the comprehensive school – which is nothing more than a school in which all children can be educated together – is inevitable.

The next day, Mr. Howard of Michael House, Ilkeston, spoke on Imagination in Educational Theory and Practice. Starting from the well-known fact of how an illustration, a verbal picture, can light up an otherwise laboured sequence of thought, he went into further detail about this inner faculty for making mental pictures, or imagination. He showed how this not only catches the child's attention, but helps the child to grow and develop inwardly by its own creative activity. He strongly deprecated the present tendency to reduce education to a well-organised system of "visual-aids", if only because ordinary observation was far more tiring than imagination. We must revise, he said, our concept of the teacher. He is not an encyclopaedia; but must strive ever to be an artist – an artist who can paint in vivid word-pictures and descriptions that which he communicates to the child. It is not sufficient for the teacher to *know*; for if education is to get to grips with the ills of our time, what the teacher has to say to the child must not only inform, it must inspire.

* * * *

There is no doubt that public interest in Rudolf Steiner's methods is increasing. Not only were there good, attentive audiences at both these lectures (and by the way, they were held at 10-30 in the morning), but many questions were asked seeking for help and information in educational problems which teachers are meeting everywhere. In our opinion, the time is not far distant when it will be possible to stage a public exhibition and conference on our work, of an order hitherto never attempted in this country, and be able to draw confidently on the widest possible public interest in it.

A. G. H.

**Easter Conference of the Rudolf Steiner
Educational Association at Michael Hall**

April 9th — 13th 1955

Theme :	"KNOWLEDGE OF MAN THROUGH LANGUAGE"
SATURDAY	"The Recovery of The Word"
April 9th.	Introductory lecture by
8-15 p.m.	H. L. HETHERINGTON
SUNDAY	"Man and Speech"
9-30 a.m.	J. DARRELL with other contributors.
11-30 a.m.	"Speech Before the Change of Teeth"
5-0 p.m.	EURYTHMY PERFORMANCE
8-15 p.m.	"The Class Teachers' Task in Language"
	Introductory lecture by
	A. G. HOWARD.
MONDAY	Speaking, Recitation, Grammar, Story Telling,
9-30 a.m.	Writing, Reading, Literature.
11-30 a.m.	Continuation
5-0 p.m.	Association business meeting.
8-15 p.m.	"LANGUAGE AND LITERATURE FOR THE ADOLESCENT"
	Introductory lecture by
	MISS E. HUTCHINS.
TUESDAY	"Treatment of Language in the Upper School"
9-30 a.m.	Continuation.
11-30 a.m.	Association Business Meeting
5-0 p.m.	"Understanding Man through Language"
8-15 p.m.	Lecture by L. F. EDMUNDS.
WEDNESDAY	Foreign Languages
9-30 a.m.	Continuation.
11-30 a.m.	

"And what have you learned at school, today?"

"I've learned how to stop teachers talking".

"Oh, indeed; and how do you do that?"

"You just put your hand up, and they stop straight away".

"Can These Bones Live?"

A. G. H.

CORRECT speaking is often regarded as the hall mark of education; and at the basis of it lies a fundamental requirement: a sound knowledge of grammar.

On the face of it, however, Grammar is no more than the elaboration and logical organisation of certain rules of word order and word relationships; and you just can't fling all that at a child's head, and expect him either to absorb it or enjoy it. That this was done — and often very painfully done — in the past, may be the reason why the subject is still regarded with a certain distaste, and why a reaction against it set in the schools a few years back, so that for a time the subject was ostracized altogether. "Let us teach the child by imitation" was the cry; and it was not until the problem became acute of what to tell a child who insists on knowing why "she is older than me" is wrong, that people began to think again.

It is, of course, the "bare bones" of language teaching; but it is a pity that this phrase, so accurate in way, carries with it a certain contempt, as though only a pedant could be interested in "bare bones". A skeleton, too, is the "bare bones" of a man; but we do not relegate a knowledge of its articulation and arrangement to pedants and academicians. Indeed, it is just because Grammar is the "bare bones" of language that the teaching of it can become very much alive and real. Rudolf Steiner said once that a knowledge of grammar gives a kind of skeleton to the child's soul; he begins to feel and reveal a certain inner firmness as a result of learning at the right time something about the solid framework that underlies the language he uses.

But one must approach it in the right way, which is, directly. One should not, for instance, give a child a made up example of a grammatical rule, and make him write it down and learn it off by heart for that purpose. For thereby one petrifies something that is by its nature ever-changing and mobile — language itself. It is a kind of mummification of speech to learn lists of examples. A man can move his arm in a variety of ways, and he can do this because of the very definite mechanical principles involved in the bony framework within the arm. No one single movement, however, explains the mechanics of the arm; only the mechanical principle itself explains that. Similarly only the grammatical rule explains *how* and *why* you can say this and not that under certain circumstances. No one combination of words wholly contains that rule. Rudolf Steiner advocated that while the child should be encouraged to make innumerable examples of any given rule, the value of the practice lay in the variety of examples which should not be retained, but allowed to be forgotten. Only the rule should be retained, and, if necessary, written down. Thus the child may come to realize that

grammar is an entity in its own right and in its own nature, indwelling all the manifold examples that language can produce. We should point to this "skeleton"; should, in fact "teach" it boldly; but as the very inner reality by which words take shape and form.

Speech has to be made before we can observe the inner structure by which it is made; just as a creature has to die before we can abstract and study the skeleton. Speech too, has to die, to pass away in being spoken, before we can abstract the inner skeleton on which it shaped itself. Therefore while grammar teaching aims primarily at giving the child a knowledge of the rules, these rules are not given intellectually as something to be learned and applied. *They are already there*, and must be abstracted from the language itself. For instance, if after having begun to teach a child grammar, you talk to him one day about himself, and about how once he was very small, you may get him to describe what his mother used to do for him, and you will probably get such sentences, as "I was washed by my mother" or "I was dressed by my mother". Then if you ask him who does this for him now, he will assert – and with some force, too, as he should – "I wash myself, of course". "I dress myself". And so from an experience of life itself, which can be approached in a living, natural way, one can abstract, or point to the grammatical structure of the active and passive voice, and the nature of reflexive verbs. In this way the child sees what is so important – that, in a way, grammar is not something you have to "learn", for it is there every time you speak. Grammar, on the contrary is something you "discover".

Later, it may – and indeed should – happen that the child will arrive at seeing that this "skeleton" is a wonderful and beautiful structure by itself. It is a naive and ignorant view of the bony skeleton of man that regards it as a thing of horror or ghoulish amusement. All the movements of lovely graceful limbs that are so universally admired are first and foremost the movements of that same skeleton; and all the attempts at representation of the human figure in colour and form, are only possible because to the trained artist-eye that same form has become transparent as it were, so that he sees within it the bony structure underlying it. Indeed there is no reason why the child should not come eventually to look upon the study of grammar as a beautiful and fascinating pursuit in its own right. That surely must, at least, be the teacher's aim.

Books

GREAT MEN OF SCIENCE: A History of Scientific Progress from Pythagoras to the Twentieth Century; *Phillip Lennard*; Bell; 17/6d.

Biography can be the story of what a man does in the world, or what a man does for the world. It can be extremely well worth reading in either case. In the sixty five biographical studies of great men of science contained in this book, the author has concentrated on the latter, amply justifying the subtitle of "a history of scientific progress". But the more personal, biographical details are

also there to remind the scientific reader that these were men also "of like passions" to ourselves, and to provide the imaginative reader with a picture of the human and world conditions in which scientific achievement was made. With the exception of the Greeks, there is an excellent portrait of each scientist mentioned, which are among the clearest reproductions in black and white that we have ever seen. Indeed, in addition to the considerable value of the text as such, the book is also an impressive portrait gallery of great scientists; and the reader may obtain a profound impression of an unexpected kind, by once in a while just taking up the book to study the physiognomy one by one of those represented there. This book is without any doubt an essential item for school libraries. It will appeal alike to the teacher of science and to the young scientific student who wish to obtain a comprehensive view of the development of science.

DANGER ROCK; *Richard Armstrong*; *J. M. Dent and Sons*; 8/6d.

From time to time one still reads of people making long and lonely journeys across great stretches of ocean in craft that seem only suitable for a trip round the pier. Modern liners with their cinemas and swimming baths tend to make us forget that the men who made the sea the world's highway, did so often in the frailest of craft. Such books as Richard Armstrong's 'Danger Rock' will not let any boy who reads it forget that the same courage and resourcefulness which inspired them are still necessary today. It tells how four boys and one man – separated from the rest of their shipmates when their ship, a tramp steamer, struck an iceberg – got away in the ship's jolly boat and set out for Newfoundland. After several weeks spent on a bleak uninhabited island, they hauled their boat over to the southern side of the island, and once again made for the open sea – eventually bringing themselves and their craft all safe and sound into St. John's harbour.

Apart from the vivid and dramatic description of their adventures – the author interweaves the difficulties his young hero experienced by reason of the envy of one of his companions. But that, too, works itself out successfully through the trials they all had to experience. An excellent book for all boys from eleven upwards – especially those who still have a feeling for ships and sailormen.

LOGARITHMEN FUR JEDERMANN; *Ernst Bindel*; *Verlag Freies Geistesleben, Stuttgart*.

This is a new edition of a book first published in 1938. The author is a mathematics teacher of long experience in the Waldorf School, Stuttgart. It is made clear in the foreword that the aim of the book is not to present new mathematical facts. It is to be regarded as a stimulus and help to teachers, who wish to ensure that their pupils shall not feel that what they learn is just so much "unnecessary ballast to be thrown overboard" when they leave school.

A wide range of mathematical facts are touched upon in the book, but all are intimately related to the main theme – indices, the slide rule, spiral curves, compound interest, the exponential function, musical intervals and the Weber-Fechner law of psycho-physics. A mathematics teacher who is able to draw his teaching material from these many domains is more likely to arouse his pupils' interest than one who keeps solely to 'grinding away at log tables'.

MEMORY AND ITS CULTIVATION; Dr. H. Poppelbaum; *New Knowledge Books*; 1/6d.

To those who, having begun a study of Rudolf Steiner's books, sometimes plead for a little clarification, we can heartily recommend anything written by Dr. H. Poppelbaum. His supreme mastery of both the English and German languages, coupled with his wide experience of Anthroposophy, enable him to expound fundamental facts in either tongue, with a clarity and directness shared by few others. In this little book he explains just what is involved in memory-cultivation, without for one moment losing sight, or failing to remind the reader, of its deeper implications.

INFANTILE PARALYSIS (Polio): Its Recognition and Treatment; A Guide for the Layman; Dr. W. zur Linden; *New Knowledge Books*; 1/6d.

The widespread anxiety—if not, in some quarters, real fear and alarm—which the word 'polio' arouses nowadays, will recommend this little book to those who wish to know more about it. The author describes how polio is caught, the course of the illness, how it may be cured and what may be done to prevent it. It is written from the anthroposophical point of view; and the author says, "There is an effective remedy for this disease, and the days when one was helpless against it are past".

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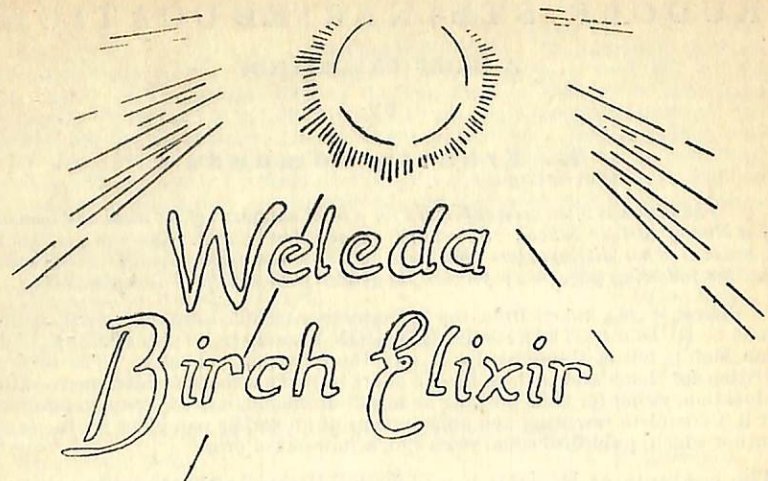
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