MARY EVEREST BOOLE

Collected Works

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III

Lectures on the Logic of Arithmetic

The Preparation of the Child for Science

Indian Thought and Western Science in the Nineteenth Century

Suggestions for Increasing Ethical Stability

"Brotherhood"
1903-1904

Mistletoe and Olive
An Introduction for Children to the Life of Revelation

"East and West"
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1906-1909

Letters to a Reformer's Children

Passive Resisters and the National Church

"The Crank"
1904-1907

LECTURES ON THE LOGIC OF ARITHMETIC, 1903

"Heaven lies about us in our infancy."
"That true Heaven, the recovered Past."

TO LADY LOW

MY DEAR FRIEND,

But for your resolute energy I think I should never have communicated to the educational world the method which I have long used for reviving the faculties of children suffering from mathematical rickets and logical paralysis. These diseases are common; they are induced by the practice of teaching mathematical processes on a hypothesis about the nature of Mathematics directly opposed to that which underlies the original invention and formulation of these processes.

I have, as you know, taken no part in recent attempts to improve methods of teaching, because, as James Hinton said, I can see no use in trying to invent good methods for teaching truth on a basis of falsehood; the only remedy in which I have any faith is to tell the pupil one or two simple laws of the relation of the human mind to Scientific Truth, and then to see that he forms the habit of working in accordance with those laws.

For nearly forty years, authorities of various kinds have been assuring me that it would be impossible to do this except in individual cases; that the public will not tolerate being shown the glowing heart of the mathematical discoverer, will not dare to let itself know to what virgin inspiration it is paying homage when it confers medals and honours on an original mathematician.

Your Ladyship has intervened in the situation, refusing to see objections and difficulties, or to take "no" for an answer. You insist that the public shall at least have the option of deciding for itself whether its children shall know what lies at the heart of genuine Mathematical Science. I must therefore ask you to accept your share of the responsibility of offering to parents and teachers what I fear is after all only a very feeble presentation of Arithmetic treated as a branch of the Art of Thinking, founded on the general Science of the Laws of Thought.

Yours affectionately,
M. E. BOOLE.

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PREFACE

THE motto chosen for the title-page of this little work may seem unsuitable as an Introduction to a course of lessons on Arithmetic; a subject which to many persons seems so eminently un-heavenly and dull. But then, the main reason why it seems so is that their teachers failed to put them in possession of that "Recovered Past," the bearing of which on the Present forms the great clue to that knowledge of subtle forces which gives its possessor the key of the Future.

The present little volume is not intended to interfere with ordinary methods of teaching Arithmetic, or to supersede the books already in use. It can be used under any School system and in conjunction with any text-book. Not more than one chapter is intended for use in any one term; the earlier chapters are suited to little children, the later ones for children of fourteen or fifteen. The lesson for the term may be repeated each week with varying illustrations.

Teachers of such subjects as Electricity complain of the difficulty of getting pupils to apply what they know of Mathematics (at whatever level) to the analysis and manipulation of real forces. It is not that the pupil does not know enough (of Arithmetic, or Algebra, or the Calculus, as the case may be), but he too often does not see, and cannot be got to see, how to apply what he knows. Some faculty has been paralysed during his school-life; he lacks something of what should constitute a living mathematical intelligence. In truth he usually lacks several things.

In the first place, though he knows a good deal about antithesis of operations (e.g. he knows that subtraction is the opposite of addition, division of multiplication, movement in the direction minus x of movement in the direction x, and so on), he has not the habit of observing in what respects antithetic operations

neutralize each other, and in what respects they are cumulative, and surely no habit is more needed than this as preparation for making calculations in electricity or mechanics.

In the next place, he too often knows, about the idea of relevance, only enough to be foggy about it. The reason for this is that his study of the idea of relevance itself began where it ought to have ended ; his attention was never called to it till the stage was reached when it would have been right that he should direct his action in regard to it sub-consciously from long habit, leaving conscious attention free for dealing with the actual elements of some question which is difficult enough to need thinking about. He was not made to grasp the fundamental idea that *a statement may be relevant to one question and irrelevant to another*, till some knotty problem occurred involving consideration of which statements are relevant to the special question in hand. So he had to try to grasp at once the *idea* of relevance and the question, *what* is relevant to what, in a special problem. Such thrusting on the young brain of two difficulties of different kinds at once, is contrary to all accepted canons of Psychology. Examples are here suggested (Lesson XIII) in which there can be no doubt as to what is relevant to the question at issue ; the child's attention is therefore free to focus itself on the idea that there can be facts concerning a thing which in no way concern the particular question which is just now being asked about the thing.

Then again, whatever skill he may have acquired in the manipulation of those notations and formulæ which he has been taught to use, he knows hardly anything about the manner in which such things come into being. Now an applier of Mathematics to real forces should be able, when occasion requires, to modify his notation, or invent a new formula, for himself. He cannot begin to learn how to do this, straight away, while his mind is struggling with problems of electricity or mechanics ; he should have had, from the first, the habit of seeing through formulæ and notations ; of watching them coming into being, of helping to construct them.

The special difficulties found in interesting pupils in Arithmetic are in no way inherent in the nature of the subject ; they belong rather to the domain of medical psychology ; their cause can be fitly described only in the language of that science. However logical may be the course of a teacher's demonstration, *given his premises*, those premises are usually introduced to the pupil under conditions extraordinarily unfavourable to concentration of the attention-power. One can only describe them by saying that if analogous conditions were set up in the stomach-nerves at the beginning of dinner, the result would be lessened appetite and

digestion-power; if in the muscles at the outset of a cricket-match, the running would in consequence be slower, the batting, bowling, and fielding less accurate, and the heart-action more irregular; if in the eye- and finger-nerves before a drawing-lesson, the result would be dazzled sight and trembling fingers.

It may be objected that if this temporary partial paralysis is set up, in the Arithmetic class, only on the occasion of the first presentation of some new idea or principle, i.e. perhaps once in a term or two, it is not frequent enough to induce disease or permanent weakness of the attention-power. But if any condition of nerve disturbance or lowered vitality accompanies the *first* presentation of an idea or object, there is a strong probability that each subsequent contact with that object or idea will produce, by association, a recurrence of similar disturbed action. Thus is set up a habit of scattered attention which retards the development of the faculty of concentration, and makes any real grasp of principles difficult, especially in regard to Mathematics. One main object of the present volume is to present the premises involved in various arithmetical operations in a manner which concentrates instead of scattering the power of attention, and thus leaves the pupils fit to attend to the teacher's reasoning.

My own experience, however, is that a child who has been helped to grasp the premises of a mathematical argument, in any hygienic manner, seldom needs much assistance in making out for himself the logical consequences.

The Preface to a recently issued text-book of Arithmetic* asserts that "the young are always eager for a rule or formula which will save them the trouble of thinking for themselves." The young who are reeling under a blow on the head from a bludgeon may not unnaturally be eager to be taken home to bed in the easiest vehicle at hand; and there is no telling what habits of lethargy might not be generated by a systematic course of such treatment; but the young who have been left in possession of their normal faculties prefer using those faculties in active personal exercise.

Another teacher says† :—

"In stocks and shares the pupil is usually dealing with things the nature of which he does not understand. A little political economy must be drilled into him. Bring the meaning of the abstractions of the subject home to him. . . The great difficulty is in problems. Nothing but stern practice can avail here. Discourage all formulæ. Anybody who knows anything about boys knows that if, by any means under heaven, they can avoid using

**Arithmetic*, Kirkman and Field.

†Workman, "Oxford Junior Local," in *Educational Review*.

their brains and attain the same result by a mechanical application of a formula they will do so. They cling to a formula as to a straw, in the ocean of new ideas in which they are drowning." Exactly so ; children's minds are too often left to clutch at straws "in an ocean of new ideas." If, two or three terms before a pupil has to do with fluctuating values, he had any clear idea why a Bank of England note has a fixed value, it would be easier than it usually is found to make him grasp the meaning of stocks and shares.

The mechanism by means of which man learns is intended to play among the conceptions *Unity, Negation, and Fraction ; Number is less cognate to it.* The kind of fractions dealt with in Arithmetic books is, it is true, too recondite to be thrust on a brain at an early stage. But if mathematical faculty is to develop normally in the youth, the child should have early practice in dealing with the idea of *a unit broken into bits, which fit together to make up a whole.*

Nature provides savages with opportunities for dealing with this idea, to an extent of which it is difficult for us to form any adequate conception. Something *has* or has *not* been caught for dinner ; and when it has been caught it has to be shared and is entirely eaten. Next day the child again sees an animal of the same kind whole. The child's mind plays constantly between the idea *of rabbit* (or whatever animal may be used for food) *whole, rabbit shared, no rabbit ; and again, whole rabbit.* This has a very different effect from what is induced by the sight of a loaf or joint appearing as a matter of course ; a loaf from which every one is helped, the rest being taken away when no longer interesting. This is one of the reasons why an existence uniformly, uninterruptedly prosperous is not always the most favourable to intellectual development.

In all ranks of life, it is true, infants provide themselves with opportunities for exercising the faculty of reconstructing a unit from its fractions, by tearing or breaking things and fitting the bits together again. Our Kindergarten systems to some extent provide for systematic exercise of the same kind by means of various toys. Even there, however, though much practice is given in constructing, too little is given in re-constructing a unit out of its fractions. But in schools the whole provision for this practice, which is the essential fibre of all mental growth, seems left to chance, and too much crowded out.

In Arithmetic, where it is specially important, hardly any opportunity is afforded for practice in swinging the mind between the conceptions Unity, Negation, and Fraction. The mass material of Arithmetic itself (i.e. the art of dealing with numbers) is packed

into the mind artificially ; little or no possibility is provided for it to build itself up by natural accretion round its organic supporting fibre. This tends to induce a condition of what I have called mental rickets.

It is desirable to fix children's minds on the act of Negation as a positive act of mind, to a far larger extent than is usually done. Opportunities for this might be taken in connexion with sums in multiplication and long division ; the zeros should be written in, as statements of fact, for some time after the pupil has grasped the idea that their omission does not actually affect the ultimate answer.

Use might also be made of such exercises as those of Chapter XIII.

Again, the teaching of Arithmetic is much facilitated, if, besides actual exercises on 0 and 1 and very simple fractions, logical exercises parallel to the operations of Arithmetic and constructed on the same models, are carried on in that borderland region where mental operations parallel to those involved in Arithmetic deal with questions of Art, or such simple portions of History, Ethics, or social relations, as come fairly within the scope of a child's intelligence. Each operation of Arithmetic may find its analogue in one of these borderland exercises in Logic.

It is of primary importance that children should clearly distinguish between what they do or recite because they are told to do so, and what they themselves grasp or see. They must do certain things because they are told, and commit to memory facts which they will need to know ; but they should always be taught to distinguish between :

"I repeat this because I was told," and "I see that this is so."

Some of the worst mental habits are induced by the practice of teachers making a statement as if *ex cathedra*, and then proceeding to bring forward proofs of its truth ; this is Euclid's method, but Euclid apparently wrote for grown-up men, perfectly well able to take care of their own minds ; he wrote probably for the best intellects of his time. His method is unsuited to children. If a teacher has anything to say to children as a statement, he should say it, not exactly as dogma which they are bound to believe, but as working hypothesis which they are to assume as a basis for the present. Anything which he intends to prove should never be stated ; children should be led up to find it out for themselves by successive questions. No pains should be spread to keep the two sets of statements apart.

To return to Mr. Workman's complaint of the abuse of formulæ, surely the remedy lies not in discouraging the use of them, but in

encouraging children to use them intelligently and to make them for themselves. They should begin early the practice of entering certain kinds of results in a book. This book may be divided into two parts : anything specially needful to remember, if found out by the children, should be entered in one part ; if told them by the teacher, in the other.

The sentimental people who assert that everything in Arithmetic can be "proved" to children have, usually, no idea of what rigid proof means ; it is not necessary that the child should see the evidence for every hypothesis on which he works ; what is necessary to mental health is a clear understanding of what constitutes evidence, and the power to distinguish between what is, and what is not, proved.

The children should be encouraged to use freely, for reference, any tables or formulæ constructed by themselves. This should be permitted as an indulgence, a labour-saving luxury, the reward for accuracy in recording the results of previous investigation. In private teaching and in very small classes, no child should be allowed to enter any formula into the form-book till he is individually able to work it out unaided. In ordinary class-teaching this may be impossible. In that case the process should be gone over at interval, still the class as a whole can, amongst them, evolve every step. The formula should then be entered by each child in his own form-book ; and the impression should be conveyed that it is the communal work of the class, the expression of its conjoint logical investigation.

The formula-book should begin with a blank form of multiplication-table, which is to be filled in by the child as practice in addition. The operation of multiplying should be introduced to the child's mind in some such way as this :—"Add together four and four and four and four and four." When the addition sum has been done correctly, say :—"You will have to add five fours together very often. You may enter the result in your table-book ; and next time I give you five fours to add together, I will allow you to look for the answer in your book instead of adding."

All the modern higher Mathematics is based on a Calculus of Operations, on Laws of Thought. All Mathematics, from the first, was so in reality ; but the evolvers of the modern higher Calculus have known that it is so. Therefore elementary teachers who, at the present day, persist in thinking about Algebra and Arithmetic as dealing with Laws of Number, and about Geometry as dealing with Laws of Surface and Solid Content, are doing the best that in them lies to put their pupils on the wrong track for reaching in future any true understanding of the higher Algebras. Algebra deals not

with Laws of Number, but with such laws of the human thinking machinery as have been discovered in the course of investigations on number. Plane Geometry deals with such Laws of Thought as have been discovered by men intent on finding out how to measure surface; and solid Geometry with such additional Laws of Thought as were discovered when men began to extend Geometry into three dimensions. The branch of Mathematics called Quaternions deals with such Laws of Thought as reveal themselves during the process of investigating the relations between n and $n + 1$ dimensions. The sooner pupils are made to see all Laws of Arithmetic as Laws of Thought, not of things, the simpler and more satisfactory will their future course be.

This is especially the case with regard to the sign —; it should never be interpreted in any such way as to convey the impression that it indicates negative quantity, subtraction, or diminution of numbers or of things; but always as indicating something about the point of view from which the things or numbers are considered. Neglect of this caution lands one in endless metaphysical contradictions and absurdities. Such for instance as that a rectangular surface becomes $= 0$ if we happen to place the origin of co-ordinates in the middle of it; for it then divides naturally into the four rectangles $X \times Y$, $X \times (-Y)$, $(-X) \times (-Y)$, $(-X) \times Y$. The amount of confusion and hindrance to progress thus induced is sickening to think of.

Teachers seldom observe how early many children are affected by such anomalies as these, or how profoundly they are affected by them. If the same boys who are thus painfully impressed became teachers in their turn, they would no doubt remember their own past experience, and a better mode of presenting the primary conceptions of Arithmetic and Geometry might soon be evolved. But, unfortunately, these logical thinkers are usually repelled by the impossibility of extricating themselves from the network of insincerity, or what seems to them such, give up the study of Mathematics, and betake themselves to some other pursuit. Very much of the waste and confusion which gather round the sign—might be obviated by making children go through such exercises as those given in Chapters VIII and IX.

Much needless difficulty is caused by the attitude of Mathematical teachers towards the symbol ∞ which they often interpret as somehow connected with endless length or exhaustless quantity. The effort to conceive of either endless length or exhaustless quantity is a metaphysical gymnastic very unhealthy for a young mind. It sets up also a set of ideas and connotations quite irrelevant to any use of the symbol ∞ in the higher Mathematics.

∞ has reference not to length or quantity, whether great or small; but to release from certain restrictions to which the values specified as finite have been subject. (See Lesson XV.)

The whole terminology connected with the operations called in Arithmetic books "Multiplication" and "Division" is excessively misleading. The words "multiply" and "divide" might have been invented on purpose to create confusion in passing from integral to fractional Arithmetic.

The continued use of the word "dividend" especially, in Arithmetic, is a symptom of the carelessness of teachers in the matter of avoiding causes of confusion. In old days, when most people who had money hoarded it in the house or deposited it in a bank, till they could use it in some business of their own, the word "dividend" had no connotation for a child's ear, till it was explained to him as "an amount *to be* divided." But in these days of limited liability companies, the word "dividend" is incorrectly but very commonly used, at home in the hearing of children, to indicate a sum of money which is the result, or quotient, of the division and distribution of the year's profits among the shareholders: "I will do so-and-so when my dividends come in," etc. Even if the teacher is careful to explain that the word in the text-book does not mean what it means in common parlance, which not all teachers remember to do, that explanation in itself causes distraction; some word should be chosen which has no misleading associations. Of course children "outgrow" any misapprehension which may be thus caused, and learn that "dividend" has two meanings. But one wonders what teachers suppose is the effect on the mental habits, on the brain tissue, of struggling, for even a few days, to understand division before this discovery has been made! The present writer has not authority to devise a nomenclature; and therefore in this introduction employs that in common use, though under protest. It should be avoided in speaking to the class.

The teacher should, in dealing with any branch of the operation called "multiplication," have in his mind this idea:—"Multiplication" means doing to the operand (multiplicand) what, if done to unity (1), would produce the operator (multiplier).

In dealing with "division" he should keep in his mind the idea:—"Division" means doing to the operand (dividend) what, if done to the operator (divisor), would produce unity (1).

The operation of division should be introduced at first, not as the inverse of multiplication but as a succession of subtractions, thus:—

If five boys are to share twenty apples among them, how many can each boy have? Let us give each boy one apple first; that

takes off ? Five apples. And leaves ? Fifteen. Now we give each boy another apple : that takes off ? Five more. And leaves ? Ten. Another to each boy leaves ? Five. Another to each leaves ? None. So now we have finished. How many times did we go the round and give each boy an apple ? Then each boy has ? Four apples.

A little practice in such successive subtractions should be gained, before the idea is introduced of doing long division straight off. Division should not be treated as the mere inverse of multiplication, but as a way of cutting short a laborious series of subtractions. The child should be led to see that the multiplication table can be used to cut short not only series of similar additions, but also series of similar subtractions. A great deal of the difficulty afterwards found in dealing with such operations as G.C.M. is traceable to neglect of this simple precaution.

The manner in which that most logical of all text-books, Euclid, has been misused to induce illogical habits of mind, repeats itself in most departments of elementary Mathematics. A good instance of such misuse can be shown in connexion with the subject of equivalent fractions (Lesson XVI). Let us suppose that the teacher wishes to prove to the class that three-quarters of one is equal to one-quarter of three. He takes as his unit of thought the concept apple. He too often begins by stating a thing which is not true in itself : viz. that three-quarters of an apple is the same thing as a quarter of three apples. For the purpose with which the teacher's mind is occupied at the moment (the equivalence of fractions), the statement is true ; it is as true as that, from the shop-keeper's point of view, twelve pence are a shilling. But the child, who has not yet been introduced to the conception of equivalence of fractions, is at a point of view quite different. To the child's imagination "great lots of grub" have a fascination quite independent of the size of his own share. To suggest (for instance) that a bun for one child is the same as a hundred buns for a hundred children would be to insult the pupil's understanding and his feelings—feelings which affect him all the more keenly that as yet he does not know how to express them. If he *could* believe you, what would be the meaning of school treats and social picnics ? In proportion as you ultimately induce him to feel that one bun for a child is the same as a hundred buns for a hundred children, he will be, in future, the worse man, citizen, political economist ; and the less fit to apply mathematics to problems in real forces. But we are speaking now of the effect of such statements on his intellectual processes, at the age when his sensations are as yet unwarped. The statement that a quarter of three apples is "the same as" or

"equal to" three-quarters of an apple has brought prominently into the field of his imagination two pictures—an apple, and a group of three apples. The natural way of making an apple equal to three apples is to bring forward two more apples. It is the way things used to be made equal when he was learning addition ; why not now ? The teacher has therefore started him looking out for the two more apples ; and as what is said next does not seem to be tending in that direction, his attention is distracted ; he gives only half his mind to what is said. Thus he fails to get hold of one or more links in the chain of argument. Some children soon recover themselves, and attend to the rest of what is said. And, as the teacher seems to be satisfied with the reasoning and to expect them to be so, they imagine they are so. This helps to form a habit of intellectual dishonesty, of confusing sham proof with real proof. The children who are either less sharp or more logical and thorough look longer for the non-appearing two apples, and miss more links of the chain of proof. These children feel that the whole demonstration has passed in that region where grown-ups conduct a self-satisfied mental life in which children cannot share. Thus are formed habits of "hopeless non-comprehension," perhaps even of "self-protecting and contemptuous non-attention." The chapter on equivalent fractions (Lesson XVI) suggests ways of attacking the problem not open to this objection.

It may occur to some that too much use is made of examples relating to food. But we cannot make mathematicians by insisting upon a non-existing superiority to physical facts. Apple or bun forms the natural unit for a child ; the *sharing* of a cake or fruit is the natural fraction as well as the true introduction to the higher ethical life. As a matter of fact the Arithmetic of grown people is largely occupied over questions of food supply and of personal or family interest. To place children's ideas about such subjects on an honest basis and give them a social direction would surely tend more towards ethicalizing the community than the setting up of topics of fictitious interest, and then teaching children to be satisfied with reasoning which is either imperfect in itself or but partially understood by them. To let the children be thoroughly logical about their own sphere of action among things which they do care about, and deal practically with duties which they must perform is far better training than to encourage them to express opinions about subjects the data of which lie beyond their personal ken.

The pauses of sitting with slack muscles and taking slow quiet breaths, to make mind-pictures, is not intended to supersede the usual permitted "intervals" between lessons ; they are an integral

part of the Logic lesson itself. They, as well as the rest of the scheme here suggested, form, it is believed, the first attempt to adapt to elementary education here the magnificent method of study described in Gratry's *Logique*. A certain element of normal mental life, essential to sound intellectual development, and which can only be received during suspension of the active perceptions of intellect, is being driven out by modern educational grind. This tends to produce a sort of mental and moral rickets, analogous to the physical disease induced by a diet deficient in the bone-forming element. Teachers who have studied any sort of medical psychology bitterly lament that the requirements of existing systems force them to inflict this grievous wrong upon the rising generation. In the present volume, an attempt is made to re-introduce at least a small share of the skeleton-forming elements of mental life, in a manner which does not necessitate disturbing existing arrangements. The author has been kindly assisted in this matter by Mrs. Archer and her pupil Miss Cross, of Coombe Hill School.

English children have now to be taught to relax, to breathe, to see. It is probable that the cultivated art of relaxation will ultimately prove more satisfactory than the mere following of natural impulse to relax.

But it is certain that the teachers who have weeded out the wild growths must see about planting the cultivated ones. Such exercises as those here recommended tend to promote sane and healthy mental action, and to make the discipline of school more organic and harmonious. They have a great fascination for children, as my young friends at Coombe Hill School know. I am sure they will be glad that I am attempting to give to other boys and girls a share in the fun that we had over our little sums.

INTRODUCTORY ADDRESS TO YOUNG TEACHERS

SOME of you may perhaps have seen what are called Japanese Flowers. You buy a penny packet of things which look like rather clumsy wafers, each of which has a fine line round its outer edge. You put one of the wafers into warm water, and (as the printing on the envelope says) "Watch the result." The line round the edge melts and slips off. Then perhaps, from the wafer come out first one little coloured flower, then another, and another. Or there may come out leaves, or sea-weed. The change seems wonderful, but the explanation of it is simple enough: some one in Japan, by great care and skill, made each leaf and flower; then they were linked together by stalks made of thread, and then the whole set was rolled up into a tight form convenient for carrying about, and fastened round with a little strip of paper. And we have to put

them into warm water which acts as a *solvent* (that is to say, a melter), before we can see how pretty they are.

Arithmetic seems to some people dry and un-beautiful; but that is because they have not soaked it in that solvent which is called sympathy. If we had sympathy with the struggles and labours of others, Arithmetic would be easier to understand and pleasanter to learn than many children find it.

It must, however, be distinctly understood that any of the following lessons are to be omitted or modified, if, in the judgment of the teacher, it is unsuited to the condition of the class.

This remark applies especially to Lesson I. If the discipline of the class is in such condition that the teacher would not find it easy to restore order after a burst of laughter, he may suggest to the children, in some quieter way than that here given, that men held up all their fingers, as a way of saying "Many," before they had learned to count how many. But my own experience and that of several of my friends is that the dramatic introduction of the savage element, where this can be safely permitted, has a wonderful effect in conquering the apathy of which so many teachers complain, and making Arithmetic real and living. This remark applies to children of all ages, and at all social levels.

In this book you will find no long sums. The following caution may be found of use in dealing with those which you set from the ordinary text-books. Children should be carefully taught to suspend attention at proper pausing-places; as, for instance, at the ends of lines, in multiplication, long division, practice, or equations. Just as, in reading aloud, one must take breath at suitable stopping-places, or one will be driven to stop for breath involuntarily at the wrong place, so it is with the attention-power in Mathematical work: if it is not trained to take a moment's rest at the right place, it rests itself (or, as we say, "the mind wanders") in the middle of a line of figures; a wrong figure is written down during the lapse, and sets the whole sum wrong. This acts very unfavourably on those children who have specially short-breathed attention-power; who are often, otherwise, the cleverest, and might become, if properly trained, the most intelligent mathematicians. On the other hand, a training in the proper care of the attention-power is good for all children alike.

I

HOW MEN LEARNED IN OLD TIMES

You have heard, my dears, that, a long time ago, there were no people in this country except savages. Perhaps some of you have read that delightful book, *The Story of Ab*; or you may have seen the picture of a savage with his wife and baby, at the beginning of Clodd's book, *Primitive Man*.

How do you think children learned lessons in those days? Do you think Ab's wife ever told little Mok to wash his face and

hands,* and come to lessons ? Do you think that the hairy woman in Clodd's book ever called out to her boy : "The school bell is ringing ; make haste, or you will be late ?" Oh ! no ; nothing of that sort ever happened at that time. Yet the children did not grow up quite ignorant. We are going to have a little talk to-day about how people learned in those days, and what sort of teachers they had to make them learn.

Why do the monkeys in the Zoological Gardens like climbing on their ropes ? Why is it found good for the health of children to climb the gymnasium ladder and cling to the bar by their hands ? Why do most of you enjoy doing so as soon as you have got a little practice at it ? Why do dogs not climb ladders or ropes, and why is it not found good for their health to teach them to do so ? You and the monkeys had ancestors who climbed trees in order to be out of the way of wild beasts of the dog kind. These ancestors of yours forced themselves to learn to climb, by great labour and effort, driven by great fear and desperate need. But they went on, generation after generation, trying and trying, till it came quite easy and pleasant, till they could climb for pleasure and fun. And that has worked into the very muscles of your flesh and the blood of your veins, the power and the wish to climb. But the dogs seem to have had no ancestors who learned to climb ; when their ancestors were afraid of enemies, they protected themselves in some different way. Primitive Man climbed trees quite easily, and so did Ab, and Ab's wife, and Mrs. Primitive Man ; they carried their babies up trees till the babies were old enough to learn how to go up, and then the mothers made the children learn. And all that has helped to make climbing natural and good for children now.

But another thing was happening at the same time. Have you noticed what sort of words a child learns first ? Names of *things*, or names of *numbers* ? For instance, if a child of about a year and a half old saw six birds on a wall, would he say "Six," or would he say "Dickie-birds ?" You know that he would say "Dickie-birds" much earlier in his life than he could count "six." Well, savages of very long ago, such as Primitive Man, could not talk as we do ; indeed, one name for them is "Speechless Man." But they must have had words or grunts or growls or signs of some sort for some few things ; even a hen can tell her chickens that she has found

*In old Miracle Plays the first woman is represented as calling her boys in to wash their hands and brush their hair, because to-morrow will be Sunday and they will be examined on the Catechism. The future villain of the piece initiates his evil career by some such breach of good manners as taking off his cap with his left hand ! These and countless other literary phenomena of the same kind go to show how far astray the uninstructed imagination goes in its presentation of historic data ; and how necessary it is to take frequent opportunities of pulling it into line with the reality of things.

food, or that she sees a hawk. We may be sure that Primitive Man could tell his wife that there was a wolf near when he could not say "Six wolves." Perhaps he said "Woo-oo-oo-oo" by way of a sort of imitation of a wolf's howl.

And presently he began to find out that it would be convenient if he could somehow tell his wife whether there was one wolf or many. He had no words, as yet, to tell her with.

Now what does an omnibus conductor do, when you have heard, or guessed, that he said "Fares, please!"; but, because of the rattling noise, he cannot make you understand whether your particular fare is two pence or three? He holds up fingers. Can we not fancy Primitive Man doing that? If he said his word or grunt for wolf, and held up one finger, that might mean: "Just stand behind me with baby, my dear, while I kill the wolf with a stone." But if he spread out all his fingers, that might mean: "Let us get up the tree quick; for there are more wolves coming along than you and I can manage."

We see now that the savages of long ago had teachers; though they had neither desks nor books nor school bells. Outside of themselves there were wild beasts which taught them to be sharp and try to escape danger. Inside of them they had feelings which taught them that it is not always enough to climb up a tree by oneself, that they must help each other and take care of the baby. And, between the two sets of teachers, they somehow learned to say "One" and "Many" on the fingers of their hands. Neither set of teachers could have taught them alone; neither the wolves outside them nor the feelings inside. But between the two sets, the savages learned their lesson so well that, to this very day, we have never forgotten it. Children count on fingers still, unless there is some reason for using counters instead.

Poor Mrs. Primitive Man, and all the rest of our wild ancestors! I often think of them when I am puzzled and worried myself. They little guessed what delightful gymnastics they were preparing for you children, or what a convenient way of doing sums they were helping to prepare for us all, by their care of their babies and by their brave struggles against laziness and cowardice. Perhaps, thousands of years hence, people will be enjoying some wonderful science or delightful art, of which we now have no notion at all; and will be looking back with thankfulness to the struggles and troubles of us now, which are preparing for their enjoyment.

Now before you go to the next lesson and forget this one, I want you to make a picture in your minds that you will remember in after life.

Shut your eyes; lean back comfortably in your seats. Let your

hands lie quite slack on your laps. Take a few long easy breaths. Now then.

(The Teacher should read the following with a pause between each sentence.)

Think of the funny hairy man in Clodd's book. See him start suddenly. He calls out: "Woo-oo-oo-oo." The little ones may call out "Woo-oo-oo-oo" if they like. Now be quiet again. He calls out "Woo-oo-oo," and puts up his hands with all his fingers spread out. His wife comes out of her dreamy mood. Jumps up and carries her baby to the foot of the tree. Clasps the baby between her long hind feet. Climbs the tree like a monkey by her hands only. The man climbs after her. When they have reached a high branch, she takes baby in her arms: she and the man sit side by side, and wait till the wolves have gone by.

(Two or three minutes should now be spent in silence, sitting at ease, before the class breaks up. Attention should be paid to relaxation of that muscular tension which accompanies all active attention to external facts.

Modern children are fast forgetting the secret of slow, deep natural breathing, as well as that relaxed attitude and meditative picture-soakage which is one of Nature's most powerful educators. The loss of these things is probably one great factor in the failure of modern educational schemes.

As the sudden rush from active attention to one topic to active attention to another is in itself bad for the young brain, the last few minutes of each class seems a good opportunity for practising concentration.

The above method for impressing mind-pictures on children is an adaptation, suited to ordinary class teaching, of a more elaborate method carried out at Coombe Hill School.)

II

ON COUNTING BY TENS

BLACK-BOARD

WHAT is this, 1? And this, 2? And this, 3? (and so on), and this, 9?

Now I want to write ten: how shall I do it?

Put 1 and 0.

But what has ten done to be different from the rest?

Why should it have two signs instead of one like its neighbours? and why does it take signs belonging to its neighbours, instead of having one of its own?

Did ten ask to have two signs ? Did it wish to have two ? No ; then why do we give it two ?

I once asked a young friend of mine why he did something in his sum ; and he answered : "My reason is that I was told to do it at school ; but I know I ought to have another reason, and I know I haven't." I thought that was a sensible answer. It applies to most things in arithmetic : your reason for writing ten with two signs is that your teachers told you to do so ; their reason for telling you to do so is that it has been found a convenient and suitable way for people to write ten. But there is a reason why it is suitable and convenient, and you ought to know that reason. All your sums will seem to you more interesting, and, I think, easier, when you know it.

We have seen under what sort of pressure people must have found out how to tell each other that there were *one* or *many* wild beasts. But when once they had learned that much, they could apply it further. By-and-by they began to keep flocks of sheep or goats, and they made stone walls to fence in the sheep by night, so that wolves could not get at them. Perhaps they might wish to count their flocks, to see if all the animals were safe in for the night ; or one man might wish to sell his sheep to another. Well, at first the owner might count by putting up a finger for each sheep, as it passed in through the gap in the fence. That did very well up to ten. But what next ? How could he show anybody that there were sixteen sheep or twenty-nine sheep ? He might put up all his fingers for ten, and then put them down ; and then put up six fingers for the other six sheep, that would mean sixteen. He might put up all his fingers twice for two tens, and then nine fingers ; that would mean twenty-nine.

But if he had many tens of sheep, he might lose count of the number of times he put his hands up and down. What was to be done about that ?

The man who had very many sheep to count must contrive somehow to make a mark for each time he put his hands up.

There was no paper in those days, no pens or pencils, not even balls strung on wires such as we see in some infant schools. I believe people had not even names for more than a very few numbers. There are still people in the Malay Islands who have no names for any numbers except one, two, and three. People had to think about keeping flocks in order to be sure of having food and clothes for their families, before they began thinking about what was the best way of doing sums ! What they wanted was to make sure somehow that all the sheep they sent out in the morning were safe inside the fence at night. There was a quicker way to manage that

than inventing figures, and finding out how to make pencils. The man could call up his little daughter, who had no school to go to, and say to her: "Would you like to help Daddy count the sheep? Just stand nice and quiet beside me, and I'll tell you presently what to do." Then each time he finished putting up all his fingers, he would make her put up one finger, till all the sheep had passed out. Then he would look well at his own fingers and the little girl's, and make a picture on his mind of how they looked. Then he would perhaps say: "Now dear, when the sheep come home we must get our hands looking just like this; and we must not be satisfied till they do." In the evening, if his hands and hers looked as they did in the morning, he could take her in to supper, and have a game of play with her, and then go to bed quite happy, because all his sheep were safe in for the night. But if either he or she had too few fingers up, and no more sheep seemed coming in, he knew that he must send her in to her mother, and call his big son, and go out on the moor to look for the rest of the sheep.

Now I think we had better spell a number in the way that the shepherd and his child did; then you will know better what sort of way it was. Tom, come here, please; stand at the right hand of the class; you shall play at being the shepherd. Jane, you stand at the left side of the class; you shall play at being the daughter. I cannot let the rest of you rush about pretending to be sheep, in school; you can do that in the playground if you like; but, in school, I will say "sheep," and you children must try to make a mind picture of sheep going out through a gateway, one by one, as fast as I count. Tom, every time I say "sheep," put up a thumb or finger. Jane, wait till I tell you what to do. Now, Tom:—

★ One sheep; two sheep; three sheep; four sheep; five sheep; six sheep; seven sheep; eight sheep; nine sheep; ten sheep.

Now you have no more fingers to put up. Hold your hands up high, and show the class that you have no more fingers left to count with. Put your hands down. Jane, put up one finger; that means that Tom has put up all his fingers once. Hold it high up for a minute, for the class to see that you have one finger up. Now, you need not keep your hand so high any longer, it would make your shoulder ache; but keep that finger out steadily all the time till I tell you to leave off. Now Tom: One sheep (*repeat* ★).

Hands down, Tom. Jane, put up one more finger to show that Tom has gone over all his fingers once more. Tom, one sheep (*repeat* ★).

Hands down, Tom. Jane, one finger more. Tom, one sheep; two sheep; three sheep; four sheep; five sheep; six sheep; seven sheep.

Now, both of you, hold your hands high, so that the class can see them. How many fingers has Jane got up ? Three. And each of the fingers means ? That Tom has counted ten on his fingers. So Tom has counted ten three times ; how many does that make ? Ten three times ? Thirty. That is right. But Tom has done something else besides putting up ten fingers three times ; he has also put up seven fingers besides. How many sheep has he counted then ? Thirty-seven. We will pretend that this is early morning and the sheep have just gone out to feed. Look well at the hands. When the sheep come home at night, the hands must look just so, or else the shepherd cannot go happily to bed ; he must go and see where the missing sheep are.

If you play that game out of school, you can play at counting other numbers ; forty, fifty, seventy, ninety sheep. But that would take too long now.

For many, many generations people had only fingers to count with ; and, all that time, one finger of some other person may have stood for ten fingers of the person counting. So, at last, when people found out how to write, it *came natural* to them to make one in the left-hand place of the paper stand for ten in the right-hand place, just as it comes natural to monkeys and boys to climb things, because their forefathers had done it for so long that they did it without much thinking about it. It seemed easier to do it that way than to think about any other way ; the inclination to do it so had got worked into the very marrow of their brains. And so, when they came to want to reckon more than ten tens, they put the figure for ten tens in a fresh place ; and that is what we call the hundreds' place of a row of figures. And so they went on and on, making fresh places for the different *powers* of ten (as some people call it) because their great-grandfathers had ten fingers to count with.

Now we come back to the questions we started with just now. Why does ten have two signs belonging to other numbers instead of one sign of its own ? It does not ; it has one sign. Its sign is a "1," *written in the tens' place,* and that means : once the hands are put down, after counting ten, in order to begin counting over again. When we write twelve, which means ten-two, we write it so "12" ; that is, one ten or one double-hand, and two in the place of units as we call them. But if there are no things over, no units, we say so ; we put 0 in the units' place. That helps to remind the writer, and to show to other people, that the 1 stands for one ten, not one thing.

If ever you are teaching a baby brother or sister to count, there

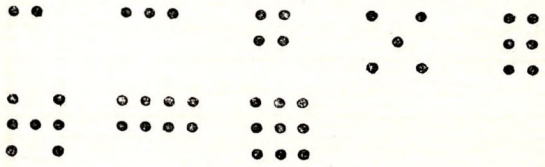
are three things I should like you to be careful about. Never teach a baby to say "one, two, three," like a parrot ; always teach him to count *things*. If you have no counters, use some sort of blocks, or bricks, or collect little pebbles, or buttons. (Only then you must be careful not to let him swallow them.) Or he might count your fingers and toes, or the railings. But it is best to have things he can shift about, such as buttons ; and let him push each, as he counts it, from the uncounted heap to the counted heap. Never make a little child say "eleven, twelve" ; always tell him to say "ten-one ; ten-two ; ten-three ; ten-four" ; grown-up people say "eleven, twelve," and now you are old enough to go to school, you must do the same ; but a little child should always say "ten-one ; ten-two" ; like "twenty-one, twenty-two." And as soon as he has counted ten things, make him put them in a little box or in a heap by themselves ; that will make him understand what he is about much better than most little children do. And then you can tell him the stories about Mr. and Mrs. Primitive Man, and the baby, and the wolves ; and about the shepherd and his little daughter.

III

WHY WE DO NOT ALWAYS DO SUMS THE WAY THAT COMES NATURAL

It is often best to do things the way that "comes natural," as long as there is no reason for altering it. Very many things have to be altered as we become civilized and have to live in towns. It comes natural to children to count on their fingers, but they have to be made to use counters or blocks instead, because counters can be arranged in convenient patterns :—

BLACK-BOARD



Whereas fingers are much less convenient.

It came natural to bees to make round cells, because their forefathers had made little holes by rubbing their bodies round ; but when the bees took to living a great many of them in one hole, they had to be stopped doing what was natural, and made to learn to fit their cells into each other, because it saved room and was more convenient. Poor little bees ! They didn't at first like learning the new way of making cells, I dare say ; but they had to. It comes natural to you to do some things that have to be stopped because they are inconvenient. It comes natural to a baby to grab with its hands at everything it wants ; but it has to be taught to eat properly with a spoon. There are such quantities of things that we must alter, that it is generally best to go on doing things in the old way until a reason comes for altering them. It would take a good deal of trouble now to learn to count ordinary things otherwise than in tens. There is no particular reason why we should do so, so we all go on counting by tens ; and you were made to learn to do the same. Half the use of school is that children should learn which things they had better do the way that their forefathers did them, and which things we must now learn to do in some other way.

Once upon a time a dear little girl about a year old was sitting on her mother's lap, and a bright teapot full of hot water was on the table close by. It comes *natural* to babies to try to get hold of anything bright that they see. So this baby put out her hand towards the teapot. Mother said "No," and pushed the little hand away. But baby thought she *would* do what was natural ; she screamed and put out her hand again. Mother began to think that if baby was so anxious to get at the bright things, she might make a grab at the candle or the lamp some evening, or crawl to the fire, and have a bad accident. So she thought she would let baby have her way at once, when it could not do any real harm ; she pretended to give in, and let baby touch the teapot. It was very hot. It did not actually injure the child. But somehow, after that, baby understood why it isn't always nice and comfortable to do just what comes natural !

You know that we must do sums in certain ways because we are told to do them so ; but also we ought, when we can, to have another reason. It is a good thing to play sometimes, when it does not matter, at doing a sum the "wrong" way, the upside-down way to what we have been taught ; then we find out why we were taught a way that does not seem natural. We are going to do that to-day.

Suppose I have in my purse a shilling and two pence ; and some one pays me two shillings and three pence, how shall I write the account of what it ought to come to ?

BLACK-BOARD

s.	*d.*
1	2
2	3

"Three pence and two pence are . . ."

Stop a minute. Which does one care most about, the pence or the shillings? The shillings. Well, why don't we reckon the shillings first? "It is the wrong way." Why is it the wrong way? Would it make the sum come wrong?

(Usually some children in a class think it would make the sum come wrong.)

Well, we are only playing to-day, it does not matter if the sum does come wrong. Let us try.

One shilling and two shillings make three shillings. Two pence and three pence make five pence.

s.	*d.*
3	5

That is the answer we get by beginning at the shillings end. Now let us try beginning at the pence end, as we are told is the right way at lessons. Two pence and three pence make five pence; one shilling and two shillings make three shillings. So we have five pence and three shillings. Does that come to the same as three shillings and five pence? Yes. And "three and five pence" is more natural to say than five pence and three shillings. Then why are we taught to do the sums in the way that is not natural, since both ways come to the same answer?

We must find out if we can. We must know the real reasons for things when we can. Let us try another sum :—

BLACK-BOARD

s.	*d.*
2	6
3	8

Three shillings and two shillings make five shillings. Eight pence and six pence make fourteen pence. How do we write fourteen pence? Two pence and one shilling. Where must we put the one shilling? Along with the five shillings. So now our sum looks like this :—

s.	*d.*	(*a*)
2	6	
3	8	
5	2	
6		

or else like this

s.	*d.*	(*b*)
2	6	
3	8	
5		
1	2	

Now let us do the sum the way we are shown at lessons. Eight and six are fourteen. Put down two pence and carry one shilling; one shilling and three make four; four and two make six. We have our sum looking so :—

s.	*d.*	(*c*)
2	6	
3	8	
6	2	

*Now do you see why you were told to do addition sums in a way that is not the natural way? Fancy if a shopman gave us our bills all crowded up with scratchings out and extra figures at every turn, like (*a*) or (*b*)! It is necessary that you should learn, while you are young, to do some things in the way that you would not think natural. Your teachers pick out for you which way you must do them in class; they have experience and know; but in holidays you may always try doing easy sums the upside-down way to the way you are told in school, so as to gain experience for yourselves, and find out the reasons of the school rules.

It is not safe to experiment, while you are young, with real things—with fire or food or your own bodies, because you might do harm that could not be undone. But sums can be wiped off or scratched out, when you get them in a muddle; so they are capital things to experiment with, and great fun too; and you will understand your real work at school much better if you experi-

At * the teacher may interpolate other examples of beginning sums at the wrong end, taking an easy example of subtraction, multiplication, and short division

ment in play. Always do your school-work, in term-time, exactly as your teacher tells you ; that is the way to grow smart and handy and useful. In holidays, do easy sums the upside-down way to the school way. That is the way to understand your work, and grow clever enough to find out things for yourself.

Look well at the black-board. Now shut your eyes and settle at ease.

Can you see in your minds the sums (*a*) and (*b*) (and any others that may have been done in roundabout ways)? If not, open your eyes and look. Shut your eyes again. What do you see ?

IV

ARITHMETICAL SHORTHAND

BLACK-BOARD

12 buttons are a dozen.
12 pence are a shilling.

Are those statements true ?
Are they both true ?
Are they always true ?
Are they true in the same sense ?
Let us see.

Suppose you go into a shop and say : "I want a dozen of those buttons, please," and a friend says : "And I will take twelve of the same buttons, please," do your two purchases look alike ? Would the two lots weigh the same ? Would the owner of one of the lots be any the worse or the better off, if the parcels were changed by accident ? If the twelve buttons were sewn on to your coat, would any one know that they were not the dozen ? If we wanted to play a game with twelve counters and had no proper counters, we might use the twelve buttons for counters ; would the dozen do instead ? Yes, just as well. The dozen is twelve, and twelve is a dozen ; and for every purpose for which one could be used, the other would do just as well.

You say twelve pence are a shilling. Do they look like a shilling ? Are they the same colour, size, weight ? If I wanted things to use instead of counters, I might use twelve pennies : would a shilling do instead ? No. Sometimes in cooking, if we have not small weights, we use a coin as a weight ; we might be told in a cookery book to take the weight of a sixpence or shilling of carbo-

nate of soda or of some spice. How would it be if we used twelve pence instead ?

Twelve pence are not a shilling, not in any way like a shilling. Why do you say they are a shilling ? They are of the same value. Value for what ? Not for counters, nor for weighing things.

Twelve pence are of the same value as a shilling when we want to buy things. Yes, now we have it right ; twelve pence are not a shilling, and cannot be used instead of a shilling for any real use of the things themselves. But the chief purpose of coins is to exchange for other things ; and, *for that purpose*, twelve pence are of the same value as a shilling.

Then if that is what we mean, why don't we say so ? Why do we say "Twelve pence are a shilling," when we don't mean it ?

Ah ! why ? Now we have come to something which it is very important you children should understand and remember.

Think how often, in your arithmetic, you have to make the change from pence to a shilling or from a shilling to pence. How would it be if the teacher had to stop every time and say, "It is arranged by law, that, for purposes of buying and selling, twelve pence shall be considered as of the same value as one shilling" ? The teacher would be tired of saying it ; you would be tired of hearing it ; it would waste time, and disturb you from attending to your lessons ; so it has been arranged that people may always say, "Twelve pence are a shilling," for shortness, whenever the business on hand is using coins as money, or talking of them as money, as things to buy other things with ; but not when any other business is on hand.

"Twelve buttons are a dozen" is true always, everywhere where people are speaking English, whatever use they mean to make of the buttons. But "twelve pence are a shilling" is not really true in itself ; it is true as far as the business on hand is concerned, whenever people are talking about using coins to buy things with.

You might go some day to a class in what is called physical science, where the business on hand is learning about the weights of things or the qualities of things ; or to a class in cookery. If the teacher told you to go and fetch a dozen bottles, and you came back and said, "Here are the twelve bottles you sent me for," nothing would be said about it ; you would be all right. But if the teacher told you to take the weight of a shilling in some powder, or to take as much as would lie on a shilling, or to see what effect some liquid had when it touched a shilling, and he found you using twelve pennies instead, there would be something said to you then ! You would perhaps be told that you never could learn

anything while you were so stupid and clumsy and inaccurate.

I don't suppose you would ever make just that particular mistake. But I have known many children hopelessly puzzled over sums and other things ; and, when I came to see what puzzled them, I found they had been taking something some teacher had said, as meant to be true in itself, when it was only a shorthand sort of sentence which meant something else : a shorthand which was true for one purpose but not for another.

Try to understand always whether your teacher means what he says to be true always and everywhere ; or whether he means it as a bit of shorthand talk fit for that particular class If you cannot find out for yourself, ask. Never go on using a sentence till you are sure whether it is meant for literal truth or convenient shorthand. Think of the 1, the stroke which the old people cut on their tallies, and which meant, not one thing, but once putting all the fingers up and then down so as to begin counting again. Arithmetic is full, from beginning to end, of just such nice, clever convenient bits of shorthand as that. Sums are difficult and puzzling chiefly because children forget this.

V

KEEPING ACCOUNTS

Suppose you have a shilling and spend three-pence, what have you left ? Nine-pence. Is that all that is left ?

Suppose that you go out with a shilling in your purse and spend three-pence on buying flower-roots, what do you bring back ? Nine-pence in your purse. Anything else ? Anything not in the purse ? The roots. Well, is that an end of the matter ? What is to happen next ? The roots have to be planted, and then watered ; or else they will die, and you will have wasted your money.

You might have bought something else, not roots. But whatever you did with part of your money, something of some sort is left besides the change. If you bought food, it would be there ; and must be seen to that it might not be wasted. If you ate the food while you were out, you would bring back the strength you got out of it ; or if it was unwholesome food, you might bring home nine-pence and some very uncomfortable feelings. Whenever money has been spent, something remains besides the mere balance of cash.

Yet if you have been taught to keep accounts, or if a grown-up person allows you to see how she keeps accounts, you know

that when the money spent one week has been subtracted from the cash in hand, the page on which the things bought during the week have been written down is turned over, and only the remaining cash is entered on the new page for next week.

Now shut your eyes for a minute or two, and think. See an account-book. On one page is written :

"Mother gave me 1s."

On the other page is written :

"Plants, 3d."

You subtract the 3d. from the shilling, and write 9d. Then you turn over the leaf, and on the next page you write, "Brought over : 9d." The writing about the plants is hidden out of sight ; nothing is on the open page except the account of the money still left in your purse. The roots are not in sight ; they are in another room, waiting till you can go to them. But they have not gone out of the world : they are there, waiting ; and you will have to see to them presently. Then why is nothing written about them in the new page of the account-book ? Think about that a little, and we will have a lesson about it next time.

VI

DISMEMBERING AND RE-COLLECTING

THE question you were to think over was : Why, when we turn over a page in an account-book, we enter on the next page nothing that was on the last page, except the balance in cash ; we make no mention of the things bought last week, though those things may still be left for us to deal with. The plants we bought last week still need watering ; part of the food we bought may be there still to eat ; the strength we got out of what we ate may remain to be used ; the illness we got if the food was unwholesome may be still uncured. Yet we make no mention of these things in this week's accounts.

Why not ?

I think you feel why not, though perhaps you cannnot quite explain it. To-day we are going to have a little talk about that question.

Human beings, you and I for instance, are finite creatures ; that is to say, we cannot be everywhere at once or do many things at once. Our bodies are made so that we can see only a short way across our big world ; and our minds are made so that we can only attend to a small part of any big business at once. All

the rules of Arithmetic are made to help us to do big sums by attending to little bits at a time. If our minds were bigger we could do big sums, straight off, without any rules ; but, as it is, we have to attend to a bit at a time ; and the rules are made in order to fit the bits together properly. It is not only sums that have to be attended to a bit at a time, in proper order according to rule. Suppose you are going to a school-treat or picnic. If you were fairies, you could start off straight away ; and the proper clothes and boots would grow on you, if you needed them, as you flew along. But you are not fairies, so the clothes and boots have to be put on first, and carefully too, or you cannot go. Suppose you were thinking about what you would do out of doors, and not tying up your boot-laces properly, mother might say : "Come, attend to your boot-laces now ; and when they are tied up safely, you can think of out of doors." But "out of doors" has not gone away because you have to put it out of your mind for a little while and attend to your boot-laces. It is waiting, waiting, till you are at leisure to attend to it. So it is always. When we put anything out of sight and out of mind, in order to attend to something which for the moment we must attend to, the thing we put out of mind is not gone out of the world ; in some shape or form it is waiting, waiting, waiting, and will have to be reckoned with some time or other.

Now we will do a little sum.

How many days has a man lived who has lived forty-seven years ?

If I asked you how many days a child has lived who has lived two weeks, you could tell me straight off, without any need to write on the black-board. There are how many days in a week ? (7) and twice 7 are ? (14). If your minds were giant minds, you could answer the other question, about the days in forty-seven years, just as easily as that one. But we, you and I, have such tiny, helpless little minds that we cannot manage a question like that. If we were giants we could pick pears off the top of a very big tree ; but human people have to climb up on ladders to reach high-growing pears. And in the same way we have to make a sort of mind-ladder before we can reach such big numbers as the days of forty-seven years. What are we going to do ? Write on the board. Yes ; tell me what I am to write.

A 3 and a 6 and a 5. And then, underneath, a 4 and a 7.

What does the 3 stand for ? Three hundreds of days. And the 6 ? Six tens of days. The 5 ? Five single days. The 4 ? Four tens of years. And the 7 ? Seven years.

Now tell me what I am to write. Seven times five are thirty-

five . . . Why, what are you about ? I asked you to find the number of days in forty-seven whole years ; and here you are, telling me how many days seven times five days are.

Had you *forgotten* the hundreds of days and the tens of days and the forty years ? Yes, for the moment ; we had to forget them, to push them out of our minds, so that we could attend properly to just the bit we were doing at a time. Go on then, seven times five are 35. There, I have written that down. Have we done now ? Is the sum right ? Will you go home and tell your mothers that you have found out at school how many days there are in forty-seven years, and there are just thirty-five days in all those years ? Much good there would be in going to a school where that sort of thing was allowed ! Thirty-five is only the first rung of the ladder ; we haven't reached our answer yet. The three hundreds of days and the six tens of days and the forty years are waiting quietly, till we have finished attending to the seven times five ; next it will be the turn of seven times six tens to be attended to, while the hundreds are waiting, waiting. And now we multiply the three hundreds by seven ; and all this time the forty years are waiting, waiting, waiting, still.

Well, now we have attended to each bit, and here are all our bits written down, one under the other.* But which of all the bits is the answer ? Which is the true right answer to the question we began about ?

Alice, you say, $7 \times 6 = 42$. And, Mary, you think that $4 \times 5 = 20$. And, Julia, your opinion is that $4 \times 6 = 24$.

Which is the true view of the matter ? Are you going to quarrel about which is right ? Or would you rather have a nice long solemn argument, each trying to prove that she has the true, the only true, answer to the question I asked ?

You won't do either ? Well then, what will you do ? We must fit them all together to see what they all come to, before we have a right to tell people how many days there are in forty-seven years ; because our minds are so tiny, and the number of the days of the years are so very, very big. We have to make ourselves forget some things while we attend to other things ; but before we dare tell any one that we have found the actual truth, we must call back all that we made ourselves forget, and try to re-collect.

Well then, 2 and 4 are 6 ; and 1 are seven. Is that right ? No ? Why not ? Some of the figures mean hundreds and some tens and some only single days, and we must sort them properly before we fit them together, and arrange them so that each sort of figure shall stand for its true value.

*See note at end of chapter.

Now we understand better the question about the account-book. The use of the book is to keep account of money. Our minds are so small that we cannot think of cash accounts and other things at the same time. We wrote down once: "Plants, 3d.," because we may some day wish to look back and see what different things cost us; but once writing it was enough: we do not wish to be constantly reminded of plants and other nice things, while we are busy adding up accounts; we try to forget the things and attend to the cash accounts, just while we are using that book. But when we have done the accounts and shut up the books, we should recollect the things; for everything that we have spent money on is still somewhere, in some shape or form, waiting, waiting, waiting.

And when we go to recollect the things, we must try to arrange them in their proper order so as to give to each its true value and meaning.

That is enough for to-day. Sit slack, shut your eyes, and rest before you go to the next class. I am going to give you two mind-pictures:

A little boy was so excited about going to a treat that he would keep talking about it, and would not tie his shoe-laces properly. On his way downstairs his lace came untied; he stepped on it and fell and sprained his ankle, so he could not go to the treat after all.

A servant was asked to get some children dressed to go out. She got them tidy, and their boots nicely cleaned and tied on; the children felt impatient because they were in a hurry to go out; but they knew they could not go till they were dressed, so they were good and quiet. When they were ready, they thought they were to go. But the nurse grumbled and said: "Now you are dressed and all tidy and clean, I don't want you to go out, for fear you should tumble your hair or get your boots dirty. I was told to dress you, and I have dressed you: that was the important thing; that was my real duty. Going out is all nonsense. Sit still all the afternoon, and look at your nice clean boots."

Try to fancy how those children would feel, and what they would think. Try for a minute or two to fancy yourselves in the place of those children, and to think what you would feel like.

Now open eyes and stand up. Go and get ready for the History Class.

NOTE.

The answers had better be written on the board at first in this form :

$$\begin{aligned} 7 \times 5 &= 35. \\ 7 \times 6 &= 42. \\ 7 \times 3 &= 21. \\ 4 \times 5 &= 20. \\ 4 \times 6 &= 24. \\ 4 \times 3 &= 12. \end{aligned}$$

VII

WEIGHTS AND MEASURES

On the Table :—A set of weights, one-ounce, two-ounce, four-ounce, half-a-pound, one-pound.

WHAT is this ? A weight. What weight ? An ounce. What is it for ? To weigh things with. Yes, this ounce weight is one of the things that has no proper use of its own ; its use is to make other things more useful by keeping them exact and orderly.

Let us think of the uses of weights. They are used in shops, for the shopman to know exactly how much sugar or tea or meat he is to give for his customer's money.

But they have another use as well.

Very long ago people had no notion how to make cakes or puddings. When they caught an animal, they roasted it by a fire ; and when they found roots fit to eat, they roasted them in hot ashes ; and that was all they knew about cooking. Then they found out how to make pots of some kind, and then they found they could boil things in water. Gradually they found that some things improve the taste of other things, when they are boiled together ; salt improves soup, and sugar improves puddings. But there must not be too much of one sort of flavouring. People began to try to find out how much of each kind of thing made the nicest mixture. They could find out only by trying. That is what we call experiment : a woman finds the soup too salt or not salt enough one day, she thinks it nicer when she puts in less salt or more salt ; then she tries to remember for the future what is the right quantity.

But it is a pity for each one to have to make all the experiments for herself. It saves time and trouble, if one person's experiments

can be made useful to other people. Suppose a woman is a very clever cook and finds out how to make things just right, it is well for her to be able to tell other women just what she found answered best. The other women's husbands and children may not have quite the same taste as the first woman's ; they may like a little more salt or sugar or spice than the first woman said ; but still, it is useful to know what other people find answer, and then we can alter it to suit ourselves and our families.

Now how is the woman, who has made a nice cake, to tell others how much she put in ? She has to use weights or else measures. She says : "I took a pound of flour, and a quarter of a pound of sugar, and half a tea-spoonful of baking powder," and so on ; weights and measures are a language in which one person can tell others how much of anything to use.

Well, a woman read in a book a recipe, as it is called, for making a nice small cake. One of the ingredients was an ounce of lard. But she was preparing for a tea for a great many people and she wanted to mix all her dough at once for several cakes. She wanted to mix sixteen times as much dough as the recipe told about. So she had to use more lard, sixteen times as much as the recipe told about. She had only one ounce weight. Look at my set of weights here ; there is no other of this size. Most sets of weights have only one of each size. The woman I am telling you of had only one weight of this size, and she wanted to weigh sixteen times as much. What did she do ? Did she weigh out each ounce separately ? If you think, you will see she could do something handier and quicker than that : she could weigh the whole sixteen at once with the pound weight.

Now I should like you to go over the weights and see how they are arranged for use.

If we want to weigh one ounce we use ? The ounce weight. If we want to weigh two ounces ? The two-ounce weight.

If we want to weigh three ounces, what shall we do ? There is no three-ounce weight. Put in the scales the two-ounce and the one-ounce.

For four ounces ? The quarter of a pound weight.

For five ounces ? The quarter of a pound and the ounce.

For six ounces ? The quarter of a pound and the two-ounce.

For seven ounces ? The quarter and the two-ounce and one-ounce.

For eight ounces ? The half-pound.

(The teacher goes on thus up to thirty-one ounces.)

So, you see, we can weigh any number of ounces we please, up to thirty-one ounces, by having only these five weights, one

ounce, two ounces, quarter of a pound, half a pound, and one pound.

If we want to weigh more than thirty-one ounces, we shall have to get other weights ; such as two pounds, four pounds, etc.

But we can weigh thirty-one different quantities with only five different weights.

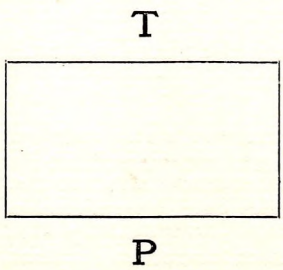
VIII

MULTIPLYING BY MINUS

Many persons who have learned a certain amount of Algebra are confused between what are called negative quantities (movements, or actions), and the mental act of negation of quantity (movement, or action) ; i.e. between the sign — which indicates active fact in the direction contrary to the one (arbitrarily) chosen as positive, and the symbol 0, which states denial of existence of fact. Practice should be given in exercises which involve these signs and show the distinction between them.

It is also desirable, for many reasons, that children should be accustomed to use letters for unknown quantities at an early age. It assists the imagination in keeping a clear distinction between a quantity in itself and the effect on the quantity of a certain operation or group of operations. Whatever a number may be, the group of operations represented by $-7+4-9+2$ diminishes it by 10. The statement $x-7+4-9+2 = x-10$ has a meaning which can be made intelligible at an early age ; whereas the mere statement $-7+4-9+2 = -10$ is confusing to a child's imagination. Even for those who are never to learn formal Algebra, the practice of using letters, for numbers which are to be the subjects of operation, imparts to Arithmetic something of Algebraic clearness of thought, which will be of use in itself ; while those who are to learn Algebra should not be exposed to the mental violence of being introduced to Algebraic notation for the first time, just when they will have to begin to learn the actual manipulation of unknown quantities by processes properly Algebraic. The following is a specimen of the kind of form in which elementary exercises in ordinary sums may with advantage be given.

BLACK-BOARD



THE figure on the board is supposed to be a counter in a shop. We are going to do a sum about buying something over the counter. What does the shopman call the thing in which he keeps his money ? A till. Well then, we will call the amount of money in it T. What do we call the thing a customer carries money about in ? A purse. We will call the money in this customer's purse P. We do not know how much T is, nor how much P is ; and we do not want to know just now. Provided that the customer has brought enough to pay for what she buys and the shopman has plenty of change, that is all we shall need to know at present. When we do not know a number, we often call it by the name of some letter.

The customer sees boxes of sweets marked 11d. She takes a box and pushes a shilling towards the shopman. What does he do ? Does he push anything towards her ? A penny.

Does the shilling which she gives to him add to what is in the till or does it make it less ? Adds to it. When we add two things together, we put this mark between them +. So now we write what is in the till T + 1s. T means what was in the till before the customer came in. T has not altered. What is now in the till is T + 1s., which we read : T plus 1s. But what has the shopman to give to the customer ? 1d. Is that added to T + 1s., or taken from it ? Taken from it. We write that this way : —1d., and we call it minus 1d.

So now this is how we write what is in the till : T + 1s.—1d.

Just for to-day we are thinking about things as the shopman thinks about them ; we are agreeing with him. It is his till to which a shilling has been added, and his till from which a penny was taken. He thinks about the shilling as plus and the penny as minus. Some other day we will see what the customer thinks, but the shopman's thinkings are enough for to-day. He thinks pushing something from P to T is a plus action ; and pushing from T towards P is a minus action. As long as we are thinking like the shopman, everything that goes from P towards T is marked plus ; and everything that goes from T towards P is marked minus.

For to-day, P to T is the plus direction. T to P is the minus direction.

By such a lesson as the above, we lay a skeleton, round which may be grouped a great variety of examples in ordinary addition and subtraction of money. The customer may ask for several articles in succession, and a bill be made out. Several customers may come in, and require amounts of change. All the money which passes should at first be registered as added to or taken from T. Sometimes the customer has

the exact coins needed. In such case no change will pass; this fact should be carefully recorded by writing — 0.

When the teacher wishes to extend the scope of the operations, he should go back to the one shilling given and one penny change; so as to leave the children's thoughts free to understand the operation involved, undistracted by questions of number.

We are going now to look at the business of paying for things, from the customer's point of view, to see how she thinks about it. When she pushes a shilling towards the shopman, is it added to or taken from P? Taken from P. And the penny of change is? Added to P. Then the customer's account now is? P — 1s. + 1d.; The shopman's is? T + 1s. — 1d.

After this, money sums should be done sometimes from the shopman's, sometimes from the customer's point of view. Occasionally, a sum should be written out from both points of view. Every shop transaction should be dealt with either as an addition to or a diminution of T or P, or, preferably, as both.

At a still later stage we suggest :—

We are going to see whether the money has been paid and the change given all right. For that purpose we must know what was in the till before the customer came in. T was £3 9s. 6d. So on the shopman's side we ought to have £3 9s. 6d. + 1s. — 1d. P was £4 7s. 8d. Therefore the customer ought now to have £4 7s. 8d. — 1s. + 1d.

Then more sums are grouped round that conception.

There is a further stage of the same scheme.

A customer asks for twelve articles value 19s. each. She lays down 12 sovereigns. The shopman hands back a shilling change for each sovereign : 12s.

One of the articles is then found to be faulty. There are no more in stock. The customer says : "Never mind ; eleven will do for the present." The shopman hands her back £1. Who has too much now ? Who must give a 1s. in change ? The customer.

The account then stands thus :

On the shopman's side,

$$T + £12 - 12s. - £1 + 1s.;$$

and on the customer's side,

$$P - £12 + 12s. + £1 - 1s.$$

In order to emphasise this lesson, it should also be written out in another form.

£1 — 1s.
× (1 doz. — 1)
———————
£12 — 12s.
— £1

Now then, what does — 1 × — 1 come to ? In which direction must the last shilling be pushed ? From P towards T. But that is, from the shopman's point of view, the plus direction. So minus multiplied by minus comes to plus.

Now from the customer's point of view :—

— £1 + 1s.
× (1 doz. — 1)
———————
— £12 + 12s.
+ £1 — 1s.

This lesson carefully gone over, with the simple numbers given above, and afterwards repeated with more complex sums, would save all future trouble about the much-vexed problem of "minus multiplied by minus."

IX

ADDING MINUS

BLACK-BOARD.

S H C
———————→
M M M

S is a shop where a boy works. H is the house where he lives and sleeps. C is a house where a customer of his master lives. Each M is a mile-stone on the road. The distances from S to H and from M to M are, each, a small picture of a mile along the road.

Now, do you remember what those letters stand for ? Because I don't want you to have to think about that presently when I am explaining something else. So say those letters over : S, shop ; H, boy's home ; C, customer's house ; M, mile-stone. Again : S, shop ; H, boy's home ; C, customer's house ; M, mile-stone.

You see which way the arrow points. Do you remember that we had a lesson about money pushed across a counter ? When it was pushed across one way, it added to the shop-man's money ; so, when we were doing his accounts, we called that direction plus ; and when he pushed change back, we called that minus. Miles on a

road are sometimes counted in the same way : we call one direction plus and the other minus. Well, the boy who works at the shop lives one mile from the shop in the direction that we are going to call plus ; what then shall we call a mile in the opposite direction ? A mile *minus* ; he walks a mile *minus* in going to work ; every evening he walks a mile *plus* in going home. C is two miles further on than H. So all the distance from S to C is how many miles ? In what direction ? S to C is three miles *plus*.

One night the master says : " Bill, there is a parcel to be taken to Mr. Smith's house (C). You live in that direction ; you must take it."

What then has Bill got to do ? How many miles plus has he to walk ? Three ; and what has he to do next ? He must get home somehow. What must he do ? Walk two miles minus. So three miles plus and two miles minus brings him to the same place, H, as he gets to on other evenings by walking one mile plus.

We said that the boy's task, set him by his master, was to walk three miles plus. He neutralized or counteracted part of that walk by adding to it a walk of two miles minus.

But now suppose that before Bill starts with his parcel a workman says to the master : " I am going to see a friend who lives close to Mr. Smith's house ; may I take the parcel, sir ?" And suppose the master gives leave. What has the workman done to Bill's task of three miles plus ? He has *taken off* from it two miles plus. Bill still has to walk one mile plus, because he must get home.

If the workman takes the parcel, he *subtracts* or takes off from Bill's task, two miles plus ; if Bill takes the parcel he neutralizes two of the plus miles by *adding* to his three miles plus another walk of two miles minus. His walk in either case ends at the same point H. But now I want to know :—are the two ways of getting home the same in any other respect ? For instance, will he get home to supper at the same time ? No, he will be more than an hour later for supper if he takes the parcel himself. And what about exercise and health and all that ? If Bill is cashier, and has been sitting still all day in a close shop, the five miles walk, three plus and two minus, would do him a great deal of good. But if Bill is a delicate little chap and has been on his feet all day, that five mile walk instead of one mile might make him quite ill. It would make a difference to wear and tear of shoe-leather, and to the length of time he would have for playing with his sister before going to bed. The only thing about which adding two miles minus *comes to the same* as subtracting two miles plus, is the point, one mile from the shop, where he gets to at the end of his walk.

So you see, if you are asked a question about the point which

Bill will reach at last, it will be quite right to say, " Adding minus two comes to the same as subtracting plus two." If you are asked about Bill's health, or his shoes, or the time he gets his supper, you must not say anything of the kind ; because, in relation to those questions, it would not be true.

MIND-PICTURE.

Bill trudging home tired ; near the middle M ; with his back to C and his face towards H. He is looking tired, and is glad to have got as far as M on his way back.

X

DIVIDING AND SHARING

WHAT is the half of five ? Two and a half. If two children are to share five ounces of anything, what is the share of each ? Two and a half ounces. Is that so always ? Are you sure ? Well now, let us see.

Suppose two children are to share a cake weighing five ounces, the share of each is ? Two and a half ounces of cake. How do we divide it ? Do we give one all the top and the other all the bottom ? No, that would not be a fair division ; we cut it so that each gets half the currants, half the sugar on the top, and half the bit of candied peel in the middle, as well as half the dough.

Suppose five marbles, weighing an ounce each, are given to two boys to play with, what is the share of each ? Two marbles ; and there will be one *over* (as you say in division sums). What would the boys do with the one over ? I think they would put it on the ground between them, and each shoot at it in turns, with the marbles that were his own share.

Suppose I have a doll weighing five ounces, and give it to two little girls. What is the share of each ? Will they cut it in two ; and each have half a dolly ? Shall each have one leg and one arm and half a head ; half the calico, half the plaster, and half the saw-dust? No. Well, what would be the share of each ? If it was a naked doll, there would be its clothes to make ; they would do the work between them. When they had time to nurse it for an hour, they would each nurse it for half an hour. When they had it to tea, they would sit one each side of it. That would be the fair sharing of a five-ounce dolly.

Now suppose a flower-bulb, weighing five ounces, is given to two children, how would they share it ? Would they cut it in two down the middle ? No ; they would plant it, and take turns at watering and tending it.

Children who have become mechanicalized, here add : "And share the flowers when it blossomed."

Do you mean what you are saying ? Just think a minute. Babies might cut a hyacinth up for the sake of sharing the flower-bells between them, and each being able to say, "These are *mine*"; but I never saw two children old enough to tend plants who would do such a stupid thing. What would you really do if the plant were yours ? Keep it growing, to look at, and show to friends ; and how about the sharing ? If one child looks at it, does that prevent the other seeing it ? If one smells it, does that prevent the other smelling it ? If one child brings in her special school-friend to see it, does that prevent the other from bringing in *her* special friend to see it too ? No. But neither child can say : " This is *my* plant."

If two people are to share five ounces of cake, each is to have two and a half ounces of cake, each share to contain half of each kind of ingredients that the cake is made of.

If they are to share five marbles weighing an ounce each, the share of each is two marbles and the fun of shooting them at the fifth marble.

If they are to share a five-ounce doll, the share of each is half the work of dressing it, the fun of nursing it for half the *time* they have to spare ; and the fact of sitting beside it at tea just as if it were all her own.

If they are to share a flower-bulb, the share of each is, half the work of tending it, all the pleasure of seeing it, all the pleasure of smelling it, all the pleasure of letting friends see it ; and none at all of the pleasure of saying : "This is mine, my very own, and no one may look at it or smell it without my leave."

XI

IN WHAT CONSISTS ECONOMY

BLACK-BOARD.

A.	*B.*
Things such that no one else can have the part thereof that I have.	*Things such that other people can have the part thereof that I have.*

You remember what we said about sharing cake and sharing a lily-bulb. If two children share five ounces of cake equally, the share of each is ? Two and a half ounces. If one has three ounces, the other can only have ? Two. If one has four ounces, the other can only have ? One ounce. If one has five ounces, the other gets ? None. Now look at the black-board. On which side shall we write *cake ?* Under A.

Now about the lily-bulb. If two children share a bulb, the share of each is ?—

Half the labour of growing it.

All the pleasure of seeing it grow.

All the pleasure of smelling the flowers when they come out.

All the pleasure of seeing friends enjoy the flowers.

None at all of the pleasure of saying : " This is my very own, and no one else can share it." So we shall write the *bulb* under ? B.

Suppose two people grow bulbs for sale, they get ? Money. What happens to the money ? It is shared between them. If they get sixpence for a bulb, the share of each is ? Three-pence. If one has four-pence, the other can only get ? Two-pence. We will write *money got by selling bulbs* under ? A.

Now I want you to think about a little row of houses, six comfortable houses, all about the same size, built near together on a common, away from shops. The gardens are as yet scarcely planted at all. Suppose one of you is the mistress of the end house of the row.

One morning, two hawkers come up the road and come past your house first. One has on his barrow a lot of nice fresh fruit, about as much as he thinks the people in your row will want to buy. The other has young plants.

Now remember, we are not here talking of shipwrecked sailors, or desert islands. I am not asking what people should do who are shut up together, with not enough food. I am not asking what is the heroic thing to do in exceptional circumstances ; but of what is the common-sense thing to do in commonplace circumstances. There is enough fruit on the barrow for every one in the row ; and every one has enough money to buy some. We will admit at starting that the first duty of a house-keeper, in ordinary civilized society, is to see that there is proper food in the house for all the household ; so the first thing you do, when the hawkers call, is to buy as much fruit as your household will need while it keeps good.

The people from one of the other houses are coming in to tea ; so you buy enough for them to have plenty as well as your own family.

We will suppose that all the rest of the necessary provisions are

in the house already. You have just bought fruit enough ; and you have a few shillings which you decide to spend on "extras." There are two things you can do with them.

It comes into your head that it would look rather grand if your neighbour were to see on the table a huge heap of strawberries—two or three times as many as could be eaten that day. Will you buy that extra fruit ? Or will you buy some plants for the garden ?

Let us see what would come of each of these proceedings.

Suppose you spend your spare shillings on buying more fruit than you need, some other family will not be able to get any. So we must enter *strawberries* on the A side of the black-board.

If you buy up that fruit, what happens to it ? A good deal is left for next day ; not quite as nice as it was the first day. No one can enjoy it now quite as much as the people who got none would have done if they had got it while it was fresh. Everybody in the house is perhaps tempted to eat a little more than they otherwise would do, because it is there and must not be wasted. Yet in spite of that some of it is wasted ; goes really bad and has to be destroyed at last. Meantime there has been about the house a faint smell of not quite fresh fruit, which takes away everybody's appetite and makes every one uncomfortable. For the next few days, no one cares as much about fruit as they did before.

You will often find this the case about the things in the A class of this division. (*Point to black-board.*) It is right that you should have *enough* of each of them ; but the least bit more than enough is too much, too much even for your own good.

Well now, suppose that instead of buying too much fruit you buy plants for your garden, what happens ? All the people in the house enjoy them ; visitors enjoy them ; and the people who pass by on the road enjoy them too.

We will write the *plants* down in Column ? B.

I have known many servants who liked living in houses where the mistress bought what is called in Ireland " lashings and leavings " of all sorts of food-things ; they called a mistress stingy who bought only as much as was of real use. You might see, in such houses, ends of joints going bad, bits of loaves on the floor among dirty boots, milk going sour, fish going stale, candles guttering away in waste ; and the garden quite neglected because the family were too poor to keep it up and had no money to spend on plants. And the servants thought such masters " rale gintry." You all know that that was because these servants were ignorant and uneducated. I think you will find that this is a good test of true education.

(The teacher now rubs out the instances, leaving only the headings of the two columns ; and writes under them this sentence :—)

True education tends to make people satisfied with just enough of the things in Column A, and leads them to spend spare time, money, and energy on things in Column B.

Read what is on the black-board. Copy it in your books. Read it out. Shut your eyes and try to say it. Learn it by heart (in preparation time).

Now I am going to tell you something rather difficult. You will not quite understand it yet, but if you think about it and fix it in your minds you will understand it some day, and it will help you to understand many other things.

You might, if you could afford it, buy more kinds of plants than you could attend to properly, or than the garden could well hold. Some people do that kind of thing ; they cannot make up their minds at once to do without what they cannot use ; so they crowd up their houses and premises with things that are in the way.

Shut your eyes and think of this for a minute or two :—Plants that are crowding each other up, and preventing each other growing, or that are not planted and are littering up the house, are not in Class B ; I am not sure that they get as far as to be properly in Class A.

XII

ECONOMY OF MIND-FORCE

TRUE education tends to make people satisfied with just enough of the things in Column A, and leads them to spend spare time, money, and energy on things in Column B.

BLACK-BOARD.

A.	*B.*
Things such that no one else can have the part that I have.	*Things such that other people can have the part that I have.*

You know that when I want to make you remember a sentence which I have written on the board, I let you all say it at once. But when I want to help you to understand something, or to see whether you understand, I allow only one child to answer at a time. I will write :—*repeating a thing to help me to remember,* in Column ? B.

I will write :—*showing how much I know and how far I understand,* in Column ? A.

There are several things you have to learn in school, besides the actual lessons in the books, such as sums and geography. One of

the most important is to answer questions properly. You must learn to think what was the exact question asked ; to think what the question means ; to answer it quickly, quietly, and politely ; to tell the truth, the whole truth so far as you know it, and nothing but the truth, about that question ; to put it in plain words, and not to use unnecessary and roundabout phrases. All that needs practice. It is the teacher's duty to give each child a share of such practice—just as it is the housewife's business to give every child a proper amount of food. And as we said, while Mary is answering, Claire cannot answer. Therefore we put :—*practice in answering questions*, in Column ? A.

Another thing that is necessary to learn is to listen to other people's conversation, without interrupting till your turn comes. If Alice is answering me, and Mary is sitting quiet, can Claire sit quiet too ? Yes. Then we will write :—*practice in listening to conversation without interrupting till my turn comes*, in Column ? B.

But we must not sit idle while other people are discussing interesting or useful things, we must learn to profit by what is said. If I am teaching Alice and making her answer, and Mary is listening and learning by what Alice and I say, can Claire listen and learn too ? Yes. Then we will write :—*learning from what is going on*, in Column ? B.

It is necessary to collect a good stock of mind-pictures for our future use. While one child is sitting nice and quiet making a mind-picture, does that hinder the others from doing so too ? No ; the quieter each one sits, and the more steadily she makes her mind-picture, the better everyone else can do the same. We will write :—*making mind-pictures*, in Column ? B.

It is necessary that a child should not pass up into a higher class (form, or standard) till he is quite fit for it. Therefore, there must be pass-examinations, to see who is fit. If one child passes an examination creditably, does that hinder another from doing so ? No. We will write :—*passing school examinations creditably*, in Column ? B.

It is necessary that Governments should know who is fit to become a doctor, or a lawyer, or a school-teacher, or a Civil Service clerk, or a postman, because they ought not to allow unfit persons to undertake responsible posts. If one man shows he knows his work properly, does that hinder another from showing that he knows it too ? No. We will write :—*passing professional pass-examinations*, under Column ? B.

But for some purposes it is right that the very fittest persons who can be got should be chosen for a post. It is sometimes right therefore that the Government should know, not only who is fit,

but who is most fit. If one man is at the top, can another be at the top ? No. We will write :—*being at the top,* in Column ? A.

Now let us read over carefully our two columns.

(Read out the columns.)

Now I am going to speak about something which puzzles many children. You are always being told that it is kind to help other people and share with them, yet if you help another child at an examination you are told it is naughty ; and if you let another child help you you are punished. Even at class, if I ask one child a question, and another whispers the answer to her, or writes it for her to see, I stop you at once.

Let us see what all that means.

If I say to one child, " I do not know whether any dogwood grows in this neighbourhood ; will you keep a look-out when you are out walking ?" Would it be right for another child to help her to look for it ? Yes ; because the thing I want to know is whether there is dogwood ; and the thing the child wants to do for me is to find the dogwood if it is there. Two pair of eyes are better than one ; two children, by helping each other, are more likely to succeed in doing what is wanted than one alone.

But if I ask one of you a question at class—for instance, what are nine times eight ?—I do not want to know what nine times eight are ; I know that already. What I want is, first, to know whether that child remembers nine times eight and can say it without help ; and, secondly, to give that child practice in grasping for herself the question she was asked and answering it for herself. If another child interferes or tries to help, she does not help, she hinders the very purpose for which the question was asked.

So it is at examinations. The examiner does not want to know the answer to the questions he has asked ; he wants to know which children are fit to begin the work of a higher class. If you "help" a friend (as you call it) to answer questions, you are really hindering her progress, by helping to get her into a class she is not fit for. You help her to be set to lessons too difficult for her. You help her to have duties which she cannot properly do. You help her to brain-muddle and overstrain and many sorts of bad things.

BLACK-BOARD.

When the object of doing a thing is to get the thing done, it is right to accept the help of other people.

When the object of doing a thing is either to get practice in doing it, or to show that I can do it, I must not accept help from other people.

There is something that I should like to tell the elder children just here. Little ones must please sit still, and practise trying to learn what they can from conversation between their elders.

There are, in every subject, some parts which *can* be learned on purpose to show that you know them ; for instance, on purpose to pass examinations in them. There are other parts which *cannot* be learned so, which must be learned while you are *not* thinking of showing what you know. Now you can never really thoroughly understand either of these parts unless you also learn something about the other. You want to know why this is so ? Well, I will answer that question after you have answered me a few questions. Which makes a man strongest for exercise, walking all day, or leaving off to take food sometimes ? Which has the better nourished body, the boy who sits trying to stuff down food all day, or the boy who does a fair amount of running about between times ? Which will put forth most leaves and fruit to show, the plant that has been cut from its root and now has only branches, or the plant that is growing from a root hidden under ground ?

I once knew a selfish, greedy little boy, who would rather make himself ill than let the servant (who made the pudding, and brought it to him, and was going to wash up his plate) have any herself. Do you think that boy could learn the true use of food, and the proper care of his digestion, while he thought of his food in that sort of way ? You know that he could not learn so. Why ? You cannot explain, but you know he could not.

Well, tell me why all those things are so, and then I will tell you why you understand your examination work best on the whole, if you do some portions of work which do not tell at examinations at all. It is our "nature to," as the old rhyme says. We are made so, and we cannot help ourselves.

All the great men whose names live for centuries after their death did a great deal of work which the world never heard of. Men who will do nothing except that part which they can show, never do anything which lasts.

A minute or two of silence.

Now all of you read aloud what is on the black-board. Copy it into your books. Read it again. Shut your eyes. Try if you can say it. Learn it by heart (in preparation), and say it to me next time.

I am not going to give you a mind-picture to-day. Shut your eyes and sit at ease, and try to put together in your minds the different things we have been talking about.

Five minutes' silence.

XIII

EXERCISE IN RELEVANCE; INTRODUCING IDEA OF PROBABILITY

SUPPOSE a pony is shut up in a field alone. How many heads will be in the field ? How many legs ? Eyes ? Hoofs ? Tails ? Hands ? How many pieces of mischief do you think will be done in an hour ? Suppose another pony is turned in. (*Repeat same questions.*) Twenty ponies come in. (*Repeat.*) A hen comes in. (*Repeat.*) A boy comes in. (*Repeat*) Another boy comes in, the second boy has a monkey. The master comes in. (*Repeat the questions each time.*) Now let us put all that on the black-board.

		Heads	*Legs*	*Eyes*	*Hoofs*	*Tails*	*Hands*	*Probable Bits of M.*
1*st*	*Pony*	1	4	2	4	1	0	
2*nd*	*Pony*	1	4	2	4	1	0	
20	*Ponies*	20	80	40	80	20	0	
	Hen	1	2	2	0	1	0	
	Boy	1	2	2	0	0	2	
2*nd*	*Boy*	1	2	2	0	0	2	
	Monkey	1	4	2	0	1	4	
	Master	1	2	2	0	0	2	

(It is important that all zeros in this exercise be filled in. For though zero is not anything, negation is a mental act, the cognition of a fact. It is important that children should learn to cognize the fact and deal rightly with it, at an early age.

The seventh column is to be filled in, in each case, according to the decision of the class after discussion of the probabilities of that case.

Exercises such as the above can be varied indefinitely. They are of great importance ; they fix attention on the questions of relevance, and of cumulation or neutralization (e.g. the advent of the master adds to the number of legs, is irrelevant to questions about hoofs or tails, and diminishes the amount of mischief). They call attention to the line of demarcation between certain, calculable knowledge (number of heads, etc.), and probable knowledge, or that which is contingent on facts not yet known, or not ascertainable (the character of the boys). They also call attention to the fact that an additional element may either add its own bulk to that previously existing (heads, tails), or may raise that previously existing to a higher power. A boy once suggested to me that, if two boys were in a field, they would not only do mischief themselves but would start the ponies trying to break fences ; and added :—"One boy alone might not think of it, but two together would be *bound* to."

I affirm that the boy's mathematical insight must have been increased by his having made such a suggestion. All such ideas are better suggested by examples of the above kind, where no intellectual work is involved in the question itself and the mind is free for new conceptions to surge up of themselves from the "abysmal depths of consciousness," than by explanations thrust in *ab extra* while the child's mind is occupied in struggling with the difficulties of a problem in Arithmetic or Algebra.

(For town children, playground may be substituted for field, dogs and cats for ponies).

MIND-PICTURE.

Shut your eyes, etc. See a field; see ponies, two boys, and monkey. Monkey jumps on the back of a pony and frightens it. Boys shout and scamper. Ponies become wild and break fences. Hen runs away scared and falls into pond, etc., etc., etc.

Master comes in and restores order.

XIV

EXERCISE ON ZERO

SHUT eyes, etc. Make a mind-picture :—Me lifting the chalk to the black-board. I make one stroke and then put my hand down. I do this action three times; how many strokes will be on the board?

If, instead of making one stroke on the board, I made two and put my hand down; how many strokes would be on the board when I had done the action once? Twice? Three times? Four times? Before I had done it at all?

Open eyes, sit up. Shut eyes, etc. Make a mind-picture :—A clean black-board, me holding the chalk and then putting it down, without touching the board; what would be on the board? Nothing. Now make another picture :—Me making a stroke. Now I rub the stroke out. What is on the board that you now see in your mind? Nothing. So if I do nothing, or if I make a stroke and rub it out, the result is the same as far as the board is concerned. Were the two ways of getting it the same? No.

That was a mind-picture black-board. Now open eyes and look at the real one. Here is a quite clean board; I make a stroke; I rub it out. Is it really quite as clean as when it has been cleaned on purpose for class? No. What do you see on it? A smudge.

Suppose I lifted the chalk to the board, and made a dot and no stroke at all; how many strokes would be on the board when I had done the action three times? Four times? Six times? Nine times? Once? Before I had done it?

One stroke no time ?
Two strokes no time ?
No stroke three times ?
No stroke one time ?
No stroke no time ?

XV

$$\frac{1}{0} = \infty$$

The idea of fraction is readily introduced by accustoming children, when the concept "child" is taken as arithmetical unit, to think of that unit as divided into halves, each side being a half ; or the unit may be a monkey, each hand representing a quarter. For instance, a common exercise in Arithmetic is the following :

If each boy is to have two apples, how many shall I want for two boys, three boys, four boys ? etc.

The problem might be stated thus :

If each boy is to have an apple in each hand, how many will be given to two boys ? Three boys ? etc. One boy ? Half a boy ? If each monkey is to have two nuts in each hand, how many will three monkeys have ? Two monkeys ? One monkey ? Half a monkey ? A quarter of a monkey ? Three quarters of a monkey ?

Such questions as the above may sound foolish, because teachers are not yet accustomed to see their importance in the development of arithmetical faculty. Let us once learn to think of the human mind as intended to build up the material sciences round an organic skeleton made of acts of positing the unit, negation, fraction and reconstruction of the broken unit, and our estimate of the relative values of many things in education will undergo rapid change. Every elementary exercise in number should be applied to the concepts unity, zero, one-half, one-quarter, etc. In constructing his tables, the child should be asked "Twice one ?" "Twice nought ?" and "Twice a half ?" as often as he is asked "Twice three ?"

Another useful exercise is the following :

I have twenty apples on a plate. Boys pass through the room, each coming up for his allowance. If I give one to each boy, how many boys can I serve before my stock is exhausted ? If I give one to each half-boy ? If I give two to each boy ? If I give two to each half-boy ? If I give four, five, ten, twenty, to each boy ?

Then come down the series.

If I give ten, five, four, two, one, to each boy ? If I give *half* an apple to each boy ? Half an apple to each half-boy, a quarter-apple to each boy ?

The questions should be kept playing round the fraction of apple and fraction of child, till the children see quite clearly through the whole process, and are familiar with the conception that, at the point where the share of each child is one apple, i.e. where the unitary concept of the class "children" coincides with the unitary concept of the class "apples," a crisis is reached ; something *happens* ; at that point the number of boys is equal to the number of apples ; on one side of it the number of boys is less than that of apples ; on the other side it is greater.

The series of questions should be repeated with ten apples in the plate ; then with forty apples, then the three series (ten, twenty, forty apples) should be inter-mixed. And as soon as it can be done without confusion, this question should be asked :

If I give none to each boy, how many can pass through the room before my stock is exhausted ?

We thus introduce the true mathematical conception of "infinity," free from all that is hazy or doubtful, or which makes a strain on the nerves or imagination ; we call attention to the simple fact that no number of boys passing through the room affects the remaining stock of apples in any way ; that, when the share of each boy passes from fraction of apple to negation of apple, the relevance of the number of apples on the plate to the number of boys is suddenly broken.

Then ask :

If the share of each half-boy is none, what is the share of each boy ? And how many boys can pass through before the supply is exhausted ?

Exercises of this kind should be strictly limited to such simple fractions as are indicated by the two hands of the child and the four hands of the monkey. No attempt should be made to use them to impart any premature information about the branch of Arithmetic commonly called "fractions."

The object of these examples is not to teach "fractions," but to supply elementary Arithmetic with that normal thinking-fibre which is, for a human creature, essential to clear ideas about anything, and which is generated, as above stated, by the mutual inter-action of the ideas of unit, negation and fraction.

XVI

EQUIVALENT FRACTIONS

SIT at ease, shut eyes. Make a mind-picture.

Each one of you is to think of some grown-up person that he likes. I am going to call the person "Mother" ; but you may think of Father or Auntie or any one else you like. Now then.

There is a plate on the table, and a knife, and an apple. Mother cuts the apple into two pieces the same size. We call those pieces ? Halves. Now Mother cuts each of those pieces into two. We call

those pieces halves of halves, or ? Quarters. Mother eats one of the quarters, and says you may have the rest. How many quarters are left for you ? Three. Two of them are the two halves of one half-apple ; the other quarter is one of the halves of the other half-apple.

Now, what is left for you when some one takes one quarter of an apple and leaves you the rest ? Three quarters.

Open eyes, sit up.

BLACK-BOARD

If a person takes one quarter of anything and leaves me the rest, what I get is three quarters.

Is that right ? Do you quite understand it ? Now write it in your table-books. Read it out.

Now sit at ease again. Shut eyes. Make a picture. Me with four of you children. Each of you is to think of himself and three others; any three others you like.

There is a table in front of me, and three apples on a plate. I am going to divide those three apples among the four children. If I give one of the apples to each of your friends, what will be left for you ? Nothing. Well, that won't do, will it ?

We must try a better way than that. I cut an apple into quarters. How many pieces will there be ? Four. I give one piece to each of you ; what sized piece will each child have ? A quarter. What will be left of that apple on the plate ? Nothing. Then I take the second apple and give each child a quarter of it. So now each child will have ? Two quarters of apple ; and there will be left on the plate one apple and no piece. Now I cut up the third apple and give each child a quarter. And now there is left on the plate ? Nothing. So we have shared up the three apples among four children. And the children have all got just the same quantity. What is each child's share ? Three quarters of apple. Are you sure you understand ? Shall we go over it all again ?

(Repeat the paragraph if necessary.)

Open eyes. Sit up.

BLACK-BOARD.

If three apples are shared between four children, the share of each is three quarters of an apple.

Copy into your table-books under the sentence you wrote last. Read both sentences over. You see that if three things are shared between four children, each one's share is the same size as it would

have been if there were only one thing, and some one took away one quarter and left him all the rest. What is alike in the two cases? Your share. Only that. Everything else is different. When we are talking short, we say that "A quarter of three is equal to, or the same as, three quarters of one." And we write it this way :—

BLACK-BOARD.

$\frac{3}{4}$ of 1 = $\frac{1}{4}$ of 3.

Copy that in your books.

When this exercise is gone over, another day, the following should be given as a variation :

I cut up the three apples into quarters. How many pieces are now on the plate? Twelve. And there are four children. How many pieces can I give to each child? Three. And each piece is? A quarter of apple. So each child's share is? Three quarters of apple.

We now have this :—

BLACK-BOARD.

Three quarters of one apple.
A quarter of each of three apples.
A fourth part of twelve quarter-apples.
All are the same size.

Copy that in your books.

If four children are to share one apple, how many quarter-apples does each child get?

If two children are to share two apples, how many quarter-apples does each get?

If two children are to share three apples?
,, ,, ,, four apples?
,, ,, ,, five apples?
,, ,, ,, six apples?
,, ,, ,, no apple?

Before children are introduced to the practice of "cancelling" out, in proportion or fraction sums, it would be desirable to introduce them to the idea underlying such processes in some such way as this :

Suppose I have four apples to share among eight boys, there are two ways in which I can do it. I can cut up all the apples into halves, and give one piece to each boy, or I can give a whole apple to each two boys, and let one of each pair divide the apple belonging to that pair. I have, to begin with, eight boys and four whole apples on a plate. I shall have at the end eight boys each

holding a half-apple. One of the ways of doing this is to make first, four groups, each consisting of two boys and an apple. The other way is to cut up all the apples into halves, and give one to each boy. Whichever way I set about it, I get at the last eight boys each holding half an apple.

It is desirable to avoid suggesting to the child's imagination, at any stage of the process, that two boys and an apple is supposed to be in any sense the equivalent of either eight boys and four apples, or one boy and half an apple. Therefore make a clear mind-picture of the four groups, each consisting of two boys, one of whom is engaged in cutting an apple into halves.

Enter in books (pupil's own part) :

"If four apples are to be shared among eight boys, the share of each boy is the same, whether one man cuts up all the apples, or whether four people each cut one apple in halves."

All lessons concerning equivalence of fractions and the dividing of numerator and denominator by the same factor should be linked in the children's minds with this fundamental conception of a set of molecules or groups, each consisting of so many boy-units and so many apple-units ; it should be shown that what is cancelled out is the number of such groups ; and that the number of the groups is rejected for the present, not as being unimportant in itself, but as being irrelevant to the immediate question on hand.

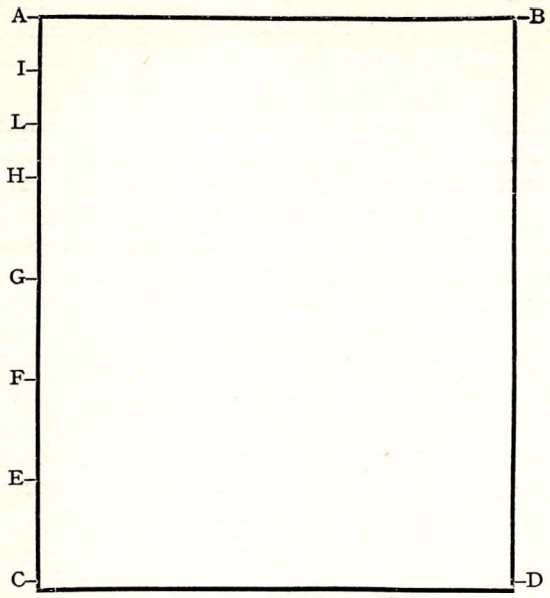
XVII

GREATEST COMMON MEASURE

THIS is the picture of a ceiling of a room. Suppose a painter wishes to ornament the edge where the ceiling meets the walls, with a little simple pattern that will fit exactly into the lengths of all the sides, without needing any extra corner-ornaments. Suppose he asks us to find out for him the length of the longest pattern that will fit in exactly. How shall we set about it ?

The pattern is to be repeated over and over again. One repeat must end and another begin at A ; one must end and another begin at B ; the same at C ; and also at D.

Let us measure off the length A B from A towards C. We will call the end of that measure E. Some number of repeats will go exactly into A B. We do not yet know what number of repeats ; but some number is to go into A B exactly. The same number will go exactly into A E. E therefore will be one of the points where one pattern ends and another begins. *Some* number of patterns will fit exactly into C E. We must find a length that will fit some number



of times into A E, and some other number of times into E C. For the present we can leave A B alone; any pattern that will fit exactly into A E can be copied exactly into A B, because A B is the same length as A E. So now we are going to attend to finding a pattern that will fit exactly into A E and into E C.

Let us measure off the length of E C from E towards A; we will call the end of that measurement F. So F is another point where a pattern begins and ends. Now let us measure off the length C E again, from F towards A; and call the end of that measurement G. Then G is a point where one pattern ends and another begins. We measure off the same length again and call the end H; and again, and call the end I; H and I are points where one pattern ends and another begins.

If we try to measure the length C E from I towards A, we cannot do it; there is not room, I A is not long enough.

Any pattern that will fit into I H will fit also into H G, and G F and F E, and E C; because all those bits are the same length. So, for the present, we will attend only to finding a length which can repeat some number of times in I A, and some other number of times in I H. Let us measure off the length A I from I towards H. We will call the end of that measurement L. L, then, is one of the points where a pattern ends and another begins. Now we will

measure off the same length, A I from L towards H. Ah! now we find that we have come exactly back to H. So that last measurement gives us no new points.

Now let us see what we have got.

A I, I L, and L H, are all the same length. The length of A I has gone twice into I H, therefore it will go into H G twice; and into G F, and F E, and E C twice each. So it fits exactly into A C, and repeats in A C? 11 times. Will it fit exactly into A B? Yes, it fits exactly into A E, and A B is the same length as A E.

Now we will work this off as a sum on another black-board. We will keep this one up, so that we can see what we have been doing.

(If there is no second black-board, the children should be told to work the sum off on paper or slates. On no account must the diagram be rubbed out till the sum has been worked.)

We ticked off the length A B from A towards C; that left E C over. If A B is 18 units and A C is 22 units, how many units is E C? Four. How do you know that? Because 18 from 22 = 4 We will put that down as a subtraction sum.

$$\begin{array}{rl} 22 & = \text{A C} \\ 18 & = \text{A E} = \text{A B} \\ \hline 4 & = \text{E C} \end{array}$$

Then we ticked off 4 from the 18.

$$\begin{array}{rl} 18 & = \text{A E} \\ 4 & = \text{E F} \\ \hline 14 & = \text{A F} \\ 4 & = \text{F G} \\ \hline 10 & = \text{A G} \\ 4 & = \text{G H} \\ \hline 6 & = \text{A H} \\ 4 & = \text{H I} \\ \hline 2 & = \text{A I} \end{array}$$

Then we ticked off

$$2 = \text{A I} = \text{I L from I H.}$$

and this left L H without any remainder.

Then we saw that the length A I would measure off exactly,

without leaving a remainder, into all the lengths H G, G F, F E, E C, because they are all equal to I H.

Now we will go over that in a different way.

How often will 18 units go into 22 units ?

Once, leaving a remainder 4.

```
                18) 22 (1
                    18
                    --
Remainder, used as new )  4) 18 (4
divisor                )     16
                             --
Ditto                     2) 4 (2
                             4
                          -------
Remainder                    0
```

Now, will A I fit exactly into A B ? What is A B equal to ? A E. Well, if the pattern fits into A E, will it fit into A B ? And into C D ? Yes, because C D is the same length as A B.

And will it fit into B D ? Yes. Because ? B D is the same length as A.C.

You remember that the question we started with was :—What is the *length* of the longest pattern that will fit exactly into all the lengths of the ceiling edge ? We have done that. We have done it in three different ways, and we know the longest pattern is 2 units long. We do not know yet how often the pattern will repeat in the room.

How many times will the length A I fit into the length A C ?

In A I ?	1
In I L ?	1
In L H ?	1
In H G ?	2
In G F ?	2
In F E ?	2
In E C ?	2
	11

Eleven times altogether.

How many times in A B ?	9
In B D = A C ?	11
In C D = A B ?	9
Answer	40

The above exercise repeated occasionally prepares children for understanding G.C.M.; especially if they have learned Division as a shortened method for getting the result of a series of similar subtractions. It may also be given with great advantage to older children who have already been badly taught G.C.M. and become foggy. In their case it should be followed up by a further explanation. Thus:

"Why could you not understand the rule before? I think it was partly for this reason:—

You have been accustomed to think that the most important part of the answer to a Division sum is the quotient; the remainder matters much less. And when you began to do G.C.M. you were told to do a Division sum; and no notice was taken of the quotient; you were made to go on as if the remainder were the important thing, and the quotient of no consequence. And that seemed to you somehow dishonest and not quite true; and it puzzled you and prevented your taking in what was really going on. But now you can see. When the painter comes to paint the ceiling border, he must provide paint enough to go all round the room. It would not be honest if he only painted from A to H. If he sends his assistant to block out the points where the patterns must begin and end, the assistant must take the trouble to go all round and divide up the whole edge. If we wanted to find out how many points he will have to mark off, we should have to take account of the quotients and the remainders. Missing a quotient would put us wrong even more than missing its remainder.

But we did not start to paint the room, nor to block out the edge, nor to find out how many times the pattern would be repeated. We were set to find out, first, what length of pattern would fit in. *For that purpose*, you see, the remainders matter, and the quotients do not.

Now do you see what mistake you made when G.C.M. was being explained to you before?

Mistakes of just that kind are made about many things in life. I am going to tell you something that may help you not to make them in future.

Sit at ease. Shut eyes. Here is a mind-picture.

There is a village. It has water-works and a reservoir. At the other end of the village there are a few houses which have a deep well of their own. A doctor notices that the people in those houses do not have a kind of illness which is common in the rest of the village. He tells the corporation that he suspects the water of the reservoir is not wholesome somehow, but he does not know exactly what is the matter with it. There is in the village a man who is fond of science, and knows a good deal about it. The cor-

poration ask this man to try to help them to get the water right. He goes to the reservoir. What do you see him doing ? Does he slash in pounds and pounds of stuff at random, to try to cure the water before he knows what is wrong with it ? No. He has a bottle with him. The bottle holds about a pint. It is perfectly clean, and has a nice clean stopper. He takes a good long look round the reservoir. He then dips the bottle in, fills it, and stoppers it up. He carries it home. He sits down in his study. He puts a drop of the water out of his bottle onto a glass slide, puts the slide under his microscope, and takes a long, long, careful look at it. He turns a little wheel round, and looks again and again.

Then he puts some water out of his bottle into a small glass, and adds a little of some stuff, and looks, and looks. Then he puts some more in another little glass, and adds a bit of some other stuff, and looks again.

In the middle of all this, two neighbours come in. One says : " How can you waste your time amusing yourself with your microscope and all these little glasses that are more fit for a doll's house than for a grown man, when your neighbours are suffering and dying because the water is wrong ? Why don't you do something to help us ?"

The other neighbour says : " I heard you were employed by the corporation to help the town to get the water pure. Why aren't you at the reservoir doing it ? Do you think it is honest to use only a grain of your stuff and purify only a pint-bottle full of water, when you are engaged to cure the reservoir ? You will want a hundredweight of disinfectant, not that tiny parcel of it."

The scientific man answers : "When we know what is the matter with the water, the corporation will send the right people to cure the evil, and they must take the right amount of stuff, and do the right kind of cleansing. If they attempt to do with less, that will be dishonest. But at present we do not know what is the matter, nor what treatment the water needs. I have been asked to *find out* these things, and am doing my best to find out. When you are ignorant, experiment on a small scale at first ; that is the way to learn."

Have you taken in that picture ? Remember it sometimes, when you are tempted to think that settling something big, in a hurry, before you understand what you are about, will do more good than careful, patient study on a small scale.

(All that is on the two black-boards, to be ultimately entered in form-books.)

XVIII

STANDARD WEIGHTS AND MEASURES

You remember I told you that in teaching a baby to count, it is best to teach him to pack up each ten of his counters or pebbles in a box or heap to itself. You will find many things come easier in your sums, if you take notice that a great deal of what you are learning is to pack things up in your minds, so that they shall be handy and convenient. It would have been inconvenient and troublesome for the shepherds of long ago to make a notch for each sheep that passed through the gateway into the fence; they packed up the number of sheep into tens, and made one stroke—put in the tens' place—stand for ten sheep. Later on, people packed up tens, and made one stroke in the hundreds' place do for ten tens.

In the same way our pennies are packed up into shillings. We need not carry about as many pennies as we shall want to spend; if we want to buy twelve penny eggs, we can pay one little shilling for the lot; because the value of twelve pennies is packed up into a shilling. We do not need to weigh out sixteen separate ounces of lard to make the dough for sixteen small cakes; sixteen ounce weights are packed into one pound weight.

You will understand sums better if you will remember that much of what you hear about in the Arithmetic-class is a sort of packing of things in your mind or memory.

Things have to be packed in parcels or bundles of different shapes and sizes, according to the nature and use of the things themselves. Let us think of a few different kinds of mind-packing that we know of.

Ordinary numbers are packed in? Tens. And then into? Tens of tens. That plan was started because? Savages found they had ten fingers to count on, before they had names for numbers or knew how to write signs for numbers.

Some things are counted in dozens, such as? Eggs, buttons. Why that is done I really do not know; I have heard that there was once a set of people who had a thumb and five fingers on each hand; that gave them? Twelve counters on their two hands. Perhaps these men invented counting by dozens, but that I cannot say.

Weights go quite differently—at least in England. They are arranged so that each one is twice the weight of the one next below, or, as it is called, they are arranged in *powers of* 2. For

some purposes this is a convenient arrangement, and it is a very interesting one to learn about.

Things to drink are arranged in something of the same kind of way; in pints and quarts and gallons. A pint, I believe, is the size that people used to like for their tumblers to drink out of. People in Bavaria still use pint tumblers; it looks very funny to see the children lifting great pint pots to their mouths. We in England have taken to have our tumblers only half that size; we call a tumbler, half a pint; and we call as much as two tumblers hold, a pint; and what four will hold, a quart; and so on.

Can you tell me how inches are arranged? In twelves. Twelve inches are called a? Foot; though very few men have feet quite twelve inches long. Three twelve-inch feet are called a? Yard. Four inches and a half are the length of an average-sized woman's middle finger; some of you have seen your mothers measuring on their fingers. How many "fingers" make a yard? Eight.

Some women measure tape or cloth by holding one end of the tape to their noses and then stretching their hands back; that measures off a yard. In old books we read of a *cubit* (that is, the length from the tip of the fingers to the elbow); and a *hand's-breadth*. All these measurements are rough and not exact, till some Government gives what are called *standard* weights and measures. This saves a good deal of disagreement and quarrelling. People in shops are made to use weights and measures that have been standardized, that is to say, stamped by people appointed by the Government; so that customers can know for certain whether they are getting a full pint, or pound, or yard.

Now when a Government is going to standardize weights or measures, a good deal of thinking has to be done about which are the exact sizes that will pack up into each other most conveniently. You know what I mean by packing, in sums? I do not mean packing actual things in trunks; I mean packing ten ones into a one in the tens' place; and the value of twelve pence in one shilling. Napoleon, more than a hundred years ago, made the French people pack all weights and measures in tens. The way they measure cloth and tapes and roads is this:—Ten centimetres make a decimetre; ten decimetres make a metre; ten metres make a dekametre, and so on. Weights go:—Ten centigrammes make a decigramme; ten decigrammes a gramme, and so on. That is what is called the *decimal* arrangement. We in England have arrangements that are not so regular; *sixteen* ounces make a pound; *fourteen* pounds make a stone; *twelve* inches make a foot; *three* feet make a yard; and so on. I do not think that either you or I know enough about the matter to be able to judge which plan is

best on the whole. Everything costs something in this world; whatever is arranged, something good and nice and interesting will have to be sacrificed to carry it out. The thing of most consequence in the matter is that we should learn to understand other people, and to speak so that they can understand us. We ought to know how they weigh and measure things, and what they mean when they say a pound or a yard; what we are to expect them to give us when we ask for a yard or pound.

If we keep shops by-and-by, we ought to know what we are to give each customer. This is partly why children go to school: to make them understand other people. People used to measure things by "rule of thumb," as it is called; every household taking its measures from the length of the father's thumb or the mother's fingers; or the tribe took its measures from the length of the chief's foot. Then when they sold to each other, there were quarrels because people's feet or fingers did not measure the same length. In civilized countries, people must have standard weights, and all learn to use the same; so whatever the English Government arranges about weights and measures by-and-by, I hope you will be ready to learn it quickly and use it good-temperedly; and remember that understanding what your neighbours mean and do is of far more consequence than anything you may happen to think, one way or other, about decimal coinage or decimal weights and measures.

And, in order that you may be ready to learn new measures easily and use them cheerfully, you ought to understand a good deal more than most of you do about the different ways in which such things pack up, as we called it. So one day soon we will have a lesson on packing quantities in our sums.

XIX

WHAT CAN BE SETTLED BY HUMAN LAW

On Table: An ounce weight, a pound weight; a yard tape marked off in inches; a metre ruler marked off in centimetres.

WHEN you see a dozen eggs, or buttons, or stamps, you see the whole twelve in the dozen, and can count them separately.

But when you see a shilling, do you *see* the twelve pennies? No; the pennies are not there at all, only the *cash value* of them is in the shilling.

Here is a pound weight. A pound is? Sixteen ounces. Can you

see the ounces separate? No. If I took this to an ironworker's, is there anything he could do to make it show its sixteen ounce weights? Yes, he could melt it down, divide it into ounces, and stamp each "one ounce"; then each would be a proper ounce weight, just like this one. If I had sixteen like this one, could they be made into a pound weight? Yes; the ironworker could melt them all down together, and make them into a one pound weight like this one.

Is there anything that any one could do to a shilling to make it into twelve pennies? No. Is there any way that any man could make a shilling out of twelve pennies? No.

So you see there are different sorts of packing in our sums. A dozen buttons is twelve buttons; you can see them and count them separately as they lie on their card.

A pound weight can be made into sixteen ounces by melting down and re-stamping; and meantime it already weighs the same as sixteen ounces, and contains the same amount of the same metal.

A shilling could not be made into twelve pennies, and does not weigh them down, and is not the same metal as pennies. But the *value* of twelve pennies is packed into a little bit of a dearer kind of metal.

What is packed into this yard measure? Three feet. What is packed into a foot? Twelve inches. So thirty-six inches are packed in a yard measure. Here is a French metre measure; what is packed into that? A hundred centi-metres.

What are these yard and metre measures most like: dozens, shillings, or weights? They are like dozens, in so far that we can see the inches as they lie along the yard.

Governments can alter the length of the divisions of a yard or metre, in a way that no Government could alter the size of an egg. Eggs grow, inches are only marked off by men.

Men might agree to sell eggs in tens instead of dozens; but they could not alter the size that the eggs grow by merely marking off differently.

What are packed into a year? Months, weeks, days. How many days are packed into a year? Three hundred and sixty-five. Who arranged that? Are there the same number of days in a year in France as here? Could the Government alter that? What makes the length of a day? The sun rising and setting, as we call it; which means, you know, that the earth turns us to the sun and then away from the sun. What makes the year? Something else that happens between the sun and the earth. The change from day to night and back to day happens three hundred and sixty-

five times for once that the other changes happen, the ones that make a year.

Who arranged that ? Was it the king ? Was it the Parliament ? Was it Napoleon or the French Government ? Do you think that if all these great people agreed together and decided to alter the number of days in a year, they could do it ? No. Long ago a number of learned men spent time on *finding out* how many days there are in a year. It took them a very long time to do, but they found out at last. But as for altering the number, oh, no ! no one has ever been able to do that.

You see how many different things had to be thought about in arranging the tables in your sum-books. The number of fingers we have ; the most convenient way to divide lengths ; the most comfortable-sized tumbler to hold ; the most convenient coins to carry about ; the length of days and years ; all sorts of things have been taken into account at different times. So the least we can do is to take things as they come, make the best of them, and learn to understand Nature, and each other's needs and wishes ; and to fit in amongst it all as best we can.

Now sit at ease, shut eyes, and make mind-pictures.

A king sitting in a Parliament House. He says : "The length of my thumb-joint shall be called an inch ; and thirty-six inches shall be called a yard." London shopkeepers now go to an office at the Guildhall, and take tapes to be marked in inches.

A French general in a cocked hat, with a uniform and sword. He says : "A metre shall be divided into a hundred centimetres." French shopkeepers go to an office in Paris, and get their metre tapes measured.

Another picture. Now the king and the general sit waiting. Learned men come and say : "There *are* three hundred and sixty-five days in a year." The king and the general bow their heads. The almanack-makers write down what the learned men said.*

XX

PAPER MONEY

On Table : A £5 note and a £10 note.

I HOPE you have begun to see that Arithmetic is very much concerned with the question of packing things in convenient shapes

*There are 365 days and a few hours in a year. But it is not advisable to enter on details in the present lesson.

and sizes, to carry them in our understanding and our memories : sometimes even with convenient packing of things to carry in our hands or pockets. Buttons are sewn in dozens on cards to avoid the need of counting them at busy times, just as grocers put up sugar in pounds ready for customers. Eggs are ready packed in boxes so that a whole dozen can be handled as one boxful. We pack up enough iron or brass to make sixteen ounce weights into one lump, which we call ? A pound weight. And so on. If you think, you can see that, if an ancient shepherd made a notch for every ten sheep that had been counted, he was really doing something of the same kind. In the same way we put a mark for a foot at the end of every twelve inches, or a mark for a yard at the end of thirty-six inches.

When we take a shilling in our purse instead of twelve pennies, the packing is of a different kind. We do not pack the twelve pennies into one lump ; we do not take the pennies themselves in any shape. Do you remember what it is that is packed into the little shilling which we use instead of the twelve pennies ? The *value* of twelve big clumsy copper pennies is packed into one little bit of the more valuable metal, silver.

In multiplication, when we say 6 times 8 are 48, we pack into a short form the business of adding six eights, one after the other. When we divide 37 by 5, what we are really doing is to see how often we can subtract 5 from 37 ; instead of doing the subtractions one after another, we pack the whole lot together and do it all in one sentence. If you think about it sometimes, as you go on learning, you will find that a great deal of your Arithmetic is simply a sort of packing up to make short cuts. We get the value, so to speak, of a long roundabout proceeding, packed into a convenient bit of work.

Well now, let us go back to our twelve pence and our shilling. You perfectly understand that the reason why this shilling is worth as much as two sixpences is because there is twice as much silver in it as in one sixpence. It weighs twice as much. And the reason why the silver is worth as much as twelve pennies is because it is a more costly material. Can you tell me any other instance of one coin being worth a great many others because it is of a more costly material ? A sovereign is worth twenty shillings or eight big half-crowns, because gold is much more costly than silver. How many pennies is a sovereign worth ? 240. Do you think you quite clearly understand why ?

Well now, look at these two pieces of paper. What are they worth ? One is worth £5, the other £10. Why ? Is paper a more costly material than gold ? No. You know that it is very much

cheaper by weight. And it would take a great many of such papers as these to weigh down a sovereign. I am sure that these papers are not worth in themselves a penny apiece as paper. And they are exactly alike ; that is, the paper part of them is alike ; one is not bigger or thicker than the other. Yet I could get five sovereigns for one and ten for the other. Why is that ? What makes them so valuable ? And why is one worth twice as much as the other ? What does it all mean ? *Something* must be packed into a little piece of paper, to make it worth so many sovereigns. Let us see if we can find out what is packed into these bits of paper to make them valuable.

It is never worth while guessing at the meaning of a thing until after you have looked at all that there is to be seen in it, and found out all that there is to learn about it. So we will begin by reading all that is on these papers. And then we shall see if we can make out what it is that has been packed into them.

Bank of England.

I promise to pay the Bearer on Demand the sum of Five Pounds.

London 5 Sept. 1902

For the Gov^{rs} and Comp^{e} of the
Bank of England.
J. G. Nairne, Chief Cashier.

The Bank of England promises to pay to whoever brings this piece of paper to the Bank, £5. And people feel so *sure* that the Bank will pay the five pounds that anybody will give five pounds for the paper. They feel they will always get their money back.

How did people come to feel so sure that the Bank would keep its promises ? Because it has gone on so many generations always keeping them.

In some countries you may see written on a Bank note a promise to pay five dollars, and you may hear people bargaining as to whether that promise (or that bit of paper) is worth two dollars or three. Which means that taking paper money in these countries is more or less a sort of gambling or speculation. People do not feel sure enough that the promise will be kept to give the full value for the piece of paper that it is written on.

What, then, is it that is packed into these pieces of paper that we call Bank notes ? *A habit of trust in the honour of the Bank of England.*

We have been hearing a good deal of late years about the honour of England and the glory of England, and there have been proces-

sions and shows and military displays, which are supposed to be for the honour of the country. I should like you to notice, my dears, that any country can wave flags and bang drums and ring bells and walk about in processions and shout about its honour and glory, if it pleases. The real glory and honour of England are much better expressed, it seems to me, by the fact that, if its National Bank promises to pay £5 or £500, the people of the country take that promise for its full value. They believe that their Government will keep its promises.

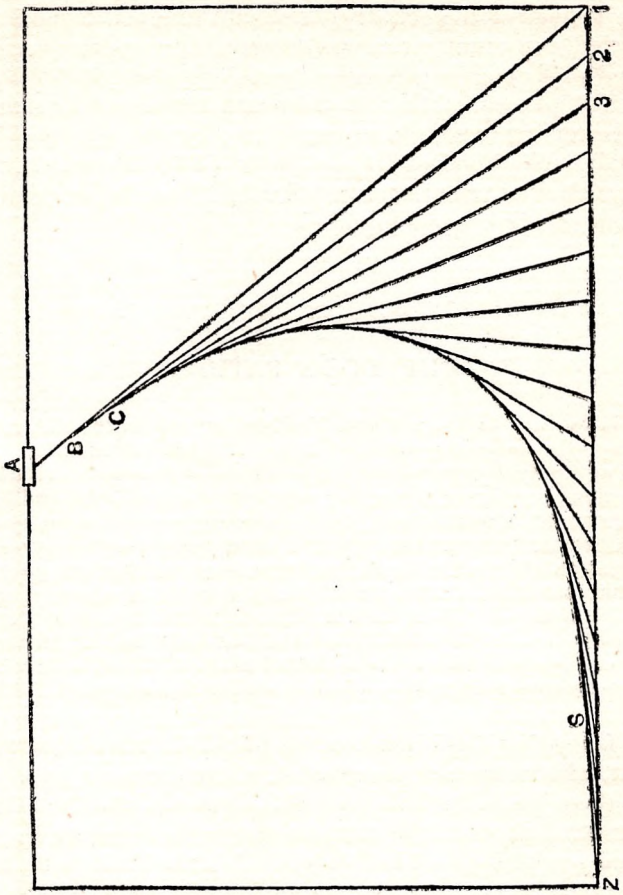
XXI

THE DOG'S PATH

If children are to learn Curve-Tracing, or any sort of Analytical Geometry, the following exercise forms a good introduction to the subject, as it puts their minds into line with the alternation of tendencies, the apparent conflict of forces, by which physical Nature and human evolution are alike worked out. It obviates any sense of mystery about what the whole thing means. Once a child has grown accustomed to pay attention alternately to the aspirations of the dog and to that of the rabbit, and to see a curve growing up under the impulsion of his own alternating sympathy, it is then legitimate to tell him that there are other forces, besides the wishes of animals, at work making curves, and that he can learn to follow the action of many of these, even when he can trace no conscious motive which is setting them to work.

TRY to fancy that this black-board is a field. It has a brick wall all round it, with no opening except at A, where there is a gate.

At Z there is a rabbit hole. A rabbit came out into the field at Z and wandered about till he came to here (*write the figure* 1), where he found something he liked to eat. After a little while, a dog came in at the gate A; the rabbit caught sight of him, and directly afterwards the dog caught sight of the rabbit. Now let us try if we can make out what happened. First we must try to think what the animals would each like to have happen; the rabbit saw the dog first; what do you think he wished? To get away. Perhaps his first idea is to run *straight away* from the dog. But he can't; the wall prevents him. What will he do next? If he was a very foolish rabbit, he might stand trying to get through the wall, and fussing, and saying:—"Oh! dear! I must get out here, there is no other way. Oh! this cruel wicked wall! it is preventing me from getting out! Oh! what *shall* I do? This is the straight way out; and I must knock a hole in this wall! Oh! what *shall* I do?"



If the rabbit was a foolish rabbit, he might go on in that way, till the dog caught him and ate him up.

But we will suppose he is a sensible rabbit who is not fond of knocking his head against brick walls, and who has learned to use his brains properly about his own business. What do you think he will think of next ? He will think of trying to get to his hole. He would like to jump straight to his hole ; but he cannot go right across a field in one jump. However, we will draw a line to show what he would like to do. (*Draw the line* 1 Z.)

But just when the rabbit gave up the notion of getting out through the wall at 1, the dog saw him. The dog had his little

wishes about the rabbit. What do you think he wished? What would the dog like to do? Jump on the rabbit and kill him. The dog can no more get across a big field in one jump than the rabbit could; but he would like to do so. We will draw a line to show what the dog thinks he would like to do. (*Draw the line A* 1.) As the dog cannot jump from A to 1 he jumps as far as he can; his first jump takes him to B. But by the time he has got to B, he sees the rabbit has got to 2. Do you think he will go on scampering down the line A 1 now he sees the rabbit is not at 1, but at 2? Of course not. He will wish now to jump from B to 2. But that again is too far from him to go in one jump; he jumps to C, but by the time he gets there the rabbit is at 3.

The teacher should go on step by step, drawing the successive wishes of the dog, and marking off the jumps of both animals, taking care to keep up, all the time, the children's consciousness of what the animals are each thinking and doing; till the diagram has evolved itself on the black-board. Then:

Now tell me, what do all these lines represent? The line 1 to Z represents the path which the rabbit would like to go along in one jump, and does take in eighteen jumps. The lines A 1, B 2, C 3, and all the other straight lines, each represent a line that the dog at some moment wished to jump along; he jumped along a bit of one, and then changed his mind and jumped a bit of the next, and so on. We drew all those straight lines; you saw me draw them by the ruler, did you not?

But here is a curved line A to Z. Who drew that? I drew no line except straight ones by the ruler. Look at it well. Make sure that you see it and all the lines on the black-board.

Now sit slack, shut eyes, and think what the curved line is and how it came.

Open eyes and sit up. What is the curved line? The path which the dog really ran, when at each step he meant only to go down some straight line.

XXII

THE BALL'S PATH

You remember that we drew the path of a dog in a field, by drawing straight lines to show what he wished to do but could not. The dog was dragged several ways, first one way and then another. The dog was dragged only by his own wishes and thoughts.

But a thing which has no wishes or thoughts of its own, may be dragged by other forces. We call what makes things move, *force*. Well, as I said, things may be moved by other forces besides their own thoughts and wishes. If you throw a ball, you make it go along. We do not know that it has any wishes of its own ; your wish is a force which moves it. But your wish is not the only force which moves it ; for if you aim exactly at the top corner of the house, the ball will not hit exactly the top corner ; some other force, what we call its weight, pulls it a little downwards as it goes along ; so, between the two forces, the ball makes a curve ! When a thing moves in a curve, it is usually because two forces, or more than two, are pulling or pushing it in different directions.

You are going to begin learning about curves. It will help you to keep out of many muddles, if you will try to remember that, when you see a curve in a book or on paper, it represents some real form or movement ; or something more or less like a real form or movement. It may be simpler than the real path or shape ; but it is *only* simpler ; it is really more or less like something meant to be real.

But when you see straight lines, they are seldom meant for anything real. A straight line represents either a path that one force alone *would* have taken something along if no other force had interfered ; or else it is just put in for convenience, to measure by. You have perhaps seen tailors' fashion books, with directions for taking measures. You see a picture of a man with a coat on, and straight lines drawn across the shoulders or bust. You would be dreadfully puzzled if you thought of those lines as parts of the picture ; because no coat has lines across the shoulders or bust ; but you know they are meant, not for seams in the coat, but for a measuring-tape supposed to be stretched across the man in order to measure the width of his coat. I have known children puzzled out of their wits, and never able to understand their Geometry for years of their school-time, because they mistook straight lines for real parts of some curved thing.

And if you ever feel worried and puzzled over your Geometry lessons, shut your eyes for a minute and think about the rabbit and the dog. Then open eyes, and look at your book ; and say to yourself, "Which parts of this picture are meant to be real like the real path of the dog ; and which parts are only like the straight lines that teacher drew on the black-board on purpose to make us children understand how the dog came to run in a path in which at first he did not mean to go ?"

XXIII

EXERCISE TO PREPARE FOR GENERAL FORMULÆ

1 and 3 are ? 4. And 5 ? 9. And 7 ? 16. And 9 ? 25.

And so on, adding successively the odd numbers. The results should be entered in a column on the right hand of the black-board, and ultimately on the right hand of the page in the formula-books. On the left hand should be entered successively :

$1 \times 1 = 1$
$2 \times 2 = 4$, etc., thus :—

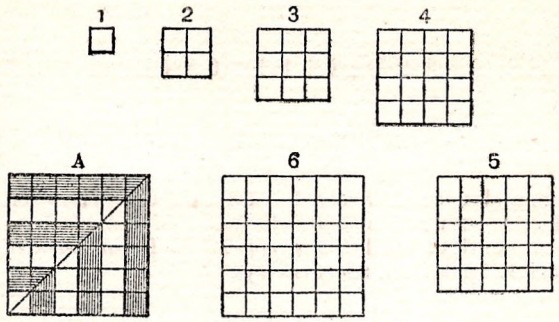
$1 \times 1 = 1$	**1**
	3
$2 \times 2 = 4$	**4**
	5
$3 \times 3 = 9$	**9**
	7
$4 \times 4 = 16$	**16**
	9
$5 \times 5 = 25$	**25**
etc.	etc.

This exercise should be repeated occasionally, as mere practice in adding and multiplying, till the fact of the identity of results of the two processes has been worked into the children's consciousness, simply as an act, empirically observed, and, as yet, unexplained.

Then, they should be told to build up the successive odd numbers, either with cubes, or on squared paper (A).

They should be led to see that, by building 3 round 1, they get a square block of the same size and shape as by building 2 on 2 ; 5 round the block of 4 gives a block the same size and shape as three rows of three, and so on.

These things should be done simply as exercises in adding, multiplying and neat pencil-shading or chalking. They should each be repeated many times. Great accuracy should be insisted on ; but no explanation



should be attempted. The good mathematician will see that none is necessary. An ordinary teacher who attempted one would be almost sure to confuse and mislead. The important thing to secure is that the children's eyes, fingers, and attention should be occupied about the diagrams, thus lodging clear images of them on the memory, ready to crop up on some future occasion ; as explained in my Address On the Preparation of the Unconscious Mind for Science.*

In case the pupil afterwards takes up Algebra or the Calculus, the theory of General (or Sliding) Formulæ will, when it has to be explained to him, find ready a substratum of observed and familiar fact, illustrating one such Formula :

$$(n + 1)^2 = n^2 + 2n + 1$$

The lack of any such basis, the consequent difficulty of making the pupil grasp the idea of a General Formula, forms one of the great obstructions to sound progress in Mathematics.

But, even if he is never to go beyond ordinary Arithmetic, no harm will have been done. He will have gained a little practice, useful in itself, in the comparison of numerical results arrived at by different methods. The time spent on gaining familiarity with the Genesis of Tables of Squares will not have been wasted. Arithmetic itself is always best taught, when it is taught on methods which constitute a sound preparation for the study of the higher Algebra.

APPENDIX

I HAVE not succeeded in drawing out any quite satisfactory scheme for suggesting the feeling of proportion to the imagination of children who have never used any optical instrument. Perhaps some reader may devise one. For children accustomed to use a magnifying-glass, the following mode of conveying the idea is simple. Draw on paper two or three short but unequal lines, and

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mark each with a letter. Let the children look at each, first with the naked eye, then with a magnifier. Tell them to draw (or to suppose drawn) the lines as seen through the glass. Then say that the little line marked (*a*) is to the big line marked (*a*) in the same proportion as the little line marked (*b*) is to the big line marked (*b*), and as the little line marked (*c*) is to the big line marked (*c*). Draw also a small triangle and quadrilateral, and a copy of each as seen through the magnifier ; say that the little triangle is to the big triangle in the same proportion as the little quadrilateral to the big one. Then show (*a*) through a weak magnifier and (*b*) through a stronger one ; and say that, now, the pairs of lines are not in proportion to each other.

I would again emphasize the caution that the lessons in this book are mere specimen types, intended, not to be slavishly read aloud to a class, but to suggest methods, such as I have found useful, of dealing with various arithmetical difficulties. In ch. 17 a sum is put in the form kindly shown me by an elementary-school teacher, as the one familiar to the pupils to which she is accustomed. There is a different form more suitable for advanced pupils doing long sums. Each teacher should use the form to which his pupils are accustomed.

In ch. 6, the lesson is given as suited to children accustomed to begin multiplying by the unit figure of the multiplier ; any teacher who habitually begins at the other end of the multiplier should modify the lesson to suit his class.

When I am giving the lesson on G.C.M., I usually connect it with a story of a painter in Rome, who knew nothing about our system of notation, and who, having to decorate a ceiling, asked his children to spare his labour by marking off, on a plan, as many as they could of the points where he would have to make a pattern end. This particular story would confuse children not yet accustomed to realize that there have been civilized and artistic people ignorant of our notation ; such an idea, suggested for the first time, would distract attention from the arithmetical fact. I have therefore omitted it in the chapter on G.C.M. But I would take this opportunity of reminding teachers that the thought, the imaginative idea, of being engaged in helping a real toiler, has a great effect in checking the tendency to showy guessing, and in fixing attention on the exact nature of the question under consideration. It strengthens the feeling that the object of study is real knowledge and not the mere power to answer examination questions.

THE PREPARATION OF THE CHILD FOR SCIENCE

By the courtesy of the Clarendon Press this work, which was published by them in 1904, *is included in the present edition.*

TO ETHEL GERTRUDE EVEREST

MY DEAR COUSIN,

Three-quarters of a century ago your father, during a visit to his native land, infused into the minds of a few young mathematicians, among whom were Charles Babbage and J. Herschell, certain ideas about the nature of man's relation to Unknown Truth which underlay all science in ancient Asia, and which he had learned from Brahman teachers. The seed which he then sowed has borne abundant fruit in English Mathematics. Of his subsequent work in India some have sought to express their appreciation by giving his name to a great inaccessible snow-peak. You and I think that we shall more truly fulfil his ambitions by making as accessible as we can to little children in all parts of the Empire that open gateway to the Unseen at which he stood in perpetual adoration to the last hours of his life.

M. E. BOOLE.

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PREFACE

THE following volume is an attempt to utilize on behalf of little children the life-work of many great men now almost forgotten. Amongst these may be specially mentioned :

NICOLAS ANTOINE BOULANGER. He left school a reputed dunce, incapable of learning algebra. He died in 1759, in his fortieth year, a self-taught mathematician and an eminent engineer. He left behind him in MS. two works, *L'Antiquité devoilée par ses usages* and *L'Origine du despotisme oriental*, in which he explained the connection of fixed mental attitude with the enslavement of the masses, and of periodic reversal of attitude with mental eman-

cipation and power. His books were published after his death in several editions, but seem to have mysteriously disappeared soon afterwards.

THOMAS WEDGWOOD. He was assisted in his scientific researches by Erasmus Darwin (grandfather of Charles Darwin), a then famous physician. His life-long dream was to promote happiness on earth, not by the multiplication of mechanical appliances for comfort and pleasure, but by the evolution of a Race gifted with powers of intellectual enjoyment, larger than those of man as he now exists. He made a special study of the faculty which he called Genius and the conditions of its orderly development. By Genius he evidently meant, chiefly, the power of seeing truth at first hand. The MS. of his work was entrusted to a friend who is said to have lost it. The rough notes for the book in Wedgwood's handwriting, with a fair copy of one or two of the chapters, were found in 1883. Among the papers was a scrap on which was written, in a shaking hand, the sentence: "How exhilarating is the thought that if, by the labour of my whole life, I can add one idea to the stock of those concerning education, my life has been well spent."

CHARLES BABBAGE. By comparing European mathematical processes with certain ideas about the development of human faculty derived from Asiatic sages, he was able to realise the nature of some thought-processes so vividly as to conceive, in imagination, what may almost be called an Automatic Thinker of iron and brass. His calculating machine, if completed, would sometimes have rung a warning-bell and put up a signal :—"More data wanted" ; and occasionally it would have put up the signal : —"Data incompatible with each other." The machine was, however, not completed ; it is kept in the Mathematical Department of the South Kensington Museum. Babbage's book and pamphlets, more valuable than the machine would ever have been, are practically unknown to the majority of the scientific world.

GEORGE BOOLE. My husband carried out Babbage's idea by means, not of a machine, but of a self-acting algebraic notation, which automatically produces the symbol for "insufficient data" $(\frac{0}{0})$, and that for "these conditions are incompatible in the sphere of human consciousness" $(\frac{1}{0})$. He also carried out into other automatic notations Babbage's suggestions about the psychological value of certain traditional opinions on metaphysical subjects. The notations adopted by him have been used in the application

of mathematics to the Physical Sciences ; the use of them for this purpose would be largely facilitated if mathematical teachers had any clear idea of their meaning and origin. His books are still used in Germany and Austro-Hungary for educational purposes. In England they have been superseded by others in which the same notations are employed, but in a manner which tends to conceal their history and genesis. George Boole was abundantly rewarded in his lifetime with medals and honorary degrees ; but his books are now out of print.

RAM CHUNDRA. Treatise on Maxima and Minima, with introduction by J. Herschell and A. De Morgan about ancient Asiatic Methods.

GRATRY : A French Oratorian. His work on Logic contains a valuable analysis of the psychology of the Infinitesimal Calculus ; which he, as did afterwards Hinton, treated as proof of the importance to intellectual progress of rhythmic alternation between the study of detail and the synthesizing of details. He asserts that Geometric Induction is a process of prayer ; by which he means an appeal from the finite to the Infinite for light upon finite concerns. The mathematical portion of his work is out of print.

BENJAMIN BETTS, formerly of the Government Survey of New Zealand, after much study of Fichte's philosophy, invented a peculiar system of co-ordinates, by means of which he illustrated diagrammatically the expansion of thought under pressure from opposing forces. To his surprise his diagrams turned out to resemble the outlines of many known leaf and flower forms, as well as of some not known on this planet. He came to conclusions on vegetable morphology in some respects similar to those arrived at quite independently by James Hinton and expressed in his "Life in Nature."

Many years ago I enjoyed the privilege of reading Mr. Betts's MS., and had a long correspondence with him. His system of co-ordinates cannot be much used except by those whose hands have been trained in the work of the mechanical draughtsman. It has, however, been very helpful in suggesting simpler methods. The following quotation from a letter of Mr. Betts will give some idea of the nature of his philosophy. "Suppose yourself placed at an almost infinite distance on the planetary axis of our solar system, and, focussing (in imagination) aeons of time into a few seconds, and millions of miles into the optical angle, view the

condition of our solar system in its passage in the direction of Hercules. What would be visible ? . . . The laws of infinite solar systems throughout the universe are telegraphed to us by the flowers at our feet. . . These laws of the corolla-form we have educed as Laws of Thought, of self-consciousness as revealed in the act of thinking. . . Some one is thinking there, thinking in potential activity, as you and I are thinking this moment."

JAMES HINTON analysed carefully the Psychology of the processes for the Summation of Series and for solving Quadratic Equations ; as well as that of the Fluxion method.

DR. CHARLES WINSLOW instituted a series of investigations on Force-lines as co-ordinates for illustration of Laws of Thought. At the same time he corresponded with ladies on Mission Stations and other persons residing in Volcanic districts, who, during many years, sent to him observations on minute points connected with seismic disturbance. After a life of heroic struggle against many difficulties, he published a book, *Force and Nature*, in which he advanced a psychologic theory connected with Geologic Evolution, which at some points coincided with the theories of J. Hinton; at some with that of Betts ; at others, again, it reminded me of my husband's system of psychologic co-ordination. He and James Hinton once compared notes in my presence.

The late DR. WILTSHIRE was well known as a physician. It was not so well known that he had made a profound study of the effect on the nerves and brain of periodic alternation of mental attitude ; not mere repose, but reversal of attitude as preparation for repose. He believed that the habit of this is conducive, not only to longevity, but to that prolonged youth of the mind which makes old age profitable. He had come to the conclusion that most of the revealing power born into the world is wasted for the service of mankind, by too early precipitating itself in some concrete form, or committing itself to some definite view or opinion. He said :—"The way to do good work is to live to be old. If you have genius, keep it fresh till you have experience as well." He expressed to me certain conclusions to which he had come about the bad consequences, to the general morality and health, of the people being educated in habits of slavery to fixed mental attitude.

GRATRY held that the Art of Thinking would never flourish during periods of intellectual individualism and competition ; that the essential condition for any marked evolution of it is one of self-

effacing communal study. This condition of generous selflessness prevailed in Mathematical Science during the great revival in which A. De Morgan and my husband took part, in the forties and fifties of the last century.

For the last thirty years there has existed an informal group of workers, organized on the communal plan suggested by Gratry, which has for one of its main objects the study of the Laws of Sequence of Thought-processes. Among its rules are the following :—

Any member is at liberty to communicate to the public any information on psychology or education which he acquires by the assistance of other members.

Any book or article emanating from the group is to be signed by the member who is responsible for the selection and arrangement of the contents. He owes to his colleagues no public recognition, and is expected not to connect their names with any views which he may put forward.

It only remains for me therefore to express my warm thanks to Miss Eleanor Cobham, whose intelligent and devoted assistance has made it possible for me to organize into a form available for publication the mass of material relating to the Psychology of the process of Investigation which has drifted into my hands in the course of a long life.

MARY EVEREST BOOLE.

CHAPTER I

THE SCIENTIFIC MIND

THE present volume is specifically concerned with the preparation of the child for science. It offers suggestions as to means by which the scientific condition of mind can be induced. Each mother must decide for herself whether, and to what extent, she wishes to induce this condition. The first desideratum is that parents should form a clear idea what is the scientific condition of mind ; the next is that they should know in what consists the preparation for it.

The typically scientific mind may be described as one which stands in a definite relation to As-Yet-Unknown Truth, and especially to that portion of the As-Yet-Unknown which is just below the horizon of knowledge. In proportion as a mind is non-scientific, the occurrence of an unfamiliar phenomenon stimulates it to form

some immediate classification or judgment. A new statement is hailed at once as "true" or "false"; a new fact is classified as "good" or "bad," "nice" or "nasty"; an unfamiliar action as "right" or "wrong," etc. In proportion as a mind is scientific, the occurrence of a new phenomenon tends to set it vibrating with a consciousness of coming revelation, and to start a certain cycle of mental attitudes, a cycle of the following kind :—

Homage.	Synthesis.
Attention.	Contemplation.
Observation.	Effacement.
Analysis.	Repose.
Antithesis.	Judgment or Classification.

The cycle varies in duration; each phase may occupy a few seconds, or many months, or even years; but the tendency to fall into some such sequence as that above described at the touch of a new fact is what constitutes the essentially scientific condition.

It would, of course, be impossible to direct the studies of a child strictly in accordance with any such sequence as the above, but a good deal may be done towards inducing scientific elasticity by setting up the habit of rhythmic alternation of attitude. And, if the child is to be prepared for science, something of reverence should always accompany the impact of the As-Yet-Unknown.

The delicate sensitiveness to the touch of the illogical, to the limits of knowledge, and to the Presence of the As-Yet-Unknown, which it was the object of great mathematicians to confer on automatic mechanism, is too often destroyed in the human brain by rough and ready processes, adopted, sometimes for the purpose of fixing the opinions of young people, sometimes for that of enabling them to pass examinations successfully in subjects which they do not really understand. To cultivate it in the young child is the object of some of the precautions recommended in the following pages. None of them, however, is intended to be slavishly carried out.

Many thoughtful parents are beginning to wish that their children, while learning the elements of sciences, could also gain an early initiation into those methods of study by following which the Newton, or Darwin, or Faraday of the future trains himself after his teachers have done with him. The methods in use in schools ought, they think, to differ from the Newton, Darwin, Faraday methods of private study only as the little sapling, which still needs support and shelter, differs from the tree. It seems a not unreasonable desire that the sapling of early method should have some natural tendency towards growing into that particular tree,

true science-method. Whereas, so far as I can learn, most of the recognized school methods differ from the essential science-method rather as the little rose bush or cabbage differs from the oak : the cabbages and rose bushes may bring forth results admirable, charming, and vigorous, which will be good to eat or pleasant to the eye, and productive of prizes at shows ; but they have no sort of tendency to grow into an oak ; and if we happen to want to plant an oak-tree in the place where they have been set, we shall have to grub up some of the roses and cabbages. The youth who means to make scientific philosophy his career usually has to begin by grubbing out of himself what he learned at school ; not of course all the statements about fact, and still less the good habits of order and industry, but all that he learned at school in the way of *method of study*. There are schools to which this sweeping criticism does not apply ; here and there a teacher of elementary science evolves unconsciously, by some accident of organization or instinct, the true secret of the Newtons and Darwins. The pupils of such teachers are not always particularly successful in their early studies, for a reason which I will explain further on ; the sapling does not grow fast, owing to uncongenial surroundings ; but it is of the true breed, and, though a starveling, sound at the core. But scientific method is something more definite than the occasional and unconscious action of a heaven-born teacher ; it might be, and ought to be, explained by lecturers on pedagogy to audiences of intelligent pupil-teachers.

There is a principle which has been formulated in scientific treatises on the Art of Study, such as that of Gratry, and which is so recognized in the circles where science is being evolved as to be held a matter of course not needing to be stated at all, unless when some science leader is roused to protest by the proceedings of those around him. An instance of such protest may as well be given now. Forty years ago a lady asked me to lend her for her children some good introduction to the study of nature. I lent her a work which had been the delight of my own childhood ; but she promptly returned it with a note to the effect that she could not allow her children to read it, for it was antiquated and not up to modern requirements ; it stated that herring shoals approach Europe from the North, whereas it had lately been discovered that they come from the South (or vice versa—I do not at this moment remember which theory was held forty years ago and which twenty years before that) ; and, she added, there is so much that children must learn nowadays that they must not waste their time in learning theories already exploded. A scientific man to whom I showed the letter remarked impatiently that the writer

evidently had no idea what she was about ; for, he said, what is most necessary for the children to learn is not what is the last new theory about where herrings are hatched, but how to extract the truth from a series of impressions and statements, each of which is only partially true. In this utterance we have, I think, the key to the most essential element in a truly scientific method of study ; and the case is worth analysing, for it illustrates the grave error, the hidden pitfall, into which the advanced section of the educational profession fell in passing from the ancient ideal of an education based on classics to the modern ideal of an education based on science.

Dead languages are fixed for ever, at least as to those parts of the study with which young people are concerned. The dative of such a noun is so-and-so ; this particular word is a dactyl and that a spondee ; and the duty of the schoolmaster was to see that the boys spelled and scanned the words accordingly. My friend had been trained in the fundamental conception that there is a right way of spelling a word, and other ways are wrong ; and that children should be taught the right way. She had so far outgrown the old classic traditions as to think that it is not enough to know how Virgil scanned Latin, and Aeschylus wrote Greek ; that a citizen of the nineteenth century should know how God makes the world and whence comes humanity's food ; she had read enough science, too, to be aware that it is a growing, not a fixed and limited form of knowledge. She was not foolish enough to imagine she could get hold of any absolute and final opinions about science, to substitute for the absolute and final right ways of writing Latin ; so she enshrined instead, on her domestic altar, the last new up-to-date opinion, having no conception of the true nature of eternal scientific method. What this lady did in detail the advanced section of educationalists have done as a whole ; when they discovered that fixed rules of grammar are not, as used to be thought, sufficient mind-food, they substituted, not the eternal truth of mental pulsation, but up-to-dateness. The newest textbooks, the latest opinion about evolution, the most newly-invented and costliest apparatus, the latest method of showing electric or galvanic action—these were supposed to be the characteristics of the best science school ! Yet it is well known that many of our great scientific leaders learned at first from books old even in their childhood, and used simple apparatus of their own contriving for lack of means to purchase any other.

In classical learning it is eminently desirable to secure that the right impression shall be made from the first ; that wrong impressions shall have as little time as possible to deepen themselves. We

wish the child's eye and ear to become accustomed from the first to welcome the right and reject the wrong ; we do not wish him to gain any habit of tolerating wrong impressions. If the child uses the nominative where he should use the accusative, and is not at once corrected, that is so much to the bad for his future progress ; if he can be got not to be able to remember a time when he used the word wrongly, that is so much to the good. But in science there are, there can be, no absolutely right impressions ; our minds are not big enough to grasp any natural fact as a whole ; everything depends upon drawing right conclusions from combinations of impressions, each of which is in itself inadequate and partially misleading ; and if the pupil is to be got into scientific methods, that is what he must be trained to do. And in order that he may learn to do it, it is sometimes necessary that each of a succession of "wrong" impressions should have time to register itself on the brain and become part of its available stock. Such a statement may naturally convey to the scholastic mind trained in classic traditions an impression of disorderliness, but it does not imply disorder. Up-to-dateness is the cause of disorder ; the haste, the greed, to efface rapidly each partial impression, when we have nothing to substitute for it but some other impression equally partial, is not only unscientific but eminently disorderly.

Some readers may be tempted to think that in mathematics there are no tolerated and mutually corrective errors. The space at my disposal does not admit of entering fully into that question ; it is enough to say here that mathematical method is the typical and perfect scientific method, in which the warp and woof of *polar partial apprehensions* are so fine and so perfectly woven that the texture is, so to speak, hardly visible to the naked eye ; but it reveals itself on close analysis of mathematical procedure ; and, indeed, it was by means of mathematical investigation that the principle underlying all true scientific mental action was brought to formulation.

The difference between teaching sciences and training in scientific method is well illustrated in the teaching of botany and biology by dissecting flowers and animals. In the first place, as Professor Geddes constantly reminds his hearers, confusion of mind is induced by using the word "biology" to anything which involves destroying the life of the object under investigation. For purposes of scientific investigation, destruction is often necessary (though there need not be nearly as much of it as there is). But, however necessary, it is in itself not biology but necrology, for it shows the pupil not how the thing lives, but how it looks when dying or dead. And this is more than a mere quibble about words ; the whole

question of scientific method is involved. Children inherit from their monkey-ancestors an abundant supply of inquisitive destructiveness; the quality which needs *educating*, i.e., educing, is reverent patience to stand still and watch other creatures living their lives. Science has been evolved by the balanced action of these two faculties or powers—the natural monkey-inquisitiveness and the educated spiritual reverence. To over-cultivate destructive curiosity is a cheap way of enabling children to make a show in science examinations; but that sort of thing has no tendency to induce the habit of true scientific method, which depends on alternation of opposites. If a child is to be initiated into scientific method, its early studies must go in the direction of *balancing* its natural destructiveness by learning to foster life and to study patiently the development of living things. Of course, this ideal is very difficult to carry on in town; it is, for instance, difficult to study botany in town except by means of cut flowers; but a good deal might be done by teaching children, when they see a flower, either growing or in water, not to touch it till they have learned all they can of its poise and mode of growth, so as to be able, after dissecting it, to reconstruct in their minds an accurate picture of how it looked before they disturbed it.

The tendency in science classes to an over-cultivation of mere monkey-destructiveness has been largely fostered by the claim of certain faddists that children shall be told nothing, but shall "find out everything for themselves." What science really does claim in this matter is that a clear line of demarcation shall be preserved between *what the individual has observed* and *what he has learned at second hand*. The claim that children shall find out everything and be told nothing is palpably absurd.

As a matter of fact, most science leaders read eagerly and omnivorously on their own subject, being anxious to get all the help they can from previous and contemporary investigators. No man can find out for himself all he needs to know. How could any individual find out by himself the earth's movement round the sun? What science does claim is, that no child shall be told anything about the motion of the earth till he has observed many sunrises and sunsets; till a clear sense-impression of the earth standing still and the sun moving has become organic within him. This registering of a "wrong" impression is what in science we have to secure; while in classics we should try to prevent it.

Now let us see how a true science teacher deals in detail with this scientific necessity for registering, separately, successive partial and misleading impressions. Her subject is, we will say, the buttercup. First, she gets the children to look carefully at the

plant as a whole ; if possible to watch it growing. If they can have a specimen in their garden, and watch the gradual unfolding of leaf and flower-buds, so much the better. If she can draw, she will teach them to register with the paint-brush their impressions of it at various stages. She will lead them to observe, among other facts, that it differs from such flowers as the larkspur by having apparently no nectary. When they have carefully noticed all she can get them to see of the living plant, she proceeds to a dissection of the flower. "What is this ? " she says, pointing to the scale at the base of a petal. "A bit of petal turned up," says one child. "A stamen with the anther knocked off," says another. "I think it looks like a little petal, like the inside petals of a double anemone," says some specially observant little person. If the teacher is a mere crammer, she will immediately explain the function of the scale ; but if she is a real science teacher, she makes no comment ; she only asks questions to draw out further observations.

Some other day she will explain that the scale is believed to secrete some substance, and, therefore, to partake of the nature of a nectary. But, if she is wise, she will not do this till the conception of an anomalous organ, as to which one could not be sure whether it is a petal or a stamen, has had time to soak itself well in. Then, when the children learn that it is, after all, a sort of nectary, though it is not the shape of one, only that it is not called nectary because the substance it secretes is not honey, this will be a real introduction for them to the conception of metamorphism. It will not enable them to answer questions at an examination on Goethe's theory of metamorphism, still less on any later one ; but it will prepare them to understand metamorphism as Goethe understood it, by leading them to see nature as Goethe saw it. Meantime, if the up-to-date mother or head mistress has been present at the former part of the lesson, this is the kind of comment she will probably make : "Miss Dash came to us with the character of a high-class science teacher ; but I am disappointed in her ; she is so dull and behindhand ; she constantly lets mistakes pass. Only to-day I heard Bessie call the little scale of the buttercup a bit of petal ; and Miss Dash seemed not to know any better ; at any rate she said nothing. I am sure I read in the Botanists' Magazine that the scale is considered to be a secreting gland. It is very provoking, after all the pains I took to secure good teaching in that department."

Such is the kind of misapprehension which has come of trying to put the new wine of scientific progress into the old bottle of academic rightness. A mistake in grammar is a mere blunder, and

should be corrected as soon as possible, so as to prevent the child's eye and ear from becoming accustomed to, and contented with, inelegant diction. But the misapprehension about the gland is not a blunder ; it is the normal impression which the phenomena should naturally make on a mind at a certain stage of development; and it is the teacher's business to ensure that her pupil's mind shall register that impression before being disturbed by the intrusion of one derived from more recondite investigations. If, indeed, the child were, from carelessness, to make what is for him, at his present stage, a blunder, she would immediately lead him by questions to see his error ; but that is quite another matter. In arithmetic—the most methodized of sciences—we make the child correct his sum if he has made a careless mistake; but no good teacher interrupts a partial apprehension till the normal time has come. Scientific education is not arrived at, and never can be arrived at, by young people being crammed at School and College with ready-made knowledge ; and left to find out, after adult life and its duties have come on them, that they are still very ignorant of how to learn what they now need to know. Nor do they mend the matter then, by turning in disgusted recoil from the sham knowledge with which others crammed them, to cram themselves, from books, with ready-made Theories about the limits of the knowable and the "Philosophy of the Unknowable." Scientific culture is the result of a steady life-long habit of friendly and intimate, though reverent, intercourse with the Eternally Infinite Unknown.

We must now go a little further into the questions : What is that essence of scientific method on which its essential scientific quality depends ? What are the conditions for securing it ? How has it been introduced into scientific colleges ? How might it be introduced into elementary teaching ? Are there any special difficulties in so introducing it ; and, if so, how can they best be overcome ?

An individual gets his information about any given class of facts from a variety of sources : his own observations on facts ; what he learns on more or less reliable testimony as to what others have observed ; theories, some true, some false, which have been held by human beings to account for the facts ; and his own thinking about the facts. The essence of scientific method, so far as I at all understand the great men who have formulated it, consists in keeping the produce of the three external sources of information *apart in the mind* till the lid is shut down, so to speak, on the outer world, and the process of thinking has begun.

A man is not reliable as a discoverer in science unless he can say,

"Such-and-such a fact I myself observed ; such another I read about and afterwards verified by my own observation ; such-and-such statements I have read, but have not yet verified ; such another I have read, but my own observation points to the contrary opinion." This is not a mere question of priority, of who deserves the honour of a discovery : we do not trust the *scientific qualities* of one who does not *feel* quite differently about a fact which he himself observed from the way he feels about something he has read or heard.* And even if he is making this distinction, it does not follow that he has performed any scientific act of mind. Not till he has thought in silence, not till different kinds of knowledge derived from various sources combine to form a mental impression, can true scientific action be said to have taken place.

Suppose a youth gazes at the starry heavens till he has soaked in an impression of their varying aspect, that is instructive ; but the instruction is not scientific. Suppose a navigator reads or is told that when the heavenly bodies appear in certain relative positions at a certain hour the latitude must be so-and-so, that is useful technological instruction : it has no claim to be called scientific. (Technologic information is often miscalled "scientific" in advertisements.) Suppose we read up a history of the various theories which have been held as to the causes of phenomena presented by the heavenly bodies, that is in itself a historic or literary treatment of the subject, not a scientific one. But when a child has formed for himself a clear, undisturbed impression of the earth's unmovableness and the apparent motion of the sun, and then has read that astronomers believe the earth goes round and the sun does not go round the earth, if he then puts together in his mind the two apparently conflicting statements—that made by his senses, and that made by his book—and lets them combine to create in him an impression which shall embrace both, then the sacrosanct scientific act has taken place within his mind. He has really done a bit of true science work.

In science colleges this *sine qua non* of scientific method is to some extent provided for. In the laboratory the youth is helped to observe for himself. In private study he has to read textbooks, in which are recorded the observations made by others ; he attends lectures, in which is narrated the history of the successive theories by which the phenomena have been variously explained. The partial impressions are given to him separately, at different hours ; usually in different rooms and by different professors. Each, therefore, makes its own distinct and separate record on the mind. And, of course, every student worth mentioning takes time

*See ch. 5.

occasionally to *think*, i.e. to make silence in his soul, as Gratry calls it; to bar the access to all fresh impressions and let the impressions already made come together and correct each other. In a science college, the arrangements being such as I have described, the mere laws of collegiate good conduct generate the essential scientific method without need of any formal defining of the method itself; the rule for the pupils is to give their whole attention to what they are doing at the time; the rule for the teachers is that each is to abstain from intruding on, or interfering with, the work that is being done at the moment by any other. Each has his hour wherein to make his own impression. Each knows that the impression being made by any other is partial and incomplete, and at times even momentarily misleading; each knows that he himself could often make the immediate impression more correct by interposing; each knows that he must not so interpose till his own hour for speaking has come; he must be content to keep silence till the partial—often from his point of view partly erroneous—impression made by his fellow teacher has had time to stamp itself fully on the pupil's mind.

The organization of a science college does really correspond in its main features to what is essentialy a scientific method of study.

And now we come to the questions: What are the special difficulties in the way of introducing true scientific method into elementary teaching? And how can these difficulties best be met?

The faculties of a child are easily fatigued, and the nature of his work must be constantly varied. We cannot give him an afternoon in the laboratory, a whole hour's lecture on theory, an hour's reading up about facts, a long walk occupied in trying to think out a problem; the attitude, the mode of study, must vary every few minutes. But we cannot every few minutes change the teacher, the room, the whole *mise en scène*, as is done in college in passing from laboratory to lecture-hall; one elementary teacher must represent in turn at least three persons: the lecturer, the laboratory teacher, and the author of the textbook used for reference. Nor can the child be trusted to think in silence unhelped; the attention of children wanders and is in need of assistance from the teacher. She must be constantly on the watch to make the necessary mental silence for him, by recalling his attention from external facts and from irrelevant topics to the special point under consideration. She therefore has, as it were, not only to act the parts of two teachers and a textbook; she must also preserve access for a fourth, that Formless One, the inner voice, with which the adult science student holds converse

when he retires into silence to think out the meaning of apparently conflicting evidence. If she is really to introduce the child to scientific method, if she is to make in her schoolroom the peculiar mode of sequence on which true science-method depends, she must somehow contrive, single-handed, to keep the four departments of the study separate. And not only is there no external change of *mise en scène* to help her ; there can be no conventions of external courtesy to check her ; if she is tempted to let one of her functions interrupt another, no consideration of discipline or of good breeding comes to her aid in resisting the temptation. She can by no possibility conform to anything that deserves the name of scientific method except by cultivating such inner courtesy of all her various functions to each other that each will keep silence when another is making some partial impression by which the pupil is evidently partially misled.

When a really great scientific man gives an elementary lesson, he sets the example of such inner courtesy ; and it is just this peculiar reticence which gives so fine a flavour of high class science to the teaching of very elementary subjects when the teacher is a very great man ; and, as I said before, one sometimes meets with a kindergarten teacher or nursery governess who adopts the great man's method by virtue of sheer heaven-sent instinct. She does truly sow the seed of true scientific method. But she sometimes has a hard time of it, and her sapling has to grow in adverse conditions, owing to misapprehension on the part of her employers.

We know from natural history what a tendency there is among weak, helpless, inefficient creatures to imitate, as a measure of self-protection, the colouring and outside appearance of the strong and efficient. Parents should remember that this is especially the case among teachers. The efficient and intelligent teacher learns all he or she can of principles of psychology and general tendencies and then carries them out by methods which, in detail, are his or her own. It is the ignorant and inefficient teacher who makes a parade of having adopted the last up-to-date device, or the one which happens to have been mentioned in connexion with some recent success in examination or good report of an inspector.

Children must be drilled into the power of learning exactly what it is that other people have said, for those who lack this power lack the continuity which is the cause of human progress and the condition of truly human thought. No better way has yet been found of acquiring the power of taking in what others say, than by studying the languages in which other people speak. In an admirable work addressed to parents, *Some Observations of a*

Foster-Parent, W. Tarver gives excellent reasons for supposing that a thorough grounding in Latin is a better preparation for a scientific career than learning "sciences" at school. The classical tripos man is obliged to give an account of the opinions held by ancient writers on physics, astronomy, and natural history, *opinions which neither he nor the examiner is supposed to endorse.* This is an excellent corrective of that shallow up-to-dateness which is the vice of modern pseudo-scientism.

My advice to parents therefore would be this : If you wish to make of your children showy pseudo-scientists, abandon all notion of true scientific method. Engage a smart up-to-date governess ; who, whenever they say anything that would not bring good marks at an examination, will pounce upon it at once and insist on their saying whatever she thinks would satisfy an examiner. But if you wish them to get an insight into the way in which great science is created, give no more time to science than you can afford to let them spend in the really scientific manner. Do not let them, while very young, prepare for any examination in natural or physical science. Give them a good foundation of training in languages and literature. For science itself get a teacher who not only loves but reverences the works of the Creator. Leave the lover of nature to teach as she is inspired by the Author of nature. And if you find that she is sometimes inspired to refrain from giving information while the child is trying to observe, or from distracting him by the intrusion of ready-made theories when he is thinking out a question for himself, be scientific enough yourself to restrain your own impatience ; do not rush in where great scientific men would be respectfully silent ; make an act of mental homage as you would at the threshold of a temple ; for the place into which you are tempted to intrude is the holy ground of science.

It would seem to be of great importance that children should learn to connect laws of thought with lines of force or motion. Every now and then some man appears in whom the instinct to express psychologic truth in terms of physical movement or of physical form is innate and overwhelming. Such a man may have all the characteristics of the great discoverer, and lack nothing of what constitutes the great scientific revealer except the possibility of communicating with other students. In the Preface I have given a short account of some of the material the waste of which, owing to this cause, has come within my personal observation. It seems impossible to teach such a man how to speak to any existing public ; it would therefore be desirable to prepare a future public capable of understanding its future revealers of this anomalous

kind ; to put some children, at least, at the start of life, on the right side of the chasm which at present divides ordinary men from the man who spontaneously sees natural forms as expressions of creative thought. This can be done by accustoming the child to evoke a curve occasionally, as the outcome of his alternate sympathy with the thoughts and aspirations of animals, as described in my *Logic of Arithmetic*. And, moreover, as alternation is of far more importance than variety of apparatus and multiplicity of subjects, a child who is learning vegetable morphology by ordinary methods in the botany class will be very much helped to understand what he is doing if in the art class he is taught to investigate vegetable form by some inverse method such as that described in Chapter II.

It is not claimed that the cultivation of the scientific habit makes very specially learned people, nor that it makes people specially pious, or specially good citizens ; it is simply the condition of the scientific discoverer. It may be that a man becomes more erudite, even about the subjects commonly known as "scientific," by learning what has been already discovered by others, than by training himself in habits favourable to discovery. It may be more useful to society to know how to do well something for which a demand already exists, than to know how to discover the Unknown. All that is here claimed is that the most likely man to discover the unknown is the one whose mind falls spontaneously into the scientific rhythm at the touch of a strange phenomenon, an unknown fact, or a new emotion.

But it should be pointed out that the scientific habit is not necessarily unfavourable to either erudition, piety, ethics, or good citizenship.

The process of original discovery, especially in pure or applied mathematics, has a peculiar effect on all the important nerve-centres ; an effect which should be taken into account by all who are interested in questions connected with nerve-health, mental development, moral stability, or national sanity. The nature of this effect is explained by Gratry,* and more fully by myself.† It appears to be intelligible to specialists in medical psychology, though the mass of the medical profession seem to have, as yet, paid little attention to it.

The formula known as Boole's Equation, $x\ (1 - x) = 0$ (Boole's *Laws of Thought*), is that of the peculiar mode of brain-sequence involved in the process of scientific induction. If the brain is accustomed early to work according to the laws of induction, it

*Gratry, *Logique*, Vol. II.

†"Suggestions for increasing Ethical Stability." *Monist*, January, 1902

acquires the power of storing up and stowing away large quantities of information, with comparatively small fatigue or injury to health.

Scientific induction is an art which, if learned early, does not lead to weariness or disappointment; it remains fresh from youth to age. This goes far to prove that it is in itself normal and wholesome. If, however, a youth has been taught scientific principles *ab extra* in childhood, and then finds his way suddenly to the bliss of personal discovery, the consequences are sometimes disastrous; like the men in Plato's Cave, never having seen anything except the shadows cast by shams, he is dazzled, blinded, and overwhelmed by the sudden contact with that reality which was his natural birthright.

Many forms of tragic waste of young life might be avoided by accustoming children to take the joy of scientific discovery quietly, as they take those other analogous delights: fresh air, exercise, and sunshine. The early cultivation of the scientific imagination on mathematical principles has other advantages besides that of preventing the future risk of danger to moral stability in case of the youth finding himself too suddenly in open daylight. It enables him both to follow easily other people's discoveries when he has time to do so; and also to use them freely, when he does not understand, without any sense of confusion or jugglement.

The immense amount of discussion which has gone on over questions of detail about the best modes of teaching, and the best books to use, tends to blind us to the main question at issue, which is: are our children to learn science as people used to learn classics, by permission of a privileged caste of men and books who have a monopoly and know all about it? or, are they to learn it by right divine, because they are children of an Unseen Teacher, heirs of His kingdom and at home in His house; and because they therefore have a right to use His tools and His toys, His methods and His forces, subject only to such restrictions as He Himself has laid on them? Let us decide that question first; and then details about what books to use, and how to teach this or that, will settle into their proper places. In science at least, if nowhere else, the ancient dictum is certainly true: it is vain that we make our children haste to rise early and late take rest and devour many carefully compiled textbooks. If their relations with the Laws of Nature are harmoniously established from the beginning, knowledge will be given to them even while they sleep.

Children have a right also to a share in that still higher and purer delight, self-effacing communal Research. The opportunity

for it should be provided in school. For if taken, under judicious supervision, by a group approximately equal in age and attainments, it is harmless and invigorating in itself, and the rhythmic beat between Altruism and Competition can be properly set up. Whereas, if the work of School and College is too prosaically and continuously competitive, the more promising pupils are often tempted to throw themselves eagerly into some group of adult thinkers, who overstrain and over-stimulate in them the desire for communal self-effacement. Then comes the necessity for taking up the life of bread-winning; the desire for worldly success reasserts itself. The consequences of this violent return to the worldly life, after too long a spell of Port-Royal-like Altruism, are not unfrequently disastrous to both moral stamina and intellectual power. It will be found a good rule to make all work which is properly *intellectual*, all which involves serious thought, either individual or communal; and to reserve competition for those portions of time which are devoted to the acquiring of skill, accuracy, and speed, by practice in what the pupils already understand perfectly. The stimulus of competition, when applied at an early age to real thought-processes, is injurious both to nerve-power and to scientific insight.

CHAPTER II

THE PREPARATION OF THE UNCONSCIOUS MIND*

IT is a common mistake to suppose that no preparation for science is needful or possible, except early teaching of what are called scientific subjects. Early attitude is far more important than early teaching.

Medical authorities have told us that consciousness resides in but a small portion of the total machinery by means of which we think and learn, and that it is dangerous and futile to over-feed and over-exercise that small portion, while neglecting that larger portion the action of which does not immediately cause consciousness. And, indeed, there is much reason to believe that the amount learned by children might be very much increased without the least injury to their health of body or mind, and with much less exertion than is now imposed on them and on their teachers, if the cultivation of the unconscious and that of the conscious portions

*Most of this chapter is a reprint from the report given in the *Parents' Review* (July, 1899) of an address at a conference of the "Parents' National Educational Union."

of the organism were kept properly balanced and adjusted to each other.

In the old days of classical education the training of the unconscious mind was necessarily little connected with school subjects ; one can learn nothing about a dead language except by reading books or being told things. Children learned Latin in school ; and the unconscious informing of the mind was done in haphazard fashion and by means of quite other subjects. Much of it was called "idling," or "mischief," or "naughtiness." The educational profession has not quite shaken off the influence of this old state of things ; it should not be blamed if it has not yet realized what needs doing in the direction of informing the unconscious mind. For the present generation, at least, it will be wise of parents to assume that teachers, on the whole, err in the direction of attending too exclusively to the conscious mental action and that they, the parents, must compensate what is lacking.

The first thing we must do is to resolve seriously that a good deal of time before the age of ten, and of the vacations afterwards, shall be resolutely dedicated to the training of the unconscious mind. We must not only discourage the setting of holiday lessons by masters ; we must also check in ourselves the tendency to overflow into being amateur professionals, so to speak, spoiling the future work of the professional teacher by premature and amateurish teaching.

Many parents seem to think that all the time is wasted for their children which is not spent in taking in consciously some special idea which some adult already understands. We must get rid of this notion entirely. A writer on education* has said that a human being comes into the world not chiefly to acquire knowledge or to develop his faculties, but to establish relations ; and I would add that a child comes into science, not only to learn facts and to develop the faculty for doing things, but primarily to establish relations with the laws of nature, by which we mean—if we truly mean anything—the laws according to which the world is governed. And in order that relations may be properly established, the adults who are directing the child must, at proper times, keep silence even from good words.

I fear we are in some danger of forgetting, in the rush of modern education, that conscious mental effort rather interferes with the work of establishing relations. The time for establishing relations is the Sabbath of the I Am, the Jubilee when the land is lying fallow. Sabbath does not mean any sort of conscious exertion. But on the other hand it does not mean useless idleness. A

*Miss Mason.

mathematical writer on logic* of the nineteenth century wrote, that to listen to the voice of the Eternal Teacher we must make silence from conscious learning or even thinking ; and adds, "In these days we need repose far more than we need work. Repose is the brother of silence. We are sterile for lack of repose far more than for lack of work. The wise man acquires wisdom during the time of his repose." A mathematician of the eighteenth century said that Sabbath and Jubilee mean, not mere cessation from work, but renewal. Sabbath, Jubilee, Holy Days, Holidays, mean, in fact, time to renew our force for future work by getting our relations with unseen forces, with nature, with man, and even with tools, more true, more perfectly harmonious, more elastic and easy than is possible while the conscious mind is acting on the relation. Begin therefore as early as you can to set up in the child's mind what one may call a Sabbatical rhythm in science ; a clear distinction between the time when he is being taught by man and the time when he is free to investigate or experiment as he pleases. Give him limits of time and place, lay down certain necessary negative conditions for safety and health, and to avoid annoying other people ; and let the child realize that during that time, in the allotted place, provided he conforms to the prescribed conditions, no one will interfere with his experimenting exactly as he pleases.

It is curious and painful to observe how many things have been proposed by true educationalists, simply for the purpose of ministering to the action of the unconscious mind, and afterwards perverted, by persons possessed with the teaching mania, to the purpose of stuffing into children's minds some idea which is in the teacher's mind. This is especially the case in regard to early kindergarten work. Each object is catalogued as intended to teach this, or to prove that, or to illustrate so-and-so ; many parents seem to have no idea that it may be well to let a child have things and handle them, without any one talking, and find out what the things have to say.

We have now to consider three points connected with sciences :

(1) What kind of teacher is likely to err least in the matter of neglecting the unconscious cerebration ?

(2) Assuming that many teachers will err in that direction, and that the parents wish to utilize the time before school age, and the holidays later on, for the purpose of compensating this one-sided action of the school ; how shall they decide, in any given case, on the kind of subject most likely to be useful in this respect ?

(3) How does one set about to direct the action of unconscious cerebration, in science ?

*Gratry.

First. What kind of teachers do least harm in the way of neglecting to provide material for unconscious cerebration in science? Those are most neglectful of it who have "got up" the elements of several sciences, simply in order to be free to advertise themselves as able to teach, and who have no other connexion with, or interest in, science than that. The best science teacher is usually a thoroughgoing enthusiast in the science itself, who, in the intervals of regular teaching, gets his pupils to assist him in his own investigations or pursuits. But that supposes an ideal condition of things; and ideal conditions can seldom be secured. As I said, the responsibility for unconscious preparation for science lies with the parents at present.

This brings us to the second question: How shall the parents decide for any given family what subjects can be most usefully employed as food for the unconscious brain? Choose for this purpose some subject to which you see the child attracted; and one the materials for which are at hand or can be procured without effort, or strain, or fuss. The means used for feeding the unconscious brain should be as far as possible dissociated in the children's minds from any notion of doing things *for their own instruction.* Whatever you set children to do for this purpose should be done either to amuse themselves or, better, to amuse some one else; or by way of helping some one else; and by means of objects which you can introduce into the house for purposes of play, or use, or ornament. If there is any one about, a relative or intimate friend, who knows some science subject well and is not a professional teacher—an uncle electrician or photographer, a friend who owns a star telescope, an aunt with a hobby for collecting seaweeds or growing ferns, a nice friendly carpenter or blacksmith in the place where you go for holidays, let the children spend as much of their spare time with this person as they and the person wish. Lay no stress on their learning any special thing from him or her; leave the children to absorb whatever impressions they can gather. A country-bred girl who in her own childhood went nutting and blackberrying, or worked in a little garden, may be a better holiday companion for children than the town-bred, school-trained governess, however much the latter may know about "ovaries" and "stipules," and the names of classes and orders.

Thirdly, when you have decided on your subject, how shall you proceed to direct the action of the children's unconscious brain towards it?

We will begin with the preparation for Natural History. Choose as pets animals to whom you can give some sort of real natural

life. Give the children something to do in connexion with the animals. If you cannot entrust the feeding or cleaning of the pets to the children, you can at least make it their business to give the horse his daily treat of fruit or sugar or bread, the dog his bath or swim. If you have birds in cages—a thing which I cannot believe is right where there are children, as I think it gives them a false start as to the *rationale* of our power over the lower creatures ; but still, *if* you do—let the children accustom the birds to fly about the room and perch on their hands and heads. Let them make a garden for the cage-birds by sowing bird-seed and chickweed in pots, so that they may watch the birds picking green shoots as they grow. But it is far better to let them feed and tame wild birds.

I am not going to join in Michelet's protest against accustoming children to masses of cut flowers ; but I will say that there is no use in trusting to cut flowers and exotics raised by gardeners as preparation for understanding Nature. Let the children have such homely plants as thrive without very skilled care, and attend to them themselves. Let them also grow such things as mustard and cress for the family use. I wish to call special attention to the advisability of children doing such things as a contribution to the family's resources. It is advisable, not only on moral grounds, as tending to promote unselfishness, but because it makes it easier to secure repeated performance of the same task, with slight variations. Incessant novelty stimulates the conscious brain too much ; monotony tends to dull the whole brain ; but a duty which has to be done under varying circumstances, a uniform result which has to be properly attained under varying conditions, does much to furnish with material the unconscious brain. A child who supplies the family with small salad at stated intervals has to water it in dry weather, shelter it from very scorching sun, grow it in pots in town, and in the hardest frosts on a flannel near, but not too near, the stove ; he thus becomes accustomed to the feeling that Nature's unvarying laws of growth present multifold difficulties to finite man.

We come now to preparation for the physical sciences.

If there is a seltzogene in the house, let the children see it made up ; not once only, with an elaborate explanation of the action of acids on alkalies—*that* appeals to consciousness ; let them see it done as often as they wish, till they become saturated with the sense of the invariableness of the action ; till they are sure that, though mother can make mistakes, the chemicals never do, and that when anything goes wrong it is because the human agent has been wrong.

The habit of using tools quite experimentally on a variety of material will be useful. The science of mechanics deals largely with resistances and strains. When the teacher begins talking of these things it is advisable that his class should have ready a basis of sub-conscious experience of the resistance of various woods to the hammer and saw. If you turn the children loose in company of some nice person of the artisan class, you may wish to make some compensation for any waste of his time the children may cause; let it take the shape of an informal present at the end of vacation, not of a weekly wage. The man who is hired to teach at a fixed wage feels bound to teach; he is sometimes tempted to treat pupils as if the business on hand were learning a lesson; to give them the right kind of wood to make each object of, cut ready into the right-shaped block to begin upon; to tell them in what order to do the various portions of the work, and which tool to use for each operation and how to handle each. It is desirable that children should sometimes be free to experiment under varied and accidental conditions, to use the wrong kind of wood and the tool which is not quite the best for the purpose, and hurt their fingers a little, and learn by making mistakes, with some one about who will protect them from seriously wounding themselves, will quietly prevent their making overmuch use of tools too heavy for their small hands and therefore likely to injure the flexibility of their muscles, and to whom they can apply when puzzled or discouraged.

There is some connexion between the due feeding of the unconscious brain and the process of going *wrong*; by which I mean going at first some way which is not the ultimately right way. The nature of this connexion is as yet obscure, but it evidently exists, and we have to deal with it. Parents are given to children in order to prevent their going wrong in ways which will compromise their future; we must not, more than we can help, let them permanently injure their health, or acquire habits which will handicap them physically, mentally, or socially, or grow up ignorant of things which they ought to know. But the more careful we are in these respects, the more, not the less, we need to compensate the lack of wrongness in serious matters by providing abundantly safe opportunities for going wrong, and learning by experience, in matters of no consequence. For among all the habits which science requires us to form, none is more important than the habit of learning when there is no man to teach us, of profiting by our own past errors, of rising on stepping-stones of our mistaken selves to correcter judgments. Now there are few places in which a child can do so many things wrong, without injury to himself or annoyance to any one else, as in a

carpenter's shop. He can begin to make something out of wood that has a flaw, or that is too soft for his purpose ; or he can try to gouge out a piece that is too hard for anything but a very sharp chisel to bite into. He can begin on too small a piece ; he can begin without taking proper measurements and put his centre-bit in the wrong place ; and, when he finds himself baffled, he can try again another way. And when he is tired of failures he can ask the carpenter how *he* begins ; and that is a useful lesson in modesty. And he can get so delightfully dirty without any real soil or filth. But, if not in the carpenter's shop, then elsewhere, provide somewhere, somehow, opportunities for children to go wrong and make mistakes, under the protection of some one who will not interfere with them till they ask for guidance, unless serious mischief is threatening.

As preparation for hydrostatics, let the child dabble in water, with hands and feet, in warm water and cold, in salt water and fresh, as much as is safe from the health point of view. Let the baby have things to float in his bath, sticks, shells, toys of wood and china. Let him turn the water-tap on and hold his hands under it and experiment on making splashes of many shapes and kinds. I do not mean that you should tolerate such disorderly mischief as turning taps on the sly and flooding the house ; that is bad training for the child as well as inconvenient for the household. But when you are by to see that no harm is done, let the child turn the water-tap when he wishes ; not once in order that you may show him something that you can see happen, but habitually. Let him play with falling water. What is wanted is to get his finger-tips, so to speak, quivering in response to the tremor of water at various temperatures and densities, and moving in various ways. All these physical experiences pass up to the brain and produce some impression there. They do not constitute knowledge ; a man may dabble in water all his life and remain ignorant of hydrostatics as a fish ; but they do form the unconscious material which, when he comes to study hydrostatics later on, will make his knowledge living and real, not shadowy.

When a child's attention is attracted by any unfamiliar occurrence, especially by any such sound as that of a singing flame, or by a moving light on the ceiling, do not unnecessarily distract him. As long as he is interested and happy, leave him alone. Let him acquire the habit of quiet and silent observation.

As preparation for learning electricity, do not be satisfied with once showing the child that sealing-wax rubbed on flannel will attract bits of paper, but let him have a stick of wax, or better, a

common vulcanite comb and a piece of flannel, and keep them, and try all the experiments he wants to try. Let him learn by experience that after a time the comb discharges and needs to be rubbed again ; that if he touches the table with the charged comb it discharges at once and he has the labour of rubbing over again. As soon as he can be trusted to handle a glass rod without cutting himself, let him have one and an old silk handkerchief. Do not attempt to explain why the comb must be rubbed with wool and the rod with silk ; but let him find out that so it is. I have seen a charming set of toys made (from receipts published by Tyndal, for poor boys) out of paper and pith, wire and scraps of sheet tin, some sealing-wax and a few needles, with which two children, aged three and a half and five, played the whole afternoon. The habit of using them seemed to have evoked in the small mites a deftness of touch on apparatus, and a sort of personal acquaintance with what scientific people call the "behaviour" of electric force, its manners and customs under a variety of conditions, quite different from any knowledge that would be imparted by any kind of teaching.

Of course the child has a magnet ; but he too often uses it only for attracting the regulation ducks and fish ; he should be provided with a box of iron filings and some small nails. A second magnet increases the range of free experimentation.

Most children delight in machinery which moves with a slow, steady, rocking motion. Let them waste as much time as they like in watching it. A hayband twister such as is still in use in remote country places, the spinner of an old-fashioned rope-walk, the rocking piston of a steam ferry-boat, becomes quite a familiar friend of children who have the opportunity of cultivating its acquaintance. They might have many worse friends. But a better one still is the Sympalmograph or Harmonograph, especially the old-fashioned kind, made of two pendulums swinging different ways, and holding between them a pen, which traces exquisite curves that suggest wings, and flames, and strange unknown flower-forms. If you know where lives one of these old harmonographs, cultivate the acquaintance of the owner, and get leave to let the little ones see the big, ugly, lumbering monster creating the most fairy-like beauty by simple obedience to rhythmic law. Do not preach or try to explain ; let the motion itself lay its spell on their souls and preach a sermon too eloquent to be translated into human speech.

I said that children can have worse friends than a steam piston. One of these worse friends is the person who interrupts their fascinated contemplation by saying, "It is waste of time to watch

this old slow-coach affair ; if you want to see machines, I'll take you to see one that will turn out a gross of diagrams while this lumbering old thing makes one, a mile of rope while this makes a yard." If a child is left to his natural instincts he will prefer to be able to follow what is going on. The love of very rapidly whirring machinery is an acquired taste, and, for a child, an essentially unhealthy one. It is bad for nerves and eyesight ; and if a child does like it, it is in the kind of mood in which, if he got into the same later on, he would not be likely to make a scientific discovery; he would be more likely to take to drink, or gambling, or sensationalism in politics, or to startling the public with violent attacks on sacred things, or, in short, to anything in the world which is most emphatically *not* science.

A modern child must of course acquire some sympathy with the desire for rapid achievement ; but there are better ways of introducing him to it than stunning him with the racket of rapidly whirring wheels. Choose, if possible, some machine which makes little whirr, bustle, or dust ; which causes no vicious tremor to eyes or nerves ; and in which the large amount of work got through in proportion to the amount of force exerted by the operator is due not to any piece of the machine moving quickly, but to the facts that every touch of the operator's finger sets a great variety of parts moving, each one at a moderate pace but exactly in harmony with all the rest. The Linotype composing machine is admirable in all these respects ; and the amount of work done for one movement of the compositor's finger might fairly be called miraculous.

There is at South Kensington a selection of machines well chosen for educational purposes. Some of the models are only set working by special request made beforehand ; but several work at stated hours daily. The most attractive to children are those which they can turn on themselves by touching an electric button. When you are at the Gallery, do not be in a hurry to explain ; do not talk unless the children ask questions ; and do not imagine that the afternoon has been wasted because you have no proof that any special thing has been learned. The sensation of putting one's finger on a button and seeing a whole army of wheels, cogs, levers, and hammers respond, as if by enchantment, to one's touch, is a tremendous revelation to a child's sub-conscious mind : and, until the sensation is quite familiar, it ought to be undisturbed by any conscious teaching. The day when a child receives any great new revelation of his own relation to unseen forces should be treated as a Sabbath, a Holy-day, and no work of mental effort should be imposed on him that day.

There are three volumes, called *La Science Amusante*, written in French—easy and very beautiful French—by some one whose *nom de plume* is "Tom Tit." They supply suggestions for a great variety of experiments which can be carried on at home, and which seem to be admirably selected for the purpose of training the fingers, and through them the unconscious brain, into harmony with natural law.

Real and repeated experimentation with commonplace objects has a far more educative influence than a constant variety of so-called "mechanical" toys. The common peg-top is a valuable teacher, and, like other teachers, should be allowed to speak to its pupil in its own language. When a top is asleep (i.e. when its rotation is perfect) it can be picked up from the ground and made to jump from hand to hand without its rotary motion being interfered with ; whereas the same action stops the rotation of a top which has not yet settled into its spin or which has nearly exhausted its impulsion. There are some conceptions in physical science which present no difficulty to one who, years before he hears any discussion about matter and force, has made a long series of experiments with the same object rotating under varied conditions. A useful toy for illustrating the interaction of opposing forces is the sling, which suddenly exhibits tangential motion at the moment when the stone escapes from the counteracting force of the string. A small weight fastened to an elastic string represents the dual force under which the planets move, the force of attraction alternately yielding a little to the tangential impulse and slightly overcoming it.

The practice of playing with such toys as the sling and stone, the sucking-valve, the old-fashioned rope-maker's wheel, and the bandalore, may be made a means of accustoming children's nerves to the feeling of Nature's opposing tendencies, and may prepare the organization for receiving knowledge, later on, into the conscious brain. By training the hand to trace out Nature's action, we train the unconscious mind to act spontaneously in accordance with Natural Law ; and the unconscious mind, so trained, is the best teacher of the conscious mind.

The delight that most children take in swinging is the outcome of natural physical craving to be in line with Nature's forces. This purpose is best served by the pace at which and the height to which the child is swung being regulated according to his own instincts. If we excite him to allow himself to be swung higher than he likes, either by competition with other children or by the injudicious comments of adults, we do something to turn what should be a preparation for future revelation into a preparation for

future vice or brain-disease. The element of competition has its place, and a very important one, in education ; but its function is to stimulate to active exertion among known facts. Children may legitimately run races for a prize, or compete together as to speed and accuracy in working out sums by methods already quite familiar ; but whenever the business on hand is revelation, whether by learning to understand a mental process, observing a natural fact, or tuning the nervous system into harmony with Nature's rhythmic law, the idea and feeling of competition should be entirely absent. Too much stress cannot be laid upon this point. The false crossing of influences, the applying of stimulus inappropriate to the particular function, especially the dragging of the element of competition into the wrong portions both of the educational life and the professional life, are responsible for more of insanity and vice than any one dreams of who has not given very special attention to the subject.

Of arithmetic and algebra I shall say little here, as they are treated in another chapter. Only one point I will lay stress on. Many a life of intellectual muddle and intellectual dishonesty begins at the point where some teacher explains the rule for Greatest Common Measure to a child who has not had the proper basis of sub-conscious knowledge laid in actual experiences. Therefore, if you value your child's future clearness in science, trust no teacher to tell him anything about G. C. M. or L. C. M. till you have ascertained that he is able* to find, easily and accurately, by means of compasses, the longest length that will repeat exactly into each of two unequal given lengths, and the shortest length into which each of two given unequal lengths will fit.

We now come to the subject of geometry, the condition of which affords, it seems to me, a standing warning against directing educational care too exclusively to the conscious mind, and neglecting to provide food for unconscious mental action.

There seems to be evidence that in ancient times all people in good society were expected to know simple truths about geometric forms in the same way as we all know simple facts in natural history. The elementary properties of the triangle, parallelogram, circle, ellipse, and spiral seem to have been familiar to ordinary people. They were not expected to know much about geometry, but they were expected to have and to use ordinary faculties of observation on facts within every one's reach. Euclid was, in his day, a sort of Darwin of geometry. He wrote not a geometry for beginners, but a book about the logical concatenation of geometric facts for men already geometers ; just as our Darwin wrote a book

*See *The Logic of Arithmetic.*

about the concatenation of biologic forms for people already biologists, to the extent at least of knowing that horses prance and dogs bark and wag tails ; that worms creep and birds fly ; that some flowers have scent ; that some fruits are sweet and others are sour.

Euclid's book was a type and model of all that a good book on logical concatenation should be. The use which was made of it till lately is the type and model of how such a book should not be used. Teachers assumed that the excellence of the book gave them the right to use it in defiance of all the laws of psychology. The result of such misuse is always the same : *loss of natural instinct.* Textbooks are written expressly on purpose to inform the *consciousness.* A good textbook should explain everything step by step, and should assume nothing which it does not actually state. Euclid does this in perfection. He wrote, as I have said, for men for whom the words triangle, circle, parallelogram were already charged with associations ; and he gave definitions intended for the purpose, not of telling something fresh, but of clearing up and settling conceptions which were hazy from long familiarity.

Now when it became customary to give to boys of ten or twelve what Euclid wrote for grown men, that was not far wrong ; boys now can quite well assimilate what was grown-up food two thousand years ago. But if children of twelve are to learn what Euclid wrote for advanced men, children of three should be acquiring the sub-conscious physical experiences which lads in Greece picked up in the course of nature and by the accidental help of architecture and statuary. This precaution our grandfathers entirely omitted. The effect was somewhat similar to that which would be produced if it ever became the fashion to make children learn theoretic natural history from books illustrated by flat diagrams, before allowing them to see any real animal or plant. *Europe has lost geometric instinct and the habit of geometric observation.* All of us at this time are in a condition of artificially paralysed geometric faculty ; and now the aim and study of all true mathematicians is to restore the vitality of geometric instinct.

One partial remedy that has been suggested, by Spencer among others, is to substitute for Euclid some book of similar kind but less perfect of that kind ; some book which mixes up a little real geometry with Euclid's idea of logical concatenation. This does not go to the root of the matter. The remedy is not to substitute for Euclid some inferior and less thorough textbook, but to precede and supplement the use of textbooks by some gymnastic calculated to restore normal vitality to the paralysed natural faculty. A very great deal has been done of late years, by mathe-

maticians, in the way of suggestions towards the creation of such a preparation. The misfortune is that our mathematicians do not yet know how to explain their ideas intelligibly to non-mathematical mothers and lady nurses.

What is emphatically *not* wanted is that unscientific mothers and nurses should learn something about geometry and teach it before the school age ; what *is* wanted is that we should deal with those type-forms which are the subjects of geometry on the same principles as we ought to deal, and to a great extent do deal, with the other classes of form : the living forms evolved by nature, and the artificial forms created by man for his use, such as furniture, domestic appliances, and ornaments.

First comes the education of the senses. From the time when an infant begins to stroke the cat, to smell flowers, and to handle a spoon, have geometric solids as ornaments or toys, so that the senses of sight and touch may actually develop in contact with true type-form.

Next, the training of associated ideas. When you purchase type-forms, have the correct names written on each, and take care to call each by its name, so that the children may grow up with well-formed groups of associated ideas clustered round the words which mathematical teachers will use. Be as careful as possible not to misuse mathematical terminology in daily talk ; either use it accurately or not at all. For instance, do not talk about the "centre" of a long table, nor say "ellipse" when you mean the oval suggested by two intersecting circles.

Then comes the training of the executive faculty. When the child can handle a pencil firmly and has outgrown the stage of mere scrawling, when he begins brush-drawing of flowers, or the drawing in pencil of boats and houses, give the hand also some training in the production of type-forms and the use of geometric tools. A violin, by the fact of being played on repeatedly, ripens and mellows into fitness for making music, because a relation is gradually established between the wood and the musical scale ; and so it is with a child's brain ; when he is generating type-form, some relation is being established between the brain and the laws which govern the generating of curves.

Lastly—and this is probably the most important preparation for future living comprehension of mathematical ideas—there is the cultivation of the geometric imagination. At the same age at which the child begins to realize that a tadpole grows into a frog, a boy into a man, a seedling into a flowering plant, let him have the opportunity of watching also how one geometrical type-form grows out of, or flows into, another. A common night-light placed

in the bottom of a deep round jar in a dark room throws on a sheet of cardboard held over it patterns of conic sections, which pass into each other as you change the position of the cardboard. Children very early learn to love watching figures thrown in light; and there is no age at which this amusement can hurt them, provided that the motion is slow, and that no one excites them by trying to explain things. A variety of other methods for training the geometric imagination at a later stage will be dealt with in a future chapter.

I am happy to be able to inform busy mothers that at early stages the needle and thread has many advantages over any other implement yet devised; a child can ornament cards by setting long straight stitches in a way which causes beautiful curves to grow under his hands without his knowing why or how, and without any pattern being set for him.

In the kindergarten attached to Bedales School the children generate designs suitable for tiles or carpets by the grouping and intersection of parabolas, curves of pursuit, etc.

In many of these designs lines are first drawn which represent the ribs of some natural leaf; and these are then used as co-ordinates, by means of which a leaf-outline is evoked as the envelope of a system of tangents drawn in silk. Some of these designs have been noticed in the Inspector's report that he had "found that the teaching of the calculus was leading to a most interesting evolution of design." The beauty of some of the designs is unquestionable; and there can be no second opinion about the value of the method, as training, from the point of view of geometry as well as from that of art. What is not quite so obvious at first sight is its bearing on the training of the unconscious mind for science. Without the slightest intellectual strain it puts the children through that normal sequence of orderly attention to classification and detail, interspersed with nodal points of synthesis, which may be called the very breathing-rhythm of the scientific discoverer.

But to make this exercise of any use there must be no copying from diagrams; the value of it depends on the child evoking a curve, watching it growing, under his fingers, from mere obedience to a law.

When children are introduced by any such method as the foregoing into the laboratory of the great creators of scientific thought, three classes of comments are made by adults who do not quite understand what is going on. The first takes the form of a congratulation on the cleverness of children at the present day. "I did not know what a conic section was when I was sixteen." The second, of alarmed remonstrance. "Isn't it dangerous to worry

little children's brains with such learned subjects ? It is far better for a child of seven to be stitching round the outline of an animal or a house on the ordinary kindergarten cards, or even working a sampler as our grandmothers did, than to be stimulating his brain with abstract mathematics." The third comment is one of scornful incredulity. "Now, do you believe those children understand what a parabola is ? Somebody must have shown them how to work it ; the teachers are only showing off."

I will answer these comments in order :—

There is no more cleverness in a child drawing a curve than in the pendulum of the harmonograph doing so ; in both cases alike an implement has been set moving according to a certain law, and beauty has resulted, not from understanding but from obedience. As for any strain to the brain, stitching a curve from its tangents is not more straining to the brain and nerves than stitching round a printed outline, not nearly as much so as working the fine cross-stitch samplers of our grandmothers. The difference is that working a sampler and following a ready-drawn outline cultivate only neatness and dexterity, but the act of evoking a curve "out of the everywhere into here," by simple obedience to a rhythmic law, lodges an impression on the unconscious mind which will be ready to surge up in ten years' time, and perhaps make some class-teacher at College wonder why this boy or girl, though not very studious and full of all sorts of interests outside the curriculum, never had the least difficulty in grasping the idea of the differential calculus. As for the implied suggestion that there can be no other alternative except either conscious understanding or else dishonest "show-off," let us notice this : If the child had grown some cress in his garden, no one would have asked whether he really understood the laws of evolution, or whether he was only "showing off" ; every one would know that he neither made the cress, nor thought he made it, nor pretended to make it ; by sowing seeds as directed and watering them at due times he summoned to his aid forces of growth which he could not understand, and they responded to his call and they made the cress grow. Why had he not as good a right to summon to his aid the forces which make a curve ? The cress grew even while he slept ; and the curve grew while his conscious brain slept. And if the one thing is not as simple, as restful, and as unpretentious as the other, it must be because some one is making a needless muddle about what might be a perfectly normal element of child life.

CHAPTER III

HYGIENIC SEQUENCE IN DEVELOPMENT

As I shall have to speak of artificial as contrasted with natural movements, of tools (physical and intellectual) which it is natural to use as contrasted with those the use of which is artificial, I must begin by explaining that I entirely recognize the principle "habit is second nature." At any given stage of an individual's progress an action is natural to him if he is already so accustomed to it that the whole series of movements necessary for carrying it out follow each other spontaneously at the command of one single effort of will. The principle which I wish to illustrate is that actions which are artificial should be practised in connexion with ideas which are familiar ; and new ideas should be learned by means of actions which are natural ; e.g., we ought not to try to teach a little girl to cut out a doll's frock as long as she has to stop with the scissors in her hand and think how to open and shut them. We let her learn the series of movements involved in the act of cutting by reference to some idea already familiar to her, such as that of dividing a piece of paper in two. The normal series would seem to be of this kind : The child is born with the instinct to desire food already perfected. This instinct gradually trains and co-ordinates the movements of the hand ; the child learns to grasp things and put them to its mouth. When this process of grasping and guiding the hand is familiar and automatic, the child associates it with a fresh idea, that of controlling and changing the condition of things ; first she only moves things about ; then some day, when she is grasping a piece of paper in both hands and shaking it, the paper gives way, and becomes two pieces. If you watch the little face when this happens you see how great a revelation is taking place in the mind. The fact of man's lordship over things has burst in upon the infant brain. This revelation has taken place in connexion with a series of muscular movements already natural because co-ordinated. When the new idea of destruction has become quite commonplace and familiar, we use it to teach the little creature the manipulation of scissors, by setting her to cut (instead of tearing) paper. We allow her to cut for mere cutting's sake, till the single thought "I will cut" suffices to place her finger properly in the holes, to initiate the movements of opening and shutting, and to direct and steady those movements. Till this is accomplished the use of scissors is artificial ; and, while it is so, we do not puzzle the brain with any new idea in connexion with scissors ; they are used

only in doing what the unaided fingers did before—severing the paper. Not till the process of cutting has become a natural one do we introduce the new idea that destruction is not to be merely destructive, that it can and should be directed towards some definite aim, subordinated to some constructive purpose ; at no step in this sequence is the mind distracted by trying simultaneously to receive a new idea and to correlate for a still artificial process.

I believe that hardly any mistake in education is more disturbing to normal brain-action, more likely to induce nerve-storms in delicate children, or more dangerous to future brain-power in all children, than the attempt to convey a new idea by means of a process still artificial (i.e., inadequately co-ordinated) or to teach a new process by means of an idea still unfamiliar. Another aspect of the same principle is expressed in the homely adage "Fingers before forks." The word "before" of course is here a pure adverb of time ; it has no reference to ultimate preference. None of us wish our children to grow up savages and grasp mutton chops in their fingers ; but none of us teach a child the use of a fork until after he has acquired the art of holding a bit of bread firmly in his hand and carrying it steadily to his mouth. We do not attempt to teach him the use of artificial tools for extending the scope of any action, or for refining the method of it, until the movements necessary for performing that action at its more elementary stages have been not only learned, but also perfectly co-ordinated by long practice. Think what an oculist would say if we taught a baby to use optical instruments before the focussing apparatus of its eyes was under proper automatic control ! He would warn us that a child so treated would not be likely ever to get the best use of either simple or artificial vision.

So far as physical tools are concerned, it is quite admitted as a principle of Educational Psychology that there should be a long interval between the first suggestion of a new idea and the use of special tools for carrying out that idea into its late ramifications. It is also admitted that the use of new tools must be learned by reference to ideas already familiar ; and that application of the tool to carry out complicated ideas should be suggested only after the actual manipulation of the tool has become quite familiar and automatic. Nor is any one, as far as I know, careless in carrying out the principle where the physical tools are concerned. I have yet to meet the mother or nurse who would set a child to cut out a shape the first time it was trusted with a pair of scissors, or who would allow it to get its first notions of tune while learning to hold its hands properly on the piano. But there are such things as

intellectual tools and processes. Unfortunately Educational Psychology has not yet got a firm grasp of the distinction between intellectual tools and processes and the ideas worked out by means of them. It is hardly yet sufficiently understood that there is as much difference between a scientific ideal and the process by which we realize it as between the idea of a frock and the process of making it ; that there is as much difference between a mathematical principle and the formula in which it is registered as between a loving message and the paper on which it is written.

To make clear what it is that is so chaotic in this matter, let us consider the question so often asked, "When should a girl begin learning Elocution in the dramatic sense?" The answer should be, When, besides understanding the construction of sentences, she speaks and reads simple books well, when she has complete mastery of all the elementary sounds in the language, can pronounce each of them singly and purely, and can make them staccato or prolonged at will ; and can also make readily any desired sequence of two or three sounds. The processes to which I refer (correct articulation, etc.) are the tools which dramatic elocution must use from its beginning ; therefore they should be perfected, before it begins, by carrying out the reading of simple tales and recitation of easy poems. When the pupil has, by means of them, arrived at some progress in expression, it will be time to teach other processes for carrying dramatic effect to a higher pitch. But, as things are, parents send a girl to a Shakespeare class because "she reads so badly, and it is such a nice accomplishment to be able to read aloud well." The poor elocution teacher is expected to jam together exercises which belong to quite different periods of development. How can a girl take in the sense of a drama, or learn to express its emotions, when the emotion itself is interrupted at each moment by instructions about how to move the jaws and tongue to produce a particular sound? The relation between the form taken by the mouth and the sound produced is in itself an interesting study ; but who can understand it well enough to be interested if she is being nagged at about how to express the emotions of a lover in a play ? The elocutionist has to instil habits which ought to have been acquired before the child was six, while teaching her to recite effectively poems which she should not read till sixteen. Who can say at what age this ought to be done?

The mathematical formulae which some people speak of contemptuously as "dry" are in reality as beautiful as microscopes, or any other well-adjusted and well-finished machinery intended to extend the scope of man's powers ; and as for mathematical ideas themselves, they are as grand as any expressed in poetry.

Comparatively few people get any real enjoyment out of either; and the reason obviously is that their faculties have been stamped into confusion by a method which I can only compare to that of making a child use a telescope before it can see properly with its eyes; using a complicated machine for extending and refining certain work before he has learned to do, without it, the simpler kinds of that work.

To make clearer what it is that is wrong, let us think of an orchard, at harvest time, which contains, besides the trees and fruits, the natural human limbs with which man picks the fruits he can reach; the stools, steps, and ladders of various lengths, which are an extension of his own legs and by means of which he rises to the level of the fruits which he cannot naturally reach; the sickles or fruit-scissors which improve on the action of the hand and enable us to bring down the choicest fruit without risk of spoiling its delicate bloom; the room fitted with shelves on which the fruit is stored for future use; and the basket in which it is temporarily packed for safe conveyance to the store-house. It is no exaggeration to say that all these various items have analogues in science, especially in mathematics. A mathematical textbook contains truths valuable in themselves because throwing light on the nature of human thought; other truths valuable for use in commerce or physical science; natural processes of reasoning by which the student can gain direct perception of some of these truths; artificial devices for arriving at others; refinements of various sorts; and formulae and tables in which truths are classified, stored for easy access, and preserved in the memory. It is pitiable to see how far are many students, even advanced ones, from any clear realization which of these various things is which. Many have no conception of the difference between direct and inverse in mathematics. They make no clear distinction between the truth itself, the ladder of devices by which they reached it, and the formulae in which they stored it. And can we wonder at this? No human being, I suppose, ever attempted to teach a child to climb a ladder, to use a fruit-sickle, or to store fruits on shelves, in the same summer in which it first was able to stand on its legs and grasp a low-growing apple, in which it first experienced the delight of eating fruit. It would probably be an under-statement of the case to affirm that a mode of treatment analogous to this has been inflicted on ninety-nine per cent. of the young people who have learned Algebra and Trigonometry even within the last ten years. The methods of doing this stupid thing have no doubt improved enormously since the early days of De Morgan; all praise is due to the patient workers who have done so much to improve

them ; but the stupid thing is still done ; and the parents and the public still insist on its being done. The questions so often put by parents, "At what age do you think my child had better begin Algebra ?" (or Trigonometry) and, "Can you recommend me to a good teacher ?" really mean something analogous to this :—"I intend to keep my child ignorant of all experiences concerning fruit, and all processes connected with it, till he is old enough to begin receiving straight away, in one continuous series of lessons, information, conveyed by verbal explanations, about how to stand on one's legs, how to climb ladders, how to use sickles, how fruits taste, their hygienic and economic value, their botanical classification, and the best means of preserving them. At what age do you consider this series of lessons should begin, and whom do you recommend me to employ to give it ?" The only answer one could make to such a question would be that there is no age at which any such course should begin, and no persons who ought to be asked to give it. The question asked by a parent should be, "At what age would you recommend me to let my child begin learning such portions of Algebra (or Trigonometry) as can only be learned by the aid of complicated devices invented, centuries after the science itself was an actual working possession of our race, for the sake of projecting its action into fields which would be inaccessible to it if only natural and simple tools were used ?" The answer should be, "When the process of learning by the more direct means has become so familiar as to be performed sub-consciously." The time to begin learning numeration on paper by means of digit-places is when the child not only knows but is familiar with the conception that a red counter may stand for ten white ones, and when he can count red ones "ten, two-tens, three-tens," as easily as he counts white ones, "one, two, three." The time to begin "proportion sums" is when he saves himself trouble in measuring or counting by the method of proportional measurements. The time to begin doing long sums in Greatest Common Measure and Least Common Multiple is when he is not aware of any difficulty in finding the lengths of the longest pattern that will repeat exactly in each of two unequal cornices, and the shortest length in which each of two patterns of different lengths will repeat. The time to begin Algebra on paper is when he amuses his baby sister by setting her little problems in which she has to guess what unknown number a certain coloured counter stands for ; and tells her that "long ago, when I was little, mother played that game with me." The time to begin formal Geometry is when making circles, ellipses, and equilateral and isosceles triangles, by means of compasses, pins, and a thread, is as easy as feeding himself with a spoon. The

time to begin theoretical Solid Geometry is when he has exhausted the interest of trying experiments in fitting together regular solid figures of different sorts. The time to begin the use of Trigonometrical formulae and tables is when he can no longer realize—though he perhaps dimly remembers—that there was a period of his life when he was not quite sure how to find the height of a church tower by means of a walking-stick and a yard measure. While we are on this part of the subject I may mention that there exist books for grown-up people on the so-called "Fourth Dimension," in which solid shapes, such as crystals, are treated as the shadows or sections of things not visible to or conceivable by man ; and that the time for getting anything except confusion out of such books is when one has a clear familiar knowledge of the true relation of the earthly shapes themselves to the shapes of their sections when cut, and of their shadows or projections on flat paper. For the majority of children the really right time for beginning any department of mathematics never comes, because the really right time is the time when the right condition of development has been attained ; and for nine children out of ten it never exists at all.

Between the process of introducing a concept or idea into a child's mind and its bringing forth as an intelligible entity which the conscious intellect is to handle and reason about there should intervene a period of gestation, during which the idea is left dormant and passive in the child's mind ; any attempt at premature interference is likely to result in abortion. We are not here reasoning by analogy ; we have independent experience of the need of intellectual gestation. I am using physical gestation merely as the readiest way to convey a clear notion what is the doctrine of medical psychology on this subject.

Parents imagine that if they have secured for their child the best textbooks and the best teacher they can they have done all that is necessary for his education in the particular branch of mathematics which he happens to be pursuing ; too often they have omitted to secure something much more important than the quality of the textbook, perhaps even than the skill of the teacher ; that is, a sufficient time-interval between the child's first introduction to the subject and his first introduction to the textbook and its machinery. The worst textbook in the world, where that condition is secured, will do more to make a genuine mathematician than the best without that condition. The textbooks have to squeeze together into any one chapter instructions which ought to be separated by an interval of months or perhaps years. And, moreover, the poor textbook has not only to teach what should

be taught to the well-prepared during several successive years, but also to mix up this teaching with attempts to supplement the deficiencies of those crippled and cramped by lack of natural exercise. (Therefore, when a textbook is put into the hands of a well-prepared pupil, one has to keep a little watch on his private reading of it ; a few words from the teacher are sometimes necessary to prevent his worrying his brain by efforts to find a meaning in long paragraphs which are, for him, useless rigmarole, being elaborate attempts to convey to the ill-prepared some slight and necessarily imperfect notions of things as to which the well-prepared cannot remember the time when they were not quite clear to him. This caution is important from a hygienic point of view ; the fatigue of wrestling with a long explanation, which at last turns out to be about something that needed no explaining, is often greater and always more unhealthy than that of learning what is really difficult). As things are at present, it is almost impossible for the author of a textbook in science to avoid linking together things which in actual teaching should be separated by long intervals of time ; it is for the parents and teachers to guard against misuse of the books. My object is not to encourage criticism of the existing textbooks, but to prepare a future generation of parents who will demand better ones, and whose children will be suitably prepared for using such. We may be sure that, as soon as we have created a demand for the right books, authors will spring up capable of meeting that demand. Meantime we can do a good deal to minimize the bad effects of the present arrangements by using the existing textbooks in a less slavish way than is commonly done. We can sort out for each child the elements of procedure which have become natural to him from those which, in his particular case, are still artificial ; we can instil new ideas by means of the former, and interpose between the new idea and the unfamiliar process that time-interval which is necessary for maturing and mellowing the idea itself.

I have seen in print disparaging comments on play-methods of introducing children to arithmetical ideas. Such criticisms seem to be founded on an erroneous assumption that the play-methods are intended to teach something about arithmetical procedure, for which purpose they are, as the critics perceive, ludicrously inadequate. But these methods have no relation to the teaching of anything : their use is to give to the infant brain a start on a line of development such that, in after years, when the intellectual teaching begins, it will be capable of receiving that teaching. I should be reluctant to insist on any opinion contrary to that of more experienced teachers than myself, *in any matter about which they*

have the experience. But the majority of professional teachers, at present, on their own confession, have no idea on what depends the receptivity of the child when the teaching age for the subject has begun. Parents also are still so unawake to this that they confuse preparation for a subject with premature teaching of the subject ; and do great harm by such premature teaching. Many teachers strongly deprecate amateurish attempts to instruct children before the proper time ; and in this I entirely agree with them. A concrete instance may help to make clear in what preparation for a subject consists. In my young days cards of different shapes were sold in pairs, in fancy shops, for making needle-books and pincushions. The cards were intended to be painted on ; and there was a row of holes round the edge by which twin cards were to be sewn together. As I could not paint, it got itself somehow suggested to me that I might decorate the cards by lacing silk threads across the blank spaces by means of the holes. When I was tired of so lacing that the threads crossed in the centre and covered the whole card, it occured to me to vary the amusement by passing the thread from each hole to one not exactly opposite to it, thus leaving a space in the middle. I can feel now the delight with which I discovered that the little blank space so left in the middle of the card was bounded by a symmetrical curve made up of a tiny bit of each of my straight silk lines ; that its shape depended upon, without being the same as, the outline of the card, and that I could modify it by altering the distance of the down-stitch from the up-stitch immediately preceding. As the practical art of sewing perforated card was already quite familiar to me, my brain was free to receive as a seed the discovery I had made, and to let it grow naturally ; all the more because no one spoke to me then of tangents, or tried to teach me any algebraic geometry, till some years had elapsed. Therefore, when I did begin to learn artificially about tangents, the teacher was not obliged to put cuttings into raw soil ; he found ready a good strong wild stock of living interest in the relation between a curve and the straight lines which generate it, on to which he was able to graft the new knowledge. The teacher came, not as an outsider thrusting on me the knowledge of something unfamiliar and strange ; but as a brother-seer more advanced than myself, who could show me how to make further progress on a path which I had already entered with delight. On such accidents as this of my card-sewing depends, I think, much of those special receptivities for certain subjects, quite distinct from great power, which puzzle psychologists. When we understand better how they originate, they will no longer depend on accident, and we shall more often be able to produce

them at will. But let me repeat once more: the receptivity cannot be generated by early teaching of a subject mixed up with the use of its appropriate technical machinery; but only by suggesting the new ideas by means of objects already familiar to the child's eye and touch, or of processes become habitual and automatic by use in connexion with a familiar idea. Unless this and a few other principles of normal sequence, admitted by all medical psychologists, are incorporated into the basis of our educational system, it is to be feared that more improved "methods" will increase the danger of abnormal sequences, and will turn out to be improved methods of injuring nerve-stamina, intellectual grasp, and moral stability.

CHAPTER IV

THE CULTIVATION OF THE MATHEMATICAL IMAGINATION

THEORISTS in education sometimes imagine that a good teacher should not allow the work of his class to become mechanical at all. A year or two of practical work in a school (especially with examinations looming ahead) cures one of all such delusions. Education involves not only teaching, but also training. Training implies that work shall become mechanical; Teaching involves preventing mechanicalness from reaching a degree fatal to progress. We must therefore allow much of the actual work to be done in a mechanical manner, without direct consciousness of its meaning; an intelligent teacher will occasionally rouse his pupils to full consciousness of what they are doing; and if he can do so without producing confusion he may be complimented and his class congratulated.

We teach laws of curves by reference to certain straight lines—tangents, co-ordinates, radii, etc. These lines bear the same kind of relation to the curves which the framework of sticks fastened into a pot bears to the climbing plant which is the true object of the gardener's care. The plant itself is living and growing; the justification for the existence of the framework consists in the fact that it would be impossible to get the true enjoyment of the plant without its aid. The co-ordinates form no part of what we want to teach about; but we cannot learn without their help. They enable us to see how the curve came into being, and whither it is tending.

Suppose then that a class while becoming skilful in working

problems, seems to have forgotten that the axes are no part of the curve itself. The teacher may wake it up by saying, "You don't imagine, surely, that axes form any necessary portion of a curve ? An ellipse, for instance, is the path of a body moving round a focus of attraction. Suppose a planet were endowed with the power of leaving a track in the sky, the track would be an ellipse only, unencumbered with axes. What are the axes, then ? Indications of invisible forces ? Not so. No line of attraction at any point of the orbit corresponds to the minor axis. The axes are *Human Devices* to enable us to measure and express the various elements of the orbit."

"Well, but," exclaims perhaps some clever pupil, "if the straight lines are unreal, if they mean nothing, why were they invented, and why were we made to study them ?" Such reasonable criticism is a great help to the teacher. He proceeds to picture the state of Astronomy in the days when nothing was known of the movements of the planets. He describes the first bewildered effort of the human mind to represent to itself the path of these wanderers. He shows how some man may have at last conceived the brilliant idea of projecting imaginary straight lines across the sky from one fixed constellation to another, thus forming a sort of background of measuring-rods ; how the constellations, with these imaginary connecting lines, might be copied on a tablet, and the path of the planet registered thereon from day to day ; and how Science might grow up by man inventing modes of measuring and registering curves which the living forces of Nature were describing in space.

This should come at the end of the lesson and be followed by a few minutes of silent meditation before the class breaks up and the pupils give their attention to some other subject. In the next geometry lesson co-ordinates should be treated in a purely mechanical spirit ; no fresh stimulus being applied to the imagination. But the class will go on with its work with renewed interest and quickened intelligence.

Again, the tangent to an ellipse is an imaginary straight line, representing the path which would be followed by the body tracing the ellipse if its connexion with the attracting focus were suddenly to cease. In its essence, the tangent is a sublime effort of the scientific imagination ; it pictures the result of a sudden cessation of the action of gravity. In practice, the tangent is a convenient line for indicating the curvature at any given point. The educational sentimentalists who object to mechanicalness ought, if consistent, never to use a tangent in working a problem without stopping to realize the grandeur of the idea involved. As

a matter of fact, such incessant strain on the imagination and on the perception of the sublime is unhealthy and deadening. We ought to use tangents, mechanically, as mere measuring-rods. But a good teacher will take care that no pupil goes through a year's work at Analytical Geometry without having been, once or twice, aroused to perceive the wonderful poetic conceptions represented by the lines he is using.

The above is a description of what, I suppose, everybody will recognize as a reasonable manner of dealing with a class of children, say, between the ages of fourteen and sixteen. The present chapter purports to show how this element of rationality can be infused into the elementary stages.

The teacher who would educate the mathematical imagination of pupils must begin by cultivating his own. It might assist him in doing this if he occasionally put before his mind a picture of a hypothetical class in Botany. Let him imagine a town whose inhabitants never have access to plants or flowers, except in botanical class-rooms, wherein are arranged microscopes ; lenses variously mounted ; forceps of various shapes ; dissecting needles and blades of many kinds fitted with convenient handles ; water-dishes for soaking specimens ; a few cut leaves and flowers, and a few plants in pots. It is not exaggeration to say that a state of things analogous to this has largely prevailed in regard to mathematics. It is needless to say that it is a bad state of things, and that reformers wish to establish an easy familiarity with geometric forms and conceptions previous to, and independent of, every sort of formal teaching. But, pending the possibility of this radical reform, some ways of dealing with the prevailing state of things are less bad than others. If a botany teacher in our supposed plantless, treeless town were to begin his course of instruction by saying to the class, "These objects on the table are plants ; and the movements which I shall cause to take place before your eyes will be processes of plant growth," he would create hopeless confusion. He would do the best possible under the circumstances by saying something of this kind : "A few of these objects are plants ; most of them are ingenious human devices for assisting man in satisfying the peculiarly human desire to learn about things which escape his direct cognizance. If we were angels or any other creatures possessed of super-human powers, we might be able to take cognizance of growth-processes in a direct manner ; we might see sap flowing in a branch and leaving deposits of fresh cells. But we human creatures cannot see growth-processes going on ; we can only infer or induce a knowledge of them by comparison of various facts. Even the facts by means of which we infer or induce a know-

ledge of the laws of vegetation are, for the most part, hidden from our immediate view ; we can have access to many of them only by tearing plants to pieces. I am, therefore, about to violate the sanctuary of this plant's life, to tear its structure by processes contrary to its nature, though suited to ours ; and thus enable you to see facts from which you may infer a conception of the nature of its growth. I could do this roughly with my fingers and nails, and you could then partially see with your eyes ; but the apparatus provided to man by Nature is adequate only for the satisfaction of his elementary animal needs ; if we would gratify our higher curiosity we must invent extra apparatus for the purpose. The forceps which I shall show you in use are fingers more sharply pointed than our own ; these knives and needles are specially adapted nails or claws ; with these lenses and microscopes you can see objects too small for your unaided eyes to perceive." I do not mean to say that any speech analogous to either of the above ever was made, or ought to be made, in words, by a mathematical teacher to his class. Confusion is created or avoided less by what we say or do than by what we take for granted. The latter of the two supposed speeches represents the conception which ought to underlie mathematical teaching : the former fairly pictures the assumption which too often does underlie it. The true remedy for the present condition would, of course, be such a general familiarity with superficial geometric truths as we actually have with superficial botanical truths ; a general knowledge such that no grossly false assumptions could prevail in a class. But failing that desideratum, or until we can attain it, the next best thing would be a clear conception in the teacher's mind of what the thing is which he is undertaking to do.

It should be understood from the first that no such thing exists as *a* right method of performing any operation in elementary mathematics ; because all rightness, and I may add all mathematicalness, depends essentially on getting each operation performed by *two methods* ; the first, a roundabout one, which represents and registers, the conscious action of the mind during the process of discovery ; the second, a short method which condenses the roundabout one, assists in stowing its results away in the memory, and facilitates the using of them sub-consciously. As an example of misunderstanding on this subject take the following : —English children used to be taught, straight away, how to do "Rule of Three," which few of them understood. It was then discovered that comprehension of Proportion is more easily arrived at if the first exercises in Proportion are done by the so-called unitary method, which is a registration of a natural roundabout

process of analysis. Now, children are, in some schools, encouraged to work sums in Proportion by the unitary method always, and are not taught any condensation. There is nothing that deserves to be called mathematics in either the old way of teaching or this newer one. The *mathematics* of Proportion begins at the point where the pupil, having thoroughly mastered the unitary method, with full conscious comprehension, learns to condense it into some notation which he can afterwards use sub-consciously.

The cultivation of the mathematical imagination depends chiefly on the child being put into the right attitude towards mathematical conceptions in his earliest years ; and, after that, on the right use being made of certain nodes or critical points, which occur here and there in each branch of mathematics and which should be dealt with in a quite different manner from the rest of the course. These form the revelation-crises of the pupil's mathematical history ; when he draws near one of these the human teacher should carefully withdraw his influence, and simply watch to see that no seriously false impression is being formed. His object should be to efface himself, his books, and his systems ; to draw aside a curtain from between the child and the process of discovery, and to leave the young soul alone with pure Truth.

The following directions are not meant to be absolute, but rather to convey a picture of a sort of type-scheme for the use of critical points ; any intelligent teacher will easily modify it according to circumstances.

As soon as the child can count up to ten teach him to call the next numbers "ten-one," "ten-two," etc. The more usual "eleven" "twelve," etc., can be easily learned four or five years later ; the habit of illogicality induced in infancy by the dislocation between the "eleven, twelve" nomenclature and the "twenty-one, twenty-two" nomenclature is far more difficult to overcome.

Accustom the child, when he has counted out ten counters or buttons, to put them into a little box ; the next ten into another similar box, and so on. Let him do this simply as a matter of order and routine. At first, leave the boxes open during the whole lesson; but exercise him as soon as possible in the habit of walking by faith (in his own past work), by covering each box as soon as it has received its cargo of ten. Later on, a red counter is made to do duty as substitute for a box containing ten white ones ; then a green or black one for ten red ones ; and so on.

It is well to accustom the child to realize early that any convenient number might have been chosen as the breaking-point ; that ten was chosen originally because savages had no counters and therefore counted on their fingers ; and now he must count

in tens unless the contrary is mentioned, in order to understand and be understood, because all the world does so. Tell him that English children are not allowed to count on fingers, for the same reason that they are made to use forks and spoons at table ; i.e. because it is best to learn to use civilized conveniences. This lays the foundation of a true sense of historic continuity in Mathematics ; and cultivates comprehension of its anthropomorphic basis.

It is advisable occasionally to show a skeleton leaf, the cuticle under the microscope, and the cellular substance ; and then appeal to the pupil to conceive these various portions, combined and acting on each other, in the growing leaf. The child should be led to see that it is not the nature of the leaf to grow its cuticle, its ribs, and its cellular substance separately, and then combine them ; but it *is* the nature of the human mind to work by taking things apart and then conceiving of them as united. He should feel that in Arithmetic we do the same kind of thing with regard to numbers too great for us to deal with directly ; that Arithmetic is the application to number of a scientific system for making difficulties manageable, by splitting them up in ways suited to the nature of the human mind. Of course one does not say things of this kind directly to a child ; it is not desirable to make his mental processes introspective. But the teacher should think of Arithmetic as founded on scientific anthropomorphism ; and, when the youth is old enough to look back on the course of his mathematical education, he should see himself as having been led throughout to apply general psychological laws to the solution of questions concerning number, size, and direction.

The child should be familiar, as early as possible, with the practical exchange of coins ; getting farthings in exchange for a penny (same weight in a different shape) and pence in exchange for a shilling (a more conventional equivalence). (The education of children would be more *simple* if the coinage were decimal ; I am not sure that it would be necessarily sounder.)

When he begins to do sums on paper, let him still, for a considerable period, do each addition, subtraction, etc., first in counters ; and then, while these are still on the table, work out the same sum on paper.

As soon as he can do little additions on paper, begin to cultivate his sense of the right relation toward formulae ; give a blank form of multiplication table ; give, as addition sums, two and two ; two and two and two ; and so on (alternating these examples with additions of unlike figures) ; and, whenever he has added together a group of like numbers, make him register the result in

his blank form. When he begins multiplication, let him learn the tables by heart in the old-fashioned way ; but from his own handwriting. Let him re-make or revise his table as often as is found advisable, but never allow any counting during the process of doing a multiplication sum. Make him use the table mechanically and without question ; never allow the process of making or verifying formulae to get entangled with the use of them ; "verify or construct as often as you like ; but never while using," should be the rule.

Some set of relations should be chosen to be expressed in two different ways, numerically and graphically ; and the child should be accustomed to refer, when he needs the recorded fact, sometimes to the one table and sometimes to the other.

Keep up the same habit when he begins Algebra. As soon as he can make out the results of $(a+b)^2$, $(a—b)^2$, $(a+b)$ $(a—b)$, etc., let him do it algebraically and geometrically ; then enter each result, as he arrives at it, in a formula book. As soon as a formula is made, give him easy practice in using it, always reading off from his own handwriting ; trusting to his own past work. Let him practise remaking the formulae till the whole process is familiar ; but do not let the making take place at the same lesson as the using.

If this system is steadily pursued throughout, it will be safe to give the child logarithm tables as soon as he is found capable of manipulating them. He will realize, in a general way, that adding the indexes multiplies the numbers : he will not imagine he knows exactly how the decimals in the logarithms were worked out ; but he will assume, and quite rightly so, that it was done in a way somewhat similar to that in which he constructed his own book of tables and formulae. He will use the logarithm tables with the same natural gratitude to the maker of them as he has towards the maker of his watch (to use Prof. Perry's simile). This educates or educes the maximum at once of the grateful acceptance of the work of the past which the Positivist School were so anxious to cultivate, and that sense of being free of the Guild of Discoverers of which some among them seemed to have a dread.

It seems to me a great pity that teachers, who consider themselves advanced, should drop the practice of making the child repeat his tables and formulae periodically, in parrot fashion, as a mere exercise of memory. Psychologists such as Gratry have pointed out the importance, for both individual and racial mind-stamina, of some form of words, the same from year to year and from generation to generation, which can serve as a crystallizing thread (or, as Hinton called it, an "unconscious constant"), round

which the results of intellectual effort may successively group themselves. The two essential conditions for the full efficacy of a crystallizing thread are, that no disturbing element of doubt should cling round it, and that it should be associated with some form of solemn and yet joyful emotion. If the formula itself contains any truth worth remembering on its own account, so much the better; though this condition is of less importance than the two others just mentioned. Now a well chosen series of mathematical formulae answers all these requirements perfectly. Their truth is unquestionable. The child's stock of them grows with his growth; yet those earliest learned remain valuable and important to the end; the same for all, from youth to age and from generation to generation. And if they have been acquired in a reasonable manner, each is associated with the delight of personal discovery; and is, for the child, a perpetual pledge and witness of his own power to enter into personal communion with As-yet-unknown Truth.

It is useful to connect money payments with the visual image of a shop-counter; to set up the habit of seeing money paid for goods, as coin pushed one way across the counter; and change, or money returned when a purchase is revoked, as coins pushed the other way.* This makes a link of connexion between the algebraic and the geometric interpretation of the plus and minus signs.

It is important to teach pupils to distinguish early between several different kinds of wrongness :—

$5 \times 4 = 19$ is a wrong statement, because untrue in itself.

$\frac{21}{7} = 3$ is wrong when given in answer to the question, What is $\frac{217}{7}$?

It is wrong to begin a subtraction sum by the coins or number-places of highest value, because it necessitates cumbersome and unnecessary corrections.

It is wrong to write what you mean for units to the left of what you mean for tens, because, if you do so, other people will not understand what you have written, and you yourself will become confused in passing from your own figures to those written by others, and will lose the advantage of forming a steady habit for reading and writing figures.

The geometric education may begin as soon as the child's hands can grasp objects. Let him have, among his toys, the five regular solids and a cut cone. Let eyes and hands be early accustomed to recognize the difference between natural form (that which evolves without human aid), artificial form (that which is made by man in response to a need from without, as a table, a tool, or a toy), artistic form (that which is created by man in response to the sense

*See *Logic of Arithmetic*.

of beauty within him), and type-form (that which is created by man in obedience to his mathematical sense).

Nothing is more important for the cultivation of the properly mathematical sense than the habit of evoking curves by drawing successive tangents. This can be done, before the hand is strong enough to manage a ruler, by stretching threads on cardboard. The usual kindergarten pricker, pad, and rug-needle are the only tools required for this purpose. The early use of this exercise in fertilizing the unconscious mind has already been described. It has another advantage besides that of easy manipulation which makes possible its use at an early age, one which will presently be indicated.

Great use might be made, in teaching, of the study of shadows. Those who are only beginning the shadow-study can work most conveniently with a single light overhead. Later on, combined and cross lights can be used ; and in some cases it will be useful to have a movable light. Place on the table a sheet of white paper. Hold between the paper and the light a ring. Call attention to the fact that the same ring casts a circular or an oval shadow, or a straight line, according to the position in which it is held. Also that the same series of shadows is produced by an elliptical ring as by a circular one. Either can be made to cast a shadow resembling in shape the other. A straight line, however (a knitting-needle, for instance), cannot be made to cast a curved shadow on a plane ; its shadow is always a straight line, which shortens as the needle is tilted up, till at last it resembles a mere dot. Or if a circular disk of cardboard be held horizontal under the light, it can be made to cast a series of shadows resembling in turn each of the conic sections (circle, ellipse, hyperbola, and parabola), by altering the position of the paper on which the shadow is cast. The same series of forms may be produced by placing a lighted night-light in the bottom of a tall jar, and throwing the shadow of the rim of the jar on surfaces held in different positions. Experiments should be made with the various kinds of shadow that can be cast by a coiled wire, such as is used in electric machinery. It is also well that the pupil should see such a coiled wire taken as a whole and coiled again into a larger spiral, as preparation for the conception of "space diverse, systems manifold."

A child should early be accustomed to drawing circles by means of a pencil constrained by a loop of thread hitched to a fixed pin. When he can get firm and accurate circles in this manner, two pins at a little distance from each other should be placed within the loop ; then three pins. He should vary the distances of the pins from each other, and the position of the third with regard to the

other two. As soon as this exercise is quite familiar he may begin drawing with trammels of different kinds.*

It is useful to watch, in a dark room, the path of a bright point. The effect can be fairly well got by igniting the end of a stick and then blowing the flame out, leaving the tip glowing, and whirling the stick about ; but the thin flexible Japanese joss-sticks answer better. The essential thing is that this shall not be an exhibition given once by an adult with an attempt to explain any theory about the resulting phenomena, but an informal series of vague experiments in which as many of the family as like to do so take part for sheer amusement and artistic enjoyment. Any explanation that could possibly be given by an adult would distract the child's attention from the real purpose of the game, which is to fix the imagination on the fluidity and mutual interchangeableness of natural curves. For the same purpose, he should also be allowed to watch natural reflection-curves, such as those made by the sunlight or gaslight falling on moving liquids, the light-curves at the bottom of a clear stream caused by the ripples on the top, etc.

If the child habitually walks out in company with a perambulator or mail-cart, it might be well to paint a conspicuous spot on the rim of one of the wheels. Nothing need be said about this spot ; it should be left simply to fascinate the child's imagination. In connexion with this question of a conspicuous spot on a moving object, the following is an interesting example. Paint a spot on a cane. Stand the cane perpendicularly in a corner of the room. Draw the lower end of the cane away from the wall, keeping the upper end close in the corner, till the cane is lying horizontal on the floor. Let the child watch the path of the spot. As soon as he can manipulate drawing-tools easily he might attempt to draw on paper the curve made by the path of the spot. Next he should draw the cane, with its spot, in various positions, first without, and then with, the aid of a ruler finely divided for accurate measurement. A little practice of this kind would obviate the danger of future confusion as to the connexion between a continuous curve and the points taken to determine it for graphical representation.

*Trammels may conveniently be made of cardboard or thin wood, such as kindergarten plaiting sticks, in which holes may easily be made for a pencil to pass through. If a single bar be fixed to the drawing-board at one end, points along it describe circles of various sizes. A simple linkage system, producing beautiful curves, may be made as follows :—Take three bars of equal length, AB, CD, EF. Make a series of holes along CD. Fasten B to C and D to E by an inverted drawing-pin or in any other way which permits rotation. Fix A and F to the drawing-board. A pencil passed through any one of the holes and moved through all its possible positions traces out a curve. The middle point of CD gives double symmetry ; any other point on CD, single symmetry.

As soon as the hands can hold steadily compasses and set-square the child should be encouraged both in copying diagrams from such books as *Elements of Practical Geometry, Plane and Solid*, by Thomas Bradley (published for the Committee of Council on Education, by Chapman & Hall), and in inventing others for himself. It is desirable that, before any systematic teaching of mathematics begins, the compass, set-square, and ruler marked in fractions of an inch should be as familiar implements as the fork and spoon.

Valuable exercise is that of tracing the pentagram. Number the angles of a regular pentagon in order, and draw straight lines without a ruler from 1 to 3, from 3 to 5, from 5 to 2, from 2 to 4, from 4 to 1. Repeat several times in succession. Choose the size of the pentagon to suit the size of the hand. After some practice the pentagram should be drawn without the aid of a pentagon. The exercise may be varied by tracing the heptagram, i.e. passing from one point to another of a regular heptagon in this order—1, 4, 7, 3, 6, 2, 5, 1. The tracing of these figures gives a curious feeling of arriving at completeness by a series of tentative pulsations backwards and forwards. In old days the idea of magic attached itself to the exercise. At a time when the ability to investigate the angles of the pentagram represented a high degree of mathematical skill, we may imagine that some enthusiast, in a fit of that tender fun which is characteristic of scientific genius, conceived the idea of tracing the figure on his threshold, saying to his pupils, "No lying spirit can enter, nor can science degenerate into sorcery, if study is put under the safe guardianship of accurate mathematics." "Very slight inaccuracies," he would add, "leave room for the entrance of any kind of treachery and deception."

It would conduce to the development of the imagination for intellectual purposes if children were made practically acquainted with the use of parallax as a revealing agent. This can readily be done by drawing a triangle of, say, an inch in height, and a small portion of a similar one with a base, say, three times as long as the base of the first. From the end points of this longer base draw the sides to the height of, say, half an inch ; and, in some simple way, call the attention of the child to the fact that, though all he can *see* of the large triangle reaches only to half the height of the small one, yet he can, and does, know that its apex is three times as far from the base as that of the other ; because, though there is nothing in either side to show how high it is meant to be, the parallax of the two fixes the point of junction.

Much discussion has taken place of late years about the choice of a book from which to teach Geometry. There can be no better

textbook for the teacher to use than Euclid, on three conditions: That the child has been adequately prepared before the age for any formal teaching; that the Euclid is not given to the child to learn from till he has gone through the Geometry of the important statements in the first two books without being distracted by the Logic; and that each such statement is put to him as not a statement but a question. E.g.: What is a circle? The answer to be elicited is: "The line which I draw when my compasses are properly screwed up, so that the pencil-point keeps the same distance from the steel point all round, is a circle."

What is a straight line? "When I have drawn my stitch up as tight as I can without bending the card it is straight. Then the card is flat. If I draw the thread tighter the thread will still be straight, but the card will be bent or curved. As long as my stitch is slack, so that there is more thread on the front of my card than just enough to reach from hole to hole, the thread is not straight." It is here that we perceive the advantage of letting a child associate his first conceptions of plane geometry with lines drawn, not with pencil, but with needle and thread.

Give the first axiom thus: Here is a strip of white cardboard; in the next room is a black strip; measure the white strip with this tape; cut the tape the length of the white strip. Now take the tape into the other room and measure it against the black strip. "Is the black strip just the length of the tape?" "Yes?" Now we will put the tape away. You cannot see the two strips of card at once, because they are not in the same room. "But is there anything you know about their likeness to each other?" "They are the same length." "How do you know that, when you cannot see both at once?" "Because they are both equal to the tape."

Each axiom so arrived at is to be registered in the formula-book. The principal definitions and axioms of the First Book of Euclid are thus made out by the child and entered in his formula-book as his own discoveries. Then he begins on the propositions.

"Do you think that you could, with no tool but your compasses, draw a triangle with sides all equal? Let us try."

Or, in the case of the theorems: "Here is a triangle ABC; can we make another trangle ABD, so that $AD = AC$ and $BD = BC$?" (After much experimenting) "Yes, but D will have to be on the other side of the line AB from where C is"; and so on. We go on thus till we have registered Prop. XLVI.

All this time there should have been no attempt to quicken the child's perceptions by any magnetic stimulation from the teacher, whose personality and influence should be kept as much as possible in the background. The child has gone on unfolding his direct

geometric perception at its normal pace. At Prop. XLVII, it becomes even more important that the lesson should be as little as possible connected with instruction from a human teacher. It is, or should be, one of the most momentous crises of the mental life.

The question is posed thus : "You know that any two sides of a triangle are greater than the third side. How much greater depends, you know, on the angle between the two. Now suppose we leave out of reckoning all triangles except those which have a right angle. Is there any way in which we could know the length of the hypotenuse by knowing the lengths of the other sides ?"

The child is left to grope and fumble over that question for a short time every day—for perhaps a week ; so as to get the sense of impossibility, of helplessness, well worked into his consciousness; because it is important that he should get an idea of the true relation of mathematical method to the sense of *helplessness* generated by the limitation of direct human faculty. You then tell him to make a right angle by placing three of his square counters or blocks in a row for one side and four for the other. He is then to make the hypotenuse, and see how many blocks go to make that. He will find that he needs five. He will then perhaps suspect that the law of the relation is contained in some idea of sequence of numbers. Let him then try four, five, and six ; he will find that six does not make the hypotenuse long enough. After trying various measurements for some days, you again tell him to make the triangle whose sides are three and four and the hypotenuse five. Tell him then to build up the complete square on each side. Then tell him to count the blocks in each of his squares. Then tell him to add together the numbers of blocks in the two small squares. And then, if you can, have the tact and wisdom to be silent and let him think. Say no more of geometry that day. Next day let him build the hollow triangle and solid squares of 3, 4, 5 again. Then other right-angled triangles, such as those with sides 5, 12, 13 ; 8, 15, 17 ; etc. Use no unnecessary words.

When he is quite familiar with the process, tell him that some great mathematicians think that if ever we learn to talk to people in other planets the first letter of the interstellar alphabet will be the three squares done on a gigantic scale. The impression to be made on his mind is that one of the most sacred and solemn acts of a human life is that of coming into contact with the three squares on the sides of a right-angled triangle. If this lesson has been reverently carried out, the pupil will be henceforth a true initiate of the order of Free-Geometers. There will be a similar lesson with regard to Algebra, to be described presently. We will add only a few words more about the Geometry.

You may now run rapidly through Book II of Euclid, still putting the propositions as questions, and working each out, first empirically with squared paper, next algebraically. When the child has completed Book II, he will be ready for the Logic of the subject. Tell him that Euclid arranged various geometric propositions in such a way as to show, not that any one of them is true, but that they are all connected together. Let him then begin to learn Euclid from the book itself, in the old-fashioned way. Insist now on the utmost rigidity in following the exact steps of Euclid's reasoning.

The cultivation of the mathematical imagination should include not only its development but its orderly and systematic exercise. A child is too often made to pass from a particular case which suggests a law to other particular cases which require an application of it, without a sufficient amount of intermediate drill in analysis of the law and in tracing out its results exhaustively. Between the time when a child handles an actual cube, cuts sections, etc., and the time when he comes, among his ordinary geometrical exercises, to problems requiring him to draw the elevation of a cube cut in some particular way, there is a period when he finds it useful, and very delightful, to go through a set of processes in imagination and to express them in his own words. "I think of a cube. I think of slicing it, beginning at one angle. I get a point, then a little triangle, then bigger triangles. The corners are cut off, making a hexagon with unequal sides. The odd sides increase ; the hexagon now has all its sides equal. The sides which were longer before are now shorter than the others. They disappear and the hexagon has become a triangle again, but with its angles in the other directions. The triangle becomes smaller and smaller. It becomes a point. It disappears."

A little systematic drill of this sort makes subsequent drawing out of complicated problems much easier, for the child is accustomed to seeing, with his mind's eye, coherent and orderly modulations of form.

We prepared for Algebra by means of the closed boxes of counters. Practice has been given in two or three scales of notation ; on one day each box may contain (or each red counter stand for eight white ones ; on another day twelve ; and so on. This preparation forestalls many of the difficulties which might otherwise obstruct progress up to, and not including, Quadratic Equations.

"Do you mean to tell me," said James Hinton, "that there are men on earth wicked enough to *tell* a boy *how to do* a quadratic equation ?" I would rather ask : "Is there any country on earth,

calling itself civilized, where children *need to be told* how to do quadratic equations?" Long before the child will need to do quadratics in the school course he should know all about "how," without any telling, by a process of initiation. Among his ordinary simple equations should be set one of this kind :—

$$x^2 = 9.$$

He will readily guess the positive answer. Ask him whether any other value of x would make $x^2 = 9$. Give him till next day or next week to find out. When that difficulty is cleared up, set :—

$$x^2 + 10x = 24.$$

He will probably be baffled. Let him try for a few minutes daily till the sense of *bafflement* is complete. Then give

$$x + 5 = 7.$$

Bid him square both sides. Then show him his own answer side by side with the impossible equation. Make him examine in detail the steps of the multiplication which led to the originating of the coefficient 10 and the numerical term 24. Then let him find out for himself "how to do" his next quadratic; which, of course, should be on the same easy scale.

An incident in my own very irregular course of study may be suggestive to some teachers. At sixteen I was given a book on the Differential Calculus with the statement "No one can understand why this method should answer; it seems contrary to the nature of things; but if we trust to it the results come out right; it is like putting corn into a mill-hopper; you cannot see what happens, but it comes out flour at the end." I was far from satisfied, either with this account of the science or with the reasoning in the book. I soon found in the library an old book of Fluxions, into which I plunged with delight; it was perfectly intelligible to me. After I had been revelling in my prize for a week, my father found me with the book and took it away, telling me that the Fluxion notation was old-fashioned and inconvenient, and quite given up now at Cambridge. I went back to my differential book, and found, to my great delight, that it was now perfectly clear to me. Two years later I met George Boole. When he heard my story he told me that the differential notation is indeed more convenient for practical purposes than the fluxional; but it is less clear as to the philosophy of procedure; and that no young persons should see a differential book till he has made some study of Fluxions. My own conviction is that I was partly indebted for the ready response of my mind to the Fluxion-method to the fact that at an early age, when my finger-tips were still sensitive, I had the habit of playing

with a bandalore. The thrill of the fingers at the upper and lower dead-points lodged in the brain a comprehension of maxima and minima worth more than all the explanations that ever were written or spoken. The bandalore-pause is a phenomenon similar to the stationary length of days and nights at midsummer and midwinter. It might be well to lead a child to observe this.

There are several other precautions which might be taken, with a view to forestall difficulties of imagination in connexion with the Calculus ; one of these is to set the question : How many terms of the series $1+\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$, etc. must we add together to make up the number 2 ? Having got the pupil to realize that no number of such terms would quite amount to 2, but that every fresh term brings the sum a step nearer to 2, tell him that 2 is the *limit* of the series $1+\frac{1}{2}+\frac{1}{4}$, etc. Let him enter this statement in his formula-book. At about the same period he should be shown that, though neither a circle nor a straight line is really an ellipse, yet a straight line is one limit of a series of ellipses and a circle is the other. Get him to understand clearly the difference between a finite straight line which is the limit of a series of ellipses (or, in other words, the path of a point pulsating between two fixed points) and one which is cut from a longer straight line ; that a bit cut from a stick is of the latter kind, whereas a seedling shoot in the process of being generated by the flow of the sap is of the former ; say also that no living line is ever more than approximately straight.

Another kind of lesson on limits can be given in connexion with such a book as Hinton's *Life in Nature*, or the Chapter on Skeletons in his *Thoughts on Health*. Show that chestnuts, each potentially round, press each other flat inside the green outer case. Show the round cell of a solitary bee, made to suit its own shape ; then show how, when some bees took to living together in holes, or tree-trunks, and had to economize room, the pressure on space straightened out the sides of the cells, till the limiting form, the hexagon, was reached. Show a similar process going on in round sheaves of straw piled together under pressure.

All these ideas, suggested at suitable ages, prepare the mind to receive the Higher Mathematics as vital air or natural food.

By the age of fourteen an intelligent child is quite ready for a lesson in preparation for the doctrines of Singular Solutions and of Hyperspace. The following is interesting to eager young minds, and clears up the conceptions of ill-trained adults.

Get a stem, at the top of which grows an erect flower, by preference monopetalous and tubular, with a pointed bud growing beside it, the tip of which does not reach as high as the top of the flower. (There are several Gentians and Campanulas which

answer the purpose.) Say to the pupil: "Imagine a very thin horizontal section of this flower, cut above the height of the tip of the bud, and pasted down on paper. Imagine a little child, who has been accustomed to draw circles with coloured pencils in compasses, looking at the paper. He might suppose the flower-section was made in some such way as he makes his coloured circles; that it was made originally just as he sees it, without anything more than he sees. Now imagine a section cut a little lower, so as to shave off the point of the bud; imagine the whole of this new section, bud-tip and all, pasted on paper while the child is not by and afterwards shown to him. He would suppose that the circle was drawn with compasses, and the dot made separately at random. If you told him that the whole came into being as one thing, that the point was part of the same growth as the circle, he would be quite puzzled; he would not be able to conceive of any process for making the circle which would involve a point at a distance from it. But if you explained to him that the circle did not come into being as a flat circle at all, but was really part of a thing which had height as well as length and breadth; that the sap was going up a stalk till something stopped it flowing up straight, and then the stalk's growth stopped, and it split in two, and one side grew into a tubular flower, and the other into a bud; then the child would understand." "You remember that we could not understand the relation between the hypotenuse of a right-angled triangle and the lengths of the other two sides till we thought of the three lines as sides of a two-dimensional figure. Now you see how the relation between marks on a flat surface may be unintelligible till they are treated as sections of a three-dimensional figure."

Soon after such a lesson as the above it might be well to let the pupil read Babbage's *Ninth Bridgewater Treatise*; not as a lesson on Mathematics; but as a sort of Sunday or Holy-day book. It is unfortunately out of print—chiefly, it seems to me, because of the preference of the average reader for vague guesses and insincere sentiment over exactitude in matters of mental and moral development. It will be reprinted, if England comes to its senses before our civilization crumbles. If you can procure a second-hand copy give it to the pupil at fourteen. Henceforth let him learn science from cut-and-dry text-books; as much of the poetry of science as he is capable of feeling will occur to him spontaneously as he goes along.

CHAPTER V

ETHICAL AND LOGICAL PREPARATION

In the good old days, when Classics and Theology formed the staple of a liberal education, the science of a good school might be represented by a "writing and ciphering-master." This person's rank was much that of some Army drill sergeant who came periodically ; he had no status on the staff of the school, and little influence over the boys ; and of course none at all on the homes whence the boys came. The classical masters, usually clergymen, set the tone of everything and struck the key-note of all the relations between children and their elders. But in these days the science teachers, the mathematician, the electrician, the botanist, are a real influence ; the child's relations with these persons go far towards setting the tone of his relations with adults generally. Accustomed as he is to the free kind of intercourse which prevails between teacher and pupil in a laboratory or on botanical excursions, he does not quite get back, even during Latin class, into the attitude in which our grandfathers, as boys, stood to the autocratic classicist. Whether for good or for ill, the omniscient Dominie is fast disappearing from our civilization ; indeed, he would already find himself out of place in any good school.

In the old days a certain ideal of nursery discipline evolved itself, suited to prepare the child for entering into relations with the classico-theological schoolmaster under whom he would presently be placed. That ideal was summed up in the old rime :—

> "Speak when you're spoken to,
> Do what you're bid,
> Shut the door after you,
> And you'll never be chid."

"Speak when you're spoken to," in this old summary of the whole duty of the child, did not merely mean respond when you *are* spoken to; it distinctly was understood as an injunction not to speak till spoken to ; never to start questions ; never to ask for anything till it was offered you. It was in line with nursery proverbs, such as : "Children should be seen and not heard" ; "ask no questions and you'll be told no lies," and so on. About that ideal nothing need be said now, except that it is inadequate to prepare children for entering into right relations with science teachers.

Science teachers found that the old sort of nursery discipline,

what I may call the speak-when-you're-spoken-to training, sent up children to their classes unable to enter thoroughly into the relation which they wished to establish, which is found to afford the best condition for imparting and imbibing a conception of scientific method. Therefore, where they have access to nurseries, they endeavour to start a new kind of elementary training, a discipline, comparatively lax indeed at some points where the old sort exerted great pressure, but also stringent at some points where the old sort exerted no pressure at all.

I am not going to enter into a discussion as to which of the two methods is absolutely best. Personally, I incline to think that, at our present stage of evolution, the very young may still need a certain amount of the old sort of nursery training ; but the point to which I have to call attention is that, where we have relaxed it, and in so far as we have relaxed it, it has been because we wished to make room for another mode of infant discipline which suits our purpose better. If one no longer says to children : "It is naughty to disobey ; if you do, you will be slapped now and worse than slapped in the next world," one does try to make them understand that it is stupid not to be prompt and accurate in carrying out instructions, and that, unless they can become so, they will be useless and in the way, and not able to take a share in the work and life of the home.

It is painful to find that many persons are following our example in the matter of relaxing who have no idea what can be best put in the place of the old discipline, nor any special intention of putting anything in its place. Many parents seem to think there is something advanced and progressive and twentieth-centuryish in the mere fact of relaxing the old speak-when-you-are-spoken-to code of infant ethics. This is a great mistake ; *mere* relaxing without compensation is never progressive ; it is a relapsing back towards animalism ; it is de-culturing ; and it is more de-culturing in proportion to the wealth of the parents—that is to say, to their power of emancipating their children from that pressure of crude, hard, physical struggle by which Nature evolved us upwards.

If Science is making children too wide-awake to think there is any merit in believing what they are told and doing as they are bid, as it most assuredly is doing, Science is bound to set about helping parents to organize such discipline as shall prepare children to judge what is worth believing, and to obey their own higher selves : two things which the undisciplined and careless never can do. I feel that we science teachers will be guilty of grave neglect if we allow any slipping between two stools to take

sanction from our supposed example. It may be well to give parents a picture of the kind of ethical code which some science teachers are trying to introduce into the nurseries in which they have influence. Perhaps I may be allowed to sum up that code in a new nursery rime. (It is doggerel; but so was the old one.)

"Know what you mean to say; think what was said;
Fence round your fairyland; then you'll have a clear head."

What I may call the know-what-you-mean code of nursery ethics includes these elements :—

(1) A training in the sense of personal responsibility for detail.

(2) A training in giving clear reports of what has been done.

(3) A training in knowing when an incident is closed, when a cycle is completed.

(4) A training in answering the exact question that was asked.

(5) A training in distinguishing apart different sources of knowledge.

(6) A training in keeping the world of imagination and of hypothesis distinct from the world of ascertained fact.

(7) A little, though very little, elementary training in judging what is most relevant to the matter in hand.

All this can be done, and is being done, before the school age, without intellectual strain to the child, and without the aid of special educational books or apparatus, by means of the water-tap and the wash-hand towel, of pinafores and spoons.

There comes a stage in every child's life when he is anxious to be sent messages; and this phase can be taken advantage of to train him in one or two habits which it is difficult to acquire at a later age, and the lack of which hampers the development of the scientific faculty. When a child is two or three years old, you ask him: "Would baby like to go a message for mother?" When you find him willing, you say: "Put down that toy" (or whatever he may have in his hand) "and come and stand in front of me: put your hands straight down, head up, look me straight in the face, say: 'Please, Anne, a spoon.' Say it again. I am going to send you to Anne to fetch a spoon. What are you going to say to Anne? Now you will say nothing else, don't talk, don't play on the way for fear you should forget. Now tell me once more, what are you going to say to Anne?" When the child comes back with the spoon, you say to him: "Now go back and say: 'Thank you, Anne.' What are you going to say to Anne? Well, now go and say it." When he comes back the second time, you ask him what

he said to Anne. If he cannot remember, or is not clear whether he said it properly, you send him back to try again. As soon as he brings a clear and crisp report of having given his message properly, you at once restore whatever he may have had in his hands before you began. This habit of withdrawing all possible sources of distraction before business begins, and restoring whatever you deprived him of directly the business is completed, is of importance ; it answers the same purpose as is fulfilled later by making a child put a big A opposite the final answer to a sum. All these precautions help to induce the habit of knowing when a cycle is completed, a duty fulfilled, an incident closed.

Next day the message may be, "Please, Father, a pencil," or "Please, Nurse, a clean pinafore," but it is well, while varying the material of the lesson, to keep the routine exactly until it becomes quite easy and mechanical ; until the mere fact of being called to a lesson at once throws the child bodily and mentally into the attitude of "stand at attention." After that you tell the child that whenever you send him to fetch anything he may say "thank you" to the person who gives it to him before bringing it to you ; but he is still not to talk of anything else when on his way. Just at first you will have to explain to the household that they are not to tempt the child to dawdle or talk when sent on a message; but as soon as he is old enough you may tell him that if any one speaks to him when he is on his way, he should say : "I am on a message for Mother, I will come back to you when I have done what she told me."

As early as possible you choose some little function, which the child has learnt to perform (such as washing his own hands), as a means of training him further into the sense of responsibility in carrying out orders. For instance, when you see that he is able to wash his hands properly you explain to him that it is not safe for him to touch the hot-water tap, as the water is sometimes hot enough to scald him. You tell him that he is not to touch the hot tap unless you are there to give him leave. If you intend that any other person shall have authority to give leave, mention that person formally at once ; say : "Unless Nurse or I give you leave," or "Unless Father or I give leave" ; and, having said so, let it be understood that any grown-up person whom you have not formally mentioned may draw hot water for the child if she wishes, but may not give leave for him to touch the hot tap. At this point there will probably come little difficulties with servants and relatives. "As if I didn't know as well as his mother when the water is too hot !" You must explain to the complainer that, if the business in hand were *only* preventing Jacky from scalding himself, you

would have perfect confidence in her care ; but that Jacky is just now getting a lesson about what he is responsible for, and to whom, and that no confusion should be introduced into his mind. A little tact and a little firmness are needed to soothe affectionate jealousies ; but the results of the method are so satisfactory to the whole household that people soon begin to say that, after all, the mother seems to have known what she was about. Well, you send Master Jacky up to wash his hands, giving him minute directions as to his order of procedure, which you make him repeat each day until you find that he no longer needs to be reminded of them. Every day he comes back with his report, which may be as follows : "Cook was upstairs ; I asked her to draw me some hot water ; I washed my hands ; I used soap : I rinsed the soap off ; I used my own towel ; I think I wiped my hands quite dry ; I did not touch any one else's towel ; I put my own towel back on the proper rung" ; varied occasionally by : "There was no one upstairs to draw hot water, so I used cold and gave my hands an extra scrubbing ; I think they are quite clean," etc. The report must include the details as to which you cautioned him. Amongst its other advantages this has a tendency to check a child's natural inclination to occupy the conversation with details of his own affairs and performances. He understands that reporting the details of what he has been about is a piece of business to be done at a certain hour of the day, and heard no more of.

Jacky may come down brimming over with information about something he has seen while upstairs, some effect of light from the falling water, or a big bubble that the soapy water made "with all sorts of colour in it." We must be very careful not to discourage this eager and glowing interest in natural phenomena ; but if we can, without discouraging him, introduce the conception of graduated relevance, it will be so much the better for his future clearness. This may be done by asking him whether he thinks he could manage to tell you all that over again in a different order, to tell you the business part first and about the soap bubble afterwards.

Care must be taken that all this accuracy does not degenerate into superstition about particular actions, that the child attaches chief importance, not to this or that action, but to accuracy in carrying out whatever are the orders for the time being. We need to induce the algebraic, as against the superstitious, conscience. In algebra, *a* must stand for exactly the same value throughout the one problem, but may stand for something quite different in the next problem. Great use may be made in this respect of a visit to a strange house. You may say to a child, for instance : "I am

going to send you upstairs (to fetch me a handkerchief, etc.). This house is not arranged for children ; it is different from our house. The wall-paper is white, you might easily stain it ; the stairs are slippery ; the windows have no bars in front of them. In this house you must hold tight by the banisters, come downstairs very slowly, never touch the wall-paper, and never go near a window that is open at the bottom. Now tell me what are the things you are not to do in this house ?" (Touch the wall-paper and go near windows which are open at the bottom.) "And what are the things which you are to be careful to do in this house ?" (Hold by the banisters and come downstairs slowly.) When he comes back he brings his report formally : "I fetched your handkerchief ; I held tight by the banisters ; I came downstairs slowly ; I did not touch the wall-paper ; there was a window open at the bottom, I didn't go near it" ; varied by "there were no windows open at the bottom to-day."

It must be particularly noticed that a child can be trusted about amongst dangers, such as hot-water taps and open windows, *immediately* after such a catechism and while he has it on his mind that he will have a report to give, at a much earlier age than it would be possible to trust him vaguely and promiscuously. Once, or at most twice, in the day is as often as a child under six ought to have the strain of responsibility thrown on him ; for the rest of the time he should be allowed to be his natural, careless, impish self ; and other people, not himself, should guard him from mischief and danger.

If a child is sent a lesson-message, and is asked on returning whether he gave it, he will sometimes answer, "I could not find cook," or "She was not in the kitchen." For the mother's own immediate practical purpose that is sufficient ; but logically speaking it is not a categorical answer. This elliptical mode of speech is allowable in ordinary conversation, but I am now describing specific lessons intended to evoke the algebraic super-consciousness. They are intended to serve the same purpose as is served later by occasionally making a child write out in full every step in the working of a sum, including many steps which, on ordinary occasions, he leaves out.

With a view to preparing for scientific training it is well to accustom children early to answer the exact question asked before entering on any side issue. The question "Did you do so-and-so ?" must be answered either as "yes" or "no." "She was not in the kitchen" is the answer to a further question ; and if said at all must come after the answer to the one actually asked. This habit of logical distinction is of great use in preventing friction with the

future science teacher and confusion to the pupil. At an early age, when no lessons are on hand, when learning to make the distinction is itself the lesson, it can be made non-worrying and even interesting to the child. One does not wish children made to speak, habitually, in a formal or priggish way ; but it does seem desirable that, before a child goes to school, he should be in such training that the request, "Please answer the question I asked" shall meet with intelligent response, shall not produce in his mind a sense of mere bewildered pain.

But I must here repeat the caution given in Chapter I. The habit of alternation of attitude is *the* important one to set up with a view to a scientific comprehension of things. The child who is getting lessons in the algebra of ethics by the method recommended in this chapter will be more likely to turn out really scientific, if his conduct at ordinary times is directed by an ordinary well-mannered mother or a good old-fashioned nurse, than he will if constantly in the hands of any would-be scientific faddist.

The power to distinguish apart different sources of knowledge may be evoked by an occasional very gentle, playful sort of "how do you know ?" jesting. The lesson might well take place when a child has poured out a heterogeneous mass of scraps of information gathered during his walk. "Oh ! Father ! there was a red butterfly with black spots on his wings. And he had a trunk just like an elephant's. And he drinks honey with it. And that butterfly and the bees were *so* hungry ; there were a lot of bees. And there's a butterfly with a *'normous* trunk—so long—and he ran a race with a great white flower," etc. "How do you know there's a red butterfly ?" "I *saw* him ; he flew across the road in front of me." "Could you see the black spots as he flew ?" "No ; but he went and sat on a flower in the hedge ; and then I went close to him and saw the spots." "So he had a trunk just like an elephant's had he ?" "Yes ; just like an elephant's." "Are you sure it was quite as big ?" Then, "So the bees were very hungry ? Did they say so ?" "No, they couldn't speak." "How do you know a person is hungry when he does not say so ?" "Well, they were all in such a bustle ; they went so quick from one flower to another." "Well, I'm in a bustle sometimes just after breakfast ; but I'm not hungry then." "You are going off to your office ; bees haven't an office to go to. They were getting honey." "How do you know it was honey ?" "I sucked one of the flowers myself ; and it was sweet ; and Mother said the bees were getting honey." "Do you put things in your mouth when you are out walking ?" "No ; not unless Mother is there and gives me leave ; but she said I might suck one of those flowers." "That's all right. Well, the bees were

getting stuff that tastes sweet, and Mother told you it was honey. And you think they were hungry because they worked hard; I work hard often when I am not hungry." "But Mother says you work to get money; bees don't get money." "No; they don't get our sort of money; but are you sure there is no one at home they want to get something else for?" And so on. About the butterfly with the eleven-inch trunk you elicit the avowal that no one told the child about it, and he did not see it; he heard Mother telling Auntie about it; she had read about it in a book. By asking whether the big white flower in Mother's book had legs to run with, you make it evident that the child does not understand what is meant by an evolution-race; and if he answers as a puzzled child sometimes will, "Well, I heard Mother telling Auntie about it, so it must be true," you can explain that Auntie knew what Mother meant, but he apparently does not; so he may as well leave that part of the tale out till he is older, and for the present only tell people about things he really understands. Of course one must keep a discreet limit on the extent to which one stirs up a child by this kind of "how do you know" questioning; specially one must be careful that it does not degenerate into becoming a worry and a check on his flow of talk. But a little of it, occasionally, is of great value in preparing the way for science teachers by getting the child into the right attitude to receive their instruction.

It should be noticed that a child accustomed to ever so little of it is likely to ask his elders how they know so-and-so. Parents should be prepared for this. If the child says: "How do you know?" in a saucy or ill-tempered tone, it is rebuke enough to say: "If you really want to know, you will ask me nicely." If the question is put politely and seriously by a child, the parent should be prepared to answer honestly either "I saw it," or "I read it in a book which I believe to be true," or else "I cannot explain yet how I know; I know in a way which you cannot understand till you are older." Parents who object to the "how do you know" line of inquiry being started at all in their nurseries ought to reflect that the passively receptive attitude towards elders, though a satisfactory preliminary for a merely classico-theological education, puts needless and unfair obstacles in the way of science teachers.

It is a good thing to afford a child the opportunity for perceiving that there are three ways in which he might become aware of the connexion between cause and effect, e.g. in which he might learn which handle sets a certain bell ringing. In one case Mother might have told him; in another he may have heard that particular

bell ring when that handle is pulled so often as to feel compelled to connect the two ; in the third case he may have followed, once and for all, a series of wires or cranks all the way from handle to bell.* All these ways of learning are equally legitimate, and all are useful ; but he should be clear which he is relying on in any given case.

A child is very prone to mistake the intensity of his own conviction that a statement is true for proof of its truth, or even for comprehension of the statement itself. It is astonishing to see with what simple conviction a lad or girl will sometimes assure one that he or she *quite understands* a certain process in Science, say the process for finding G. C. Measure, or for solving Quadratic Equations, or for doing something with chemicals, as to which one finds that in reality he only knows empirically the steps which he ought to take and the order in which to take them ; he has been shown what to do ; and repeated trials have proved that he can do it aright. This confusion points to something unscientific in the nursery training. A child who was scientifically trained in infancy will sometimes say, "I know how to do these sums ; I do them easily, and I always get them right ; but I don't understand *why* they come right." Now that kind of pupil is the delight of a good science teacher, and a perplexity to a bad one. The more logically we treat our children in infancy, the more likely they are to make the neighbourhood uncomfortable for unscientific teachers of science.

True, it is often necessary to know what to do and how to do it, when we have no means of knowing why it answers. But it is very unscientific not to be clear in one's own mind when one only knows that a process does answer, and when one can see beforehand that it must answer. Nothing can be thoroughly done in mathematics till the child quite understands the difference between these two things ; and it is unfair that a mathematical teacher should be interrupted by the necessity for insisting on the difference. Very many ordinary teachers are themselves so unscientific that they do not know how to explain it ; all the more is it desirable that their pupils should be clear about it before entering their classes. Indeed, it is not a thing that can be made clear by mere explanation ; it is a matter of mental habit, and must be begun early.

The same kind of reason holds good for accustoming children occasionally to that kind of mental action which is involved in

*The three methods of acquiring instruction about the bell illustrate respectively (1) learning from authority, by inheriting the stored-up knowledge of the race, (2) ordinary scientific induction, such as that by which a law of nature is inferred, (3) the specifically mathematical induction. Boole, *Laws of Thought*, p. 4.

answering such apparently foolish questions as: "Are you sure the butterfly's trunk was exactly like the elephant's? Was it quite as big?" A very great deal of the difficulty of teaching mathematics would be non-existent if the parents would accustom children very early, by means of jokes, to realize that a thing may be like another thing in one respect and quite unlike in another.

There is nothing more important in teaching Algebra than to make the pupil understand clearly the difference between an equation of identity (a dozen is twelve), an equation of real values (e.g. the circumference of a circle is three and a fraction times the length of the diameter), and an equation of hypothesis or arbitrary equation (such as: Let a red counter be supposed to stand for ten white ones). It is impossible to teach Algebra properly unless this distinction is quite clear; and it is almost impossible to make it so during the Algebra lesson itself, where the material in which we work is abstract. I cannot say that I ever found a child to whom I failed to make the distinction clear in Arithmetic, where the values are concrete, if I took trouble enough; but I have met many girls of sixteen to whom it seemed a new and puzzling conception; and I do think it is disrespectful to the teacher, and unfair to the better prepared pupils, to have to stop the work of a class in order to teach to the others something which ought to have become an easy and automatic action of the mind long before.

Again, such words as *same* are very misleading if used without care to distinguish their various meanings apart. If you say, "This blue aster is of the same species as the pink one I had last year," or "My dog is of the same breed as my neighbour's," that connotes that the two asters or dogs are (in spite of superficial difference of colour, etc.) so nearly alike as to need similar food and care; experience gained in treating the one will be of use in guiding us how to treat the other. But if you say, "This gnat is the same which was swimming as a wiggler in my aquarium this morning," that does not imply anything of the sort. The wiggler of the morning would have died if kept out of water: the gnat of the afternoon will die if kept in it. You can infer nothing about the one from what you know of the other.

All this may sound very childish, and so indeed it is. This is the very reason why I venture to think it is well when this part of the work of training for Science is done, and well done, at a childish age, pleasantly and as mere fun, instead of throwing upon the teacher of science classes the burden of introducing such elementary conceptions for the first time to young persons whom he is preparing for stiff examinations in Science.

The effect on a science class is as distracting as it would be if a

literature teacher had to interrupt a lecture on Shakespeare to help some of the pupils to spell out ordinary English words.

We now come to the fencing round of the imaginative faculty. As we can never be sure how far a child's statement is consciously and voluntarily false with intent to deceive, many people prefer never to accuse a child of lying. Children often have no clear notion of the boundary line between fact and imagination. And indeed the modern child is far too logical to accept from grown-ups who tell fairy tales any such dictum as that it is wicked to say what is not true. But because we no longer talk to small children about the wickedness of lying, that is no reason why we should not try to help them to learn the art of telling truth. For it is an art; at least as difficult as playing the piano; as little to be done at any given moment by mere effort of will; as necessary to begin learning young. Most children have access to some sort of fairy-land in which they spend a good portion of their existence. There is nothing unscientific in that: indeed, every scientific man worthy of the name, every one who is not a mere mechanical adapter of other people's discoveries, spends a good part of his time in that grown-up sort of fairyland, the world of scientific hypothesis. It is from this fairyland of his that he draws the inspirations which guide his researches. We have each a private domain of our own in that Unseen World; and no mortal has the right to deny the truth of what another says he sees there.

I received a good lesson once from a little friend of mine whom I found on the sea shore, earnestly imploring some fishermen to bring her home a mermaid. I told her that there are no real mermaids. "Oh yes, there are," said the little maiden imperturbably. As I persisted, she became troubled; but presently recovered herself and said cheerfully, "Oh well, if they are not in this world they must be in fairyland, for I *know* there are mermaids somewhere." I had received a well-merited rebuke. What right had I to say there are no real mermaids? What do I know about it? There may be some in Mars for all that I can tell to the contrary; and the child may have had some *Ahnung* of something which I do not understand. What I did know, and what I ought to have said, was that there are no mermaids living under such conditions that fishermen in this world can bring them in boats to little girls.

Many children have imaginary friends, and give names to those friends; besides having a name of their own for the imaginary world in which these friends are supposed to live. This simplifies the work of teaching the child to be truthful. One can listen gravely to any sort of statement he pleases to make, and then ask quietly, "Did all that happen in this world or in mermaid world?"

(or fairyland, or dreamworld, or Charley's world, or whatever name he gives to his bit of the Unseen). He may be puzzled at first; he really does not know which world he has been looking into. But he gradually learns how to distinguish between the visible and the invisible worlds; to know an impression, however vivid, on the mental retina from the image projected from the outside on the physical retina. Sometimes he will confess that part of the story happened in the outer world and part in fairyland. This mixing up of things should be discouraged, in the same spirit in which we discourage writing down tens in the units column of his little sums; we do not assume any intention to mislead; we assume that he would have preferred to locate the things in their proper categories, but was not expert enough, or was too careless, to do so properly, and must try again.

If we suspect that the child is giving a garbled version of some transaction to screen himself from blame, it is well, before asking any other person concerned what were the facts, to ask the child himself what version *he thinks* that other person would give, e.g. When he says, "I didn't break the plate; I fell up against the table and the plate fell and broke itself," if you ask, "What do you think nurse will tell me about it?" the child will perhaps answer, "I think nurse will tell you that she had told me not to go near that table at all while the crockery was on it." A child who has thus corrected his own one-sided statement has had a very good lesson, and been much helped to become clear-headed and truthful. Nearly all the scientific truth known to man has been arrived at by successive processes of correcting error; the condition for telling truth is not the mere negative fact of abstaining from inventing falsehoods, but the acquiring of positive skill in distinguishing our own inventions from fact before we speak to men. Now the child's parents should be to him a sort of outer conscience; he should not be reproved for giving to them fact mixed with fiction, but helped to distinguish which is which, before either he or they take action in consequence of his statements or mention them to other people.

Suppose one suspects that a child is inclined to be really untruthful, one might sometimes take the opportunity, when he says he is hungry or complains of a little pain or hurt, to explain to him that there is no use in trying to bathe, or bandage, or otherwise minister to pains and aches and hungers in fairyland; and that one cannot be sure which world the statements he makes refer to.

Few things that we do are more unscientific and more confusing to a child's logical faculty than telling him, about some of his pains, that they are not real. Many so-called imaginary pains are due to inspiration, or the effect on the sensory nerves of over-rapid

illumination from within. They are so real that they have been known to re-act on the fleshy tissues, producing actual swellings or haemorrhage from the skin. Imaginary pains are as real as anything in a child's experience. But the true remedy for them consists in a habit of exerting the will in turning the mind to external objects. The habit of seeking what we may broadly call medical remedies for pains which come to the flesh from the imagination is a dangerous one; it is largely responsible for the alcohol and morphia manias; it should be checked at its source in childhood. The way to check it is not to say, what is false (and, I venture to add, profane), that these pains projected from fairyland are not real, but to accustom the child to acquire the power of controlling them from within instead of seeking help from without. The importance of this habit to health and morals is obvious enough; my present purpose, however, is to call attention to its importance with regard to the child's future science teachers. The pupil who limply and helplessly flings himself on his teacher for help in difficulties which he ought to grapple with in his own mind and conquer for himself is very difficult to teach properly; while, on the other hand, many a mind possessed of really scientific insight has been wrecked by the bad habit of pondering for weeks or months, trying to set to rights, by sheer thinking, what should have been cleared up at once by appealing to a teacher or a book. And I am convinced that every step gained by a young child in the direction of clearly distinguishing the within from the without helps to lay a good foundation for all his future relations to Science.

Many objections have been made to some of the above suggestions; but they seem to me to be the outcome of a dislike to cultivating the essentially algebraic super-consciousness in young children at all. As I said in the first chapter, it is not my business to decide whether this is to be done, but to suggest how those who wish to do it can best accomplish their end.

The physical attitudes, habits, and modes of handling things necessary in the chemical laboratory differ in some respects from those acquired in ordinary domestic and social life; so also do the moral and spiritual habits and modes of handling facts necessary in an intellectual laboratory differ a little from those ordinarily considered amiable and agreeable. Those who wish to give their children a scientific training had better count the cost.

One word, however, I would venture to say to the objectors. Whether they like it or not, Science is sweeping on, and swallowing whatever stands in its way. Now no ordinary teaching of ethics constitutes a safe basis of conduct for the young person immersed

in a scientific life, for that life is one of actual communion with the Unseen, the Eternal Organizer, who is also the Eternal Destroyer. It is a reflection of creative activity, an incessant process of reorganization of thought-material. Only those who have the orderly habit of organizing thought-chaos, of correcting the disorderly first impressions by reference to laws of organic thinking, can be morally or spiritually safe in that glorious whirlwind which we call scientific progress.

INDIAN THOUGHT AND WESTERN SCIENCE IN THE NINETEENTH CENTURY

A Letter to Dr. Bose

This letter was written in 1901 ; *it was published in* The Ceylon National Review *in June,* 1909. *In* 1911 *it was printed as a booklet under the title of "The Psychologic Aspect of Imperialism," but when Mrs. Boole put it, later on, into its final form she restored the original title.*

16 LADBROKE ROAD,
LONDON, ENGLAND,
1901.

DEAR DR. BOSE,

Nivedita* conveyed to me your request that I would explain what I meant by speaking of the unfitness of the English people to undertake the *education* of such a people as the Hindus. What I said was that the English suffer from a carefully cultivated ignorance of certain essential elements of psychology, and that European science could never have reached its present height had it not been fertilised by successive wafts from the psychic knowledge stored up in the East.

It is commonly said that the great modern advance in physical science is entirely a product of Europe and America. It is true that most of the work of observing, collecting, and classifying phenomena has been done by Europeans and Americans, but the masses of detail brought to light by Western observers are reduced to order by means of what is called the higher mathematics. Higher mathematics consists mainly of psychologic science evolved in Asia and brought to Europe by individuals who reduced it to a notation which, while facilitating its use as an organiser of phenomena, withdrew it from the cognizance of an ignorant and meddlesome priesthood. You wish me to explain the statement. If I were younger, I should like to make a fresh study of this interesting topic. But, in my seventieth year, my sight and strength are a little failing me ; I can no longer enter on fresh studies. The most I can do is to write out my reminiscences of the facts and books which led me to form my opinion.

As my letter must therefore take a personal and what may seem an egotistic form, I must ask you to let me say, at starting, that

*Margaret Noble.

when I shall speak of my husband's work having been misunderstood, I do not and cannot possibly mean that he was neglected or undervalued. On the contrary, he received recognition, in the shape of medals and honorary degrees, to an extent which he considered far beyond what he either merited or desired. He often spoke warmly to me of the generous assistance given to him in his researches by mathematicians here and abroad; of their overpraise of whatever in his books they were able to understand; and of the more than cordial welcome accorded to him whenever he visited any university. He told me that he went very little into university society, because he had good reason to know that the cordiality of his admirers would in most cases have been diminished if they had had any clear idea what his books really were about. As he knew of no way in which he could make the academic public understand his real meaning without plunging into controversies repugnant to his tastes, he shrank from receiving homage, as it were, on false pretences.

As to my own family, whatever one's opinion may be of the taste displayed by the English in altering the ancient name of the great mountain, there can be no doubt that the choice of my uncle's name in connection with this queer kind of vandalism was meant as a full recognition of the services rendered by him to engineering science. If, therefore, at your request I tell the people of India some facts which I happen to know in the history of modern European science, I do so not as one appealing to men of another race for recognition denied by her own; but because I venture to hope that for the sake of my uncle and my husband what I say may at least gain a thoughtful hearing. When you have read what I have to say, I ask no more; I do not wish to convince anyone against his instincts; judge for yourselves.

You know that Professor De Morgan caused a *Treatise on Maxima and Minima,* by Ram Chundra,* to be published in England, in order to prove to English men of science that the Hindu mind masters, without the aid of the differential calculus, problems which among us had hitherto been solved only with the help of the calculus.

The bearing of this fact has not, it seems to me, received sufficient attention. If we heard about a foreign tribe that it could see, without telescopes, celestial phenomena discovered by us only by the use of telescopes, we should at once ask: "Does this mean

**A Treatise on Problems of Maxima and Minima, solved by Algebra,* by Ram Chundra, late teacher of science, Delhi College. Published in London (Wm. H. Allen & Co., 7 Leadenhall St., 1859) under the superintendence of Augustus De Morgan, from the Calcutta edition (printed by P. S. d'Rosario & Co., Tank Square, 1850).

that they possess some instrument of equal optical power with the telescope, but differently arranged? Or does it mean that they can see, with the naked eye, or by means of some simpler optical assistance, what is invisible to us without a powerful arrangement of lenses?" In the former case we have evidence of a vision equal to our own and of a constructive ingenuity similar to our own, but which accident has directed rather differently. In the latter case we must conclude that the foreign tribe have an organic power of vision such as we have either never developed, or have lost owing to misuse or disuse. Which of these two cases does the Hindu treatment of Maxima and Minima most resemble? Read De Morgan's Preface: I can only give a few extracts.

"On examining this work I saw in it, not merely merit worthy of encouragement, but merit of a peculiar kind, the encouragement of which, as it appears to me, was likely to PROMOTE NATIVE EFFORT TOWARDS THE RESTORATION OF THE NATIVE MIND IN INDIA.

"They" (the English) "forget that at this very moment there still exists among the higher castes of the country—castes which exercise vast influence over the rest—a body of literature and science which might well be the nucleus of a new civilisation, though every trace of Christian and Mohammedan civilisation were blotted out of existence.

"Many friends of education have proposed that Hindoos should be fully instructed in English ideas and methods, and made the media through which the mass of their countrymen might receive the results in their own languages. Some trial has been given to this plan, but the results have not been very encouraging in any of the higher branches of knowledge.

"My conviction is that the Hindoo mind must work out its own problem, and that all we can do is to *set it to work*: that is, to promote independent speculation on all subjects.

"That sound judgment which gives men well to know what is best for them, as well as that faculty of invention which leads to the development of resources and to the increase of wealth and comfort, are both materially advanced by, perhaps cannot rapidly be advanced without, a great taste for pure speculation among the general mass of the people, down to the lowest of those who can read and write."

He also quotes from Sir John Herschel's historical article "Mathematics" in *Brewster's Cyclopædia*:

"The *Brahma Sidd'hanta*, the work of Brahmegupta, an Indian astronomer of the seventh century, contains a general method for the resolution of indeterminate problems of the second degree; an investigation which actually baffled the skill of every modern

analyst till the time of Lagrange's solution, not excepting the all-inventive Euler himself."

The destruction of natural faculty which De Morgan deprecated seems to have been going on in other departments besides that of mathematics. A friend of mine who employs himself in founding in Europe little colonies of peasant artists, and who for that purpose has studied good specimens of real old Eastern art, was invited to inspect some weaving done in India in an institution controlled by Englishmen. "Art?" he said to me, "call that Art ? True Art always expresses some real feeling, personal or national ; *that* stuff is neither English nor Hindu nor anything else. Some boy from Cambridge or Oxford goes out there and thinks he can tell the Hindus what they ought to do !"

And indeed I fear that the "boy from Cambridge or Oxford," or some other cramming-place here, is the *fons et origo* of all the mischief. "We *must* keep a hold on India," say our governing classes, "or else what should we do for careers for our sons ?" May the words prove prophetic, though spoken in stupid and cruel ignorance ! May England long keep a hold on India as a school where "our sons" may learn the secret of true culture ! But how can we expect to retain the loyalty of Hindus, if we trample out their normal development and their self-respect ? Someone wrote to me lately that Sister Nivedita cares for India, but not for this country. I replied that Nivedita seems to me to be doing more than any other woman whom I know of for the peace and stability of the British Empire. I have gone through all this battle before, on a small scale, and seen the issue. Seventy years ago my father, a parish clergyman, started the (then novel) doctrine that the parish pastor is not a priest, either in religion or in art, but a state-"minister" (*i.e.*, servant), appointed to organise the culture of the parish *in accordance with the desires of the most serious and wise inhabitants*. The neighbouring clergy were alarmed and angry ; they said that my father was encouraging disloyalty to the hierarchy of social rank and to the proper authority of the state clergy. But, notwithstanding their disapproval of the methods, they envied the results. There was no parish in the country round where the inhabitants, even the Nonconformists, were so fond of the parish church ; no clergyman who had such power as my father to sway the hearts of the people when any feud needed to be healed or any wrong to be righted. Therefore I have no fear of normally developed people ; but I do dread human beings who have been mechanicalised and distorted.

My father and De Morgan had drawn wisdom from the same source. What that source was will presently appear. We will now,

if you please, go back to the mathematics and the influence of De Morgan.

Of course English youths are now being taught to do problems in Maxima and Minima by means of squared paper and other simple devices similar in essence to Ram Chundra's, and probably superior in efficiency. The power of the English to do this has been, so to speak, thawed out, largely owing to the influence of De Morgan. We have nothing now to learn from India about that particular branch of actual geometry. My point is, as De Morgan's was, that we have still much to learn from India about the psychology of mathematical study generally. And there are many other branches of learning in which our powers are still latent (frozen up, as the power to understand Maxima and Minima *directly* was frozen till fifty years ago) under certain influences prevalent in Europe, and waiting the touch of India to thaw them into life. It is of these frozen, dormant faculties of ours that I have to write to you.

What I shall say next will seem to you at first connected with Jewish rather than Hindu thought. Have patience a moment : I hope soon to make you understand its relevance to your own affairs.

My husband told me that when he was a lad of seventeen a thought struck him suddenly, which became the foundation of all his future discoveries. It was a flash of psychological insight into the conditions under which a mind most readily accumulates knowledge. Many young people have similar flashes of revelation as to the nature of their own mental powers ; those to whom they occur often become distinguished in some branch of learning ; but to no one individual does the revelation come with sufficient clearness to enable him to explain to others the true secret of his success. George Boole, poor and with little leisure for study, became known as a learned and original mathematician at an early age. From the first he connected his scrap of psychologic knowledge with sacred literature. For a few years he supposed himself to be convinced of the truth of "the Bible" as a whole, and even intended to take orders as a clergyman of the English Church. But by the help of a learned Jew in Lincoln he found out the true nature of the discovery which had dawned on him. This was that man's mind works by means of some mechanism which "functions normally towards Monism." Besides the information which reaches it from the external world, it receives knowledge direct from The Unseen every time it returns to the thought of Unity between any given elements (of fact or thought), after a period of tension on the contrast or antagonism between those same elements.

At this point all possibility of becoming a priest came to an end. George set to work to write a book (*The Laws of Thought*), in order to give to the world his great discovery. If he had stated it in words, he would have been entangled in an unseemly theological skirmish. He presented the truth to the learned, clothed in a veil so transparent that it is difficult to conceive how any human being could have been blinded by it ; he proved that by the mere device of always writing the symbol 1 for whatever is the "Universe of Thought" for the time being, the whole cumbersome mechanism then known as 'Logic' could be dispensed with. If you are thinking of sheep as divided into white and not-white, put x for 'white' and 1 for 'sheep' ; if you are thinking of sheep as a portion of the animal kingdom, write z for 'sheep' and 1 for 'animals,' and so on. Using this simple device, he proved that the most complicated examples given in any treatise on logic could be solved easily and mechanically by the ordinary processes of elementary algebra. He said in the book that this law was a law, not of facts or of essential reason, but of the human mind (*Laws of Thought*, p. 4). He also said he wrote the book for two purposes :

(1) "To investigate the fundamental laws of those operations of the mind by which reasoning is performed" (p. 3), and

(2) "To give expression in this treatise to the fundamental laws of reasoning in the symbolical language of a calculus" (p. 5).

It was when this book was nearly finished that he came strongly under the influence of what I would venture to call the Everest School of Mathematics : at first indirectly ; afterwards by direct contact with Sir George himself. He finished off his book *The Laws of Thought* somewhat hastily ; in fact, he afterwards told me that he had given seven years to its preparation but he wished he had given fifteen.

The academic world was enchanted. George visited Cambridge in 1855, a year after the publication, and was astonished, and at first gratified, at the cordiality of his reception. Herbert Spencer said that the book was "the greatest advance in Logic since Aristotle." George Boole said to me that neither Aristotle's Logic nor the Creed of Moses could have been enunciated unless the formula to which the Universities had now given the name of "Boole's Equation" had been, in some form or other, perfectly well known. George afterwards learned, to his great joy, that the same conception of the basis of Logic was held by Leibnitz, the contemporary of Newton. De Morgan, of course, understood the formula in its true sense ; he was Boole's collaborator all along. Herbert Spencer, Jowett, and Leslie Ellis understood, I feel sure ; and a few others. But nearly all the logicians and mathematicians ignored

the statement that the book was meant to throw light *on the nature of the human mind* ; and treated the formula entirely as a wonderful new method of reducing to logical order masses of evidence about external fact. Only think of it ! The great English religious mind, which considers itself competent to preach *the Truth*, the only saving Truth, to all mankind ; the great academic educational mind which is to improve Hindu culture off the face of the earth, fell into a trap which I believe would hardly have deceived a savage. My husband said to me that he believed he could never have made his discoveries if he had received a university education (as he at one time much wished to do, but was, fortunately, prevented by poverty). My after-experiences, among men who had been subjected to that process, incline me to think he was quite right in so believing. He was, as I said, a quiet student, gentle, timid, very conscientious, and averse to controversy ; he could not face the theological animus which would be aroused by any attempt to explain himself in open words, nor did he feel it right to unsettle the superstitions of people evidently too stupid to take in reasonable truth ; he went on to further researches.

He had proved the essential rightness, in relation to human progress, of the command to think of the Infinite Unknown as Unity when appealing to Him for light on finite concerns.

The question next arose : What instinct in man, what fact in human psychology, has given rise to the tendency to think of the Divine as a Trinity ?

The Jew could give no further help. The Trinitarian tendency was seen by George Boole in connection with the fact that man conceives the physical world in three dimensions. His Sonnet to the Number Three (p. 250) gives a clue to his view of this matter.

But the great delight of all his later years was the study of the psychology of Incarnation Myths ; and I incline to think that the record of it, in *Differential Equations* (Chap. viii, "Singular Solutions"), will be considered by posterity the crowning achievement of his life. Numa Hartog said to me, in a puzzled way, that it did not read like a chapter of an ordinary text-book. A student who heard his lectures while he was engaged on it, said he looked not like a professor before a blackboard, but like an artist painting from a vision.

My uncle, George Everest, was sent to India in 1806 at the age of sixteen. Things were different in those days from what they are now ; there were neither competition Wallahs nor Officers trained in England by 'Army Coaches' : the boy went out ignorant, unspoiled and fresh. He made the acquaintance of a learned Brah-

man who taught him—not the details of his own ritual, as European missionaries do, but—the essential factor in all true religion, the secret of how man may hold communion with the Infinite Unknown. This my uncle told me long afterwards. Some time about 1825, he came to England for two or three years, and made a fast and lifelong friendship with Herschel and with Babbage, who was then quite young. I would ask any fair-minded mathematician to read Babbage's *Ninth Bridgewater Treatise* and compare it with the works of his contemporaries in England ; and then ask himself whence came the peculiar conception of the nature of miracle which underlies Babbage's ideas of Singular Points on Curves (Chap. viii)—from European Theology or Hindu Metaphysic ? Oh ! how the English clergy of that day hated Babbage's book !

My uncle returned from India finally in 1844. He never interfered with anyone's religious beliefs or customs. But no one under his influence could continue to believe in anything in the Bible being specially sacred, except the two elements which it has in common with other Sacred Books : the knowledge of our relation to others, and of man's power to hold direct converse with the Unseen Truth. In 1846 my father, Uncle's younger brother and pupil, published a paper on the names of God in various languages, in which he attempted to show that Odin, God, Theos, etc., were names for *spiritual vitality* imparted to man. When I was preparing for confirmation, I asked him what the church prayers meant by calling Jesus 'God.' "He is an Incarnation of God," said my father. "But I don't know what Incarnation means ; and you told me not to use words the meaning of which I don't understand." "Why can't you understand ? You are an Incarnation of God yourself." This from a country clergyman in 1849 ! You can see that India 'avait passé par là.'

Now you see why "Boole's Equation" seemed to me at the age of eighteen exactly what it was : the mere algebraic expression of natural psychologic truth ; why I was never either puzzled or shocked by my husband's conception of Trinity and Incarnation as myths connected with the psychology of the human mind ; and why I was able to help him in his work.

My father used to say to me : "Few crimes which a man can commit are more wicked than trying to convert Jews to any of our forms of Christianity ; because the New Testament is their own book ; and the best hope of the world is that they (the Jews) should study it in their own way and tell us what it means." I have found the teaching of Jews about the New Testament very helpful in connection with my husband's psychology. Therefore I

never care what Europeans say about India ; I wish to hear what Hindus themselves can tell us about their old literature.

When my husband died I received an enthusiastic welcome as the widow of the mysterious recluse to whom science owed so much. Scientific men, theologians and publishers alike, invited me to throw light on some passages in my husband's works which they felt to be obscure ; but every attempt on my part to interpret "Boole's Equation" as a law of the human mind known in Asia from the earliest recorded ages met with either violent opposition or blank non-intelligence. My adventures among the learned would fill a volume, and very funny reading it would be, though in some parts very sad. I can now only sum them up in a short parable. There was once a steam-hammer, capable of crushing a big iron bar flat at a single blow. The inventor (Mr. Nasmyth) sometimes amused himself by showing visitors that his control over it was perfect ; that he could crack a filbert shell with it without injuring the contents. Now, can you imagine a party of squirrels watching this *tour de force ? "Oh !* here is a wonderful man ! He has invented a mechanical nut-cracker ! We need never use our own teeth again ! Let us give him medals, and confer on him honorary titles as a learned squirrel, doctor of the Science of Nut-cracking ! But . . . stop, there are parts of this machine not essential" (to the cracking of nuts) ; "let us get rid of them ; then the apparatus will function more easily. Oh ! dear Mrs. Nasmyth ! how glad we are that you have come to us ! You were in your husband's confidence ; you know how his glorious machine was made ; help us to improve it !" Imagine Mrs. Nasmyth trying to explain to these amiable beings that the cracking of nuts was an accidental side-issue ; that the true purpose of the machine was something entirely different. . . . There you have my history during the thirty-six years that have elapsed since my husband's death.

With regard to my husband's later work, I have found myself since his death caught between the cog-wheels of two opposite kinds of superstition, which seem to me equally childish and unworthy of civilised beings. Men who were pledged to a theologic system based on the conception of three individual gods in One God, were afraid to face the simple statement that Trinity is a limitation, not of the Divine Essence, but of human concrete imagination. On the other hand, many "Free-thinkers," proud of their emancipation from the trammels of idolatrous Trinitarian theology, shrank from all reference to Trinitarian metaphysics, as if it necessarily involved a step back towards the idolatry from which they had escaped. Those who can treat this subject sanely and reasonably are almost invariably persons who have become

what he meant. He revelled in Gratry's book. I have never met with any other Englishman who had seen the mathematical portion till it was pointed out to him by me ; though as a religious writer Gratry is well known. What has become of Gratry's influence on science ? I have heard that he was threatened with excommunication. The sentence was not carried out : it would have called attention to his work. The Church did a cleverer thing. Gratry's psychological deductions from his theory of mathematical induction were of the highest order ; they were republished in a separate form, without any mention of the mathematical root whence they sprang. Thus it was possible to make them appear as the outcome of specially Catholic theology, and to hide their connection with the great psychologic truth which underlies all religions alike.

At this point our reasoning must leave the earth and rise for a moment on its wings. Those who can understand nothing which does not refer either to the hoarding of minerals or the cracking of nuts will not be able to follow us. Shut your eyes for a moment and turn your gaze within. Think what must have been the effect of the intense Hinduizing of three such men as Babbage, De Morgan, and George Boole on the mathematical atmosphere of 1830–1865. What share had it in generating the Vector Analysis and the mathematics by which investigations in physical science are now conducted ?

Ask Mr. Sinnett to think of this, and then to assert again, if he can, that *Hindu thought has had no influence in developing European physical science.*

I have one more point to notice, the significance of which I think you will easily perceive.

After reading Boulanger, it occurred to me to follow up the clues as to early spiritual thought given by ceremonies connected with natural objects, such as trees, branches, etc.

Surely physical and intellectual fertilisation run parallel in the history of the minds of all naïve peoples, and the one is to them a symbol of the other.

I published a few papers on "Sacred Branches," and received more than one warning—one in especial from a well-known leader of religious reform—that I must be mistaken in supposing that ceremonies connected with branches had ever any reference to spiritual or intellectual fertilisation ; because—guess why—because there is evidence that they *had* been at various times connected with physical generation !

These be thy intellectual leaders, O England ! These be the wise men who are going to show Hindu women how superstitious

it is to offer rice to the Sacred Egg. You would probably still find more than a few ladies in Hindustan capable of pointing out to these prosaic gentlemen that the person that does see the connection between physical and spiritual fertilisation is more likely to be a true interpreter of any ancient religion than the person who cannot see it. God defend India from having its women 'educated' under the auspices of such men !

Now, dear sir, I have told you the special facts to which I alluded in our short conversation. Will you allow me the privilege of indulging in a few promiscuous suggestions born of my various experiences in the English thought-world ? They cannot harm you ; they may, perchance, afford you a little help some time or other. Take them at least as an old woman's blessing on your aims and on Nivedita's undertaking.

The class of literature called Sacred Scriptures, such for instance as the Scandinavian 'Eddas,' the Sanscrit 'Vedas,' and that collection of Hebrew and Greek writings known in England as 'the Bible,' is made of two strands closely interwoven.

One strand consists of the traditions, myths, legends, laws, ethical notions, rituals and customs which constitute the 'religion' of some particular race or nation.

The other strand consists of allusions to and hints of the great, world-wide, world-old secret, of the means by which man can maintain and increase his capacity for directly receiving into himself fresh force from cosmic sources, and fresh knowledge direct from that storehouse of the As-Yet-Unknown which remains always infinite, however much we may learn. I call this latter strand 'secret,' not because those who most truly know it are unwilling to communicate it to anyone who wishes to know it, but because of the unwillingness of men agglomerated in groups either to know it or to let it be known. The majority both dislike for themselves the stern self-discipline which the knowledge of it imposes, and dread the mental power given to others by its possession.

Europe for the last fifteen centuries has been subject to an influence peculiarly favourable to trampling out the true secret of power to draw knowledge direct from the Infinite Unknown. As long as a race is familiar with its own sacred literature, the more earnest and thoughtful of each generation will understand the literature in spite of the dislike of the majority to their doing so. No opposition can prevent an intelligent Hindu from catching the secret from the Vedas, or a spiritually minded Hebrew from knowing how Moses, Isaiah and Jesus held converse with the Inconceivable Unity. But we in North Europe were robbed of our

Eddas and our Druidic lore by Roman priests mad of that lust for religious uniformity which is a spiritual perversion of the brute lust for conquest and self-assertion. These Southern invaders did (what missionaries still try to do in Asia) : they robbed us of our legends and old customs, which, however perverted by the masses, would always have been transparent and shown the Great Secret of culture to all who wished to see ; and they imposed on us a "religion" and a sacred literature, doubly unintelligible to us Western Aryans, as being Eastern and as being of Semitic origin. Had they left North Europe its native legends, and given us the Bible in addition, as interpreter and purifier of our own rituals and customs, they would have bestowed on us a boon indeed ! But they insisted on our accepting their ritual and legends *instead* of our own. Thus in Europe even the intelligent lost for the most part the knowledge of the organic psychologic method of communion with Unseen Truth, and accepted instead a 'religion,' the one commonly miscalled Christianity. It seems hardly credible, but it is a historic and indisputable fact, that for fifteen centuries not only the ignorant and thoughtless, but the large majority of intelligent and spiritual Europeans, believed it to be their duty to allow themselves to be robbed of their natural birthright of spontaneous communion with Unseen Truth, and to accept instead the special doctrines of an alien 'Bible,' the allusions in which they could by no possibility understand aright. Every now and then, of course, some man in Europe caught a glimpse of the laws of man's natural relation to the Unknown. This has happened sometimes spontaneously, often by contact with the Hindu Sacred Writings AS INTERPRETED BY THE LIVING HINDU MIND. Those who received such illumination, if they spoke in words, were in the Middle Ages burned or tortured to death. In modern times they have only been worried or starved to death. But many of them—my husband, for one, and many another besides—have found the way to state the laws of human approach to and acquisition of the Unknown in a convenient notation, which, as I said, both withdraws what they have to say from the notice of the so-called "religious" world, and facilitates its use in organising physical science by making its application compact and rapid. This science of the laws according to which "finite man can appeal to the Infinite for light on finite concerns," reduced to a compact notation, is what is known in Europe as THE HIGHER MATHEMATICS or CALCULUS OF (mental) OPERATIONS.

Ram Chundra could do without the calculus what Europeans at that time did only by the aid of the calculus, because the calculus was a mechanical invention intended for the purpose of

bringing within the reach of the deadened European mind certain things which the Hindu mind saw spontaneously.

When we Europeans boast of our science, one point remains almost always ignored ; it is this : no amount of mere observation and experiment can prove a Law of Nature, in any sense which makes it available for purposes of real science. Babbage (*Ninth Bridgewater Treatise*, 1837, 1st edition, ch. ii., and 2nd edition, 1838) showed that however long or carefully men may have observed a sequence of events, if they try to state the law which governs the sequence, the chances are still as infinity to one that they have misstated it, that events predicted by them will fail to happen as observation had led them to expect. Wherever we find the element of prophetic certainty, *i.e.* of such certain knowledge of a law as shall enable us to say beforehand what consequences will flow from given causes, there must have come in a touch of that other kind of induction—the one called in the West "mathematical." Now the notation, the manipulation of mathematical induction, is entirely European ; but the mathematical induction itself *comes from the East.* The majority of Englishmen, when they speak on this topic, speak in what I have called elsewhere a condition of "serene omniescience" of the whole subject.* No amount of skill in using a mathematical notation throws any light on the conditions under which it was generated. A man may use a scientific notation with consummate skill and yet know no more of the mode in which it was generated than the boy who turns the handle of a machine need know of the nature of the investigations which presided over its construction. Many so-called mathematicians are so unawake to the true nature of the machine which they are manipulating that they are hardly aware that there is anything to learn. I, who lived nine years with George Boole while he was collaborating with De Morgan, know—that I do not know. I do as George Boole and De Morgan did : I bow my head in reverent thankfulness to that mysterious East, whence come to us wafts of some transcendent power the nature of which we ourselves can hardly state in words. When materialists on one side, and theosophists on the other, agree in assuring the public that the great structure of European science has been created *without reference to psychic lore*, I feel that I owe it to the cause of truth to say that I differ from these persons, not as to the truth or value or originality of this or that idea or statement, but as to the contents of books which they have apparently never read, about the genesis of notations which they can only use mechanically (if they can even do that much), where-

**Saturday Talks*, Colchester, 1900, p. 35.

as I have discussed the details of some of them with the originator, before their form was finally fixed.

This question surely goes to the root of all ethics and all the well-being of people in every country and every class.

The "improvement" made by Jevons in my husband's method increased its utility for dealing with mere finance at the cost of all other uses. One proof of the utter ignorance of the English on questions of psychology is, that when one speaks of a *mathematical* treatment of a subject, they almost always suppose one means something like statistics, something which deals with the *numbers* of things, not with mental operations. Mr. John Hobson told me, not long ago, that he always believed mathematics could have nothing to do with the *quality* of anything, that it must always refer to quantity only. He had no conception that the true function of mathematics is to test the *quality of our thinking* ; that it is a Calculus of Mental Operation. Mr. Hobson had got his ideas of the meaning of mathematics mainly from Jevons ; and, being a true thinker, had refused to acknowledge such mathematics as a guide. The difference between mathematics and statistics is shown in this : the statistician deals only with averages ; he rejects all that seems to him unusual as outside of his problem. Boole's notation enables us to deal with ultimate types of fact and to bring out their significance. This is the genesis and meaning of the Science of Incarnations or Singular Solutions. The true test of the validity of any theory, in biology, psychology, or social science, is : How does it answer when applied to *ultimate types* ? Impatience of those apparent "exceptions," which in reality "test the rule," is a sign of a feeble thought-mode whose apparent strength is due to the delirium of fever.

When a man finds that he has made a mistake, he often likes to get out of the matter without being obliged to own that he made it.

An editor will tell one in the coolest manner that one's ideas 'are highly original, interesting, and valuable, but one must manage to express them without showing that one heard them in a synagogue, or readers will take offence.' (They would do the same if one said one had heard them from a Brahman.) This same edifying system is carried on in detail, at the expense of whatever individual discoverers, ancient or modern, happen to be out of favour with the special clique for whom one is writing.

Women who have cultivated the art of 'making lenses of themselves' (*i.e.* bringing to a common focus thought-rays of different orders) are always made tools of in this way, unless they are very careful to prevent it. Many women, under inducements similar to those which have been brought to bear on me, succumb morally,

and allow themselves to be set up as *illuminate*, and traded on for dishonestly pious purposes. And many a woman who would not consent to be false to her own instincts of fidelity has gone mad under the horrible pressure.

A great alienist told me about 1885 that the present condition of the atmosphere of religious and educational circles in England was bad for the health of patients who had any tendency to *delicacy of conscience*.

I then said: "English thought is now so rotten that it gives way under any firm grasp. It lacks cohesion, because the members of one group are afraid to own their obligations to some other group."

My experience is that Jews, whatever their faults may be, have at least some perception of the meaning of *fidelity to ancestry* (racial and intellectual), and they never attempt to make one disloyal in the way that Gentiles do. Therefore Jewish thought is more coherent, vitalised and pure than ours.

Instead of trampling out the Hindu methods of culture, we had better improve on our own. Medical men have often expressed to me their regret that their preliminary education had been so one-sided and futile as to put needless difficulties in the way of their understanding the Laws of Thought as algebraically expressed.

Assistant teachers in schools, after a short period of study of "Boole's Law" (*i.e.* the law of mental unity), usually come to the conclusion that many of the methods taught to them in the training-schools are radically bad, destructive of nerve-health and of intellectual power; they are puzzled and pained at the impossibility of carrying out what they see to be the dicta of sound psychology in connection with any school system at present in existence. Children are often brought to me with the request that I will "try to find why they cannot get on with mathematics," and what is wrong with the methods in use at their school. Usually I find that the mathematical text-books in use in the school are very good in their way; but the whole system and discipline of the school are contrary to the most elementary principles of mathematical psychology; the children have acquired radically bad mental habits, and have no idea how such a thing as a mind ought to be used.

India, no doubt, sorely needs the vitalising touch of Europe; she needs both our physical science for practical use and our mathematical notation to interpret to her consciousness the treasure of her own subconscious experience. But do we not also need her touch perpetually? Those who think that the little

scraps of Indian lore already in our possession comprise all that there is to know are, I fear, leading us sadly astray. Mr. Sinnett having brought home from India one or two golden eggs, is now telling us that it never sent us any before his time and never will again ; he is trying to persuade you to kill the bird that laid them. I hope for all our sakes that you will not be persuaded to do anything so foolish.

A woman once spoke to me about "the art of sheathing the mind to prevent the shedding of force," and added : "My mother was an American Indian ; we are taught those things in our cradles ; we are born knowing them." What would it be to England and America, in these feverish, neurotic days, to have in every school a competent teacher of "the art of sheathing the mind to prevent the shedding of force" ? Alas ! what has become of those with whom it was a hereditary tradition ? As for the ART itself, we have here mean, foolish, degenerated scraps of it. Something similar has happened in the matter of at least one valuable American food-plant. Having got the potato under cultivation, the Anglo-Saxon race were foolish enough to allow the wild stock to be killed off as a "weed." Now, we would give a good deal to renew our degenerated, over-cultivated Europeanised stock by fresh importation of the true native growth ; but, alas ! the native tuber is now hard to find. Let us all pray that a similar fate may not overtake the mental foodstuff which we have imported from India. Your country may be, if dealt with wisely, a practically exhaustless store of psychologic knowledge.

The battle which you have to fight has been fought out already on a smaller scale, in the matter of Hebrew culture and faculties. For centuries Europe has been trying to unjudaise Jews : the religious party wished to missionize and "convert" them to Christianity ; the secularising party of late has wished to prove that the Jew could do nothing better than accept bodily our own materialistic, unphilosophical, anti-psychological modes of learning. This pressure produced what was known as "the Jewish Difficulty." Surely that ought to be a sufficient warning of the consequences of trying to prevent gigantic psychologic forces, of whose nature we are ignorant, from developing along the paths that are normal and safe for them. There have, fortunately, been always a certain proportion of Jews too wise to be caught* in the mischievous mantraps set by us for the destruction of their higher faculties. This

*See an able article, signed G. K. C., in *Speaker*, 2nd March 1901, on this subject. The writer refers to the habit of Gentiles of bestowing honours on precisely those lines of conduct in Jews which the Jewish community would have been too wise to reward.

select minority has accepted our science for what it might be worth, but refused to let us flat-iron out their own old methods of domestic discipline. Now, a quiet but strong current of religio-philosophic influence has set in which, originating among such Jews as Claude Montefiore, Israel Abrahams, and Lily Montagu,* is sweeping many harmful delusions from our Gentile homes. What such Jews are doing, I hope you Hindus will also do in your turn, and on a larger scale.

The treasures which these people have to guard are different from yours. No Jew that ever I met seemed to have the slightest conception of the nature of the special faculties which you Hindus inherit, and can help to develop in us European Aryans. But the struggle which you have before you is essentially the same as that which such Jews as those to whom I refer have successfully carried through. Subjects of the English government who wish to revive and give full development to their own racial potentialities (whatever those may be), while sharing to the full in the opportunities for European culture, and who wish also to avoid entangling themselves and their race in political turmoil, would do well to study, as a model, the movement which is now represented by Montefiore, Abrahams, and Lily Montagu. It is a marvel of tact, good taste, concentrated power, and effective management.

A propos of this Hebrew revival, let me tell you a story which you may find it useful to narrate to any missionaries with whom you may be troubled. Somewhere about fifty years ago, two philosophic and ethical reforms, somewhat similar in kind, were started in London ; one in the English Church, the other among the Jews. De Morgan and my husband watched both these movements with keen interest. On personal investigation I found the whole subject of modern Judaism treated by the Christian reformer and his followers with patronising carelessness, whereas the Jew reform leader had been shrewd enough to make himself well acquainted with all the writings of the leader in the English Church. I worked under both leaders at different times. Both were perfectly sincere, and, as human beings, worthy of respect. But I noticed one curious difference, which, for me, completely settled the question which was the greater as a leader. The Christian had been himself a "convert" from the Unitarian Church. He cordially welcomed converts who came to him to be received into that which he had joined. The Jew, David Woolf Marks, had all his life been a student of the Christian philosophy ; but had

*I. Abrahams, *Jewish Quarterly Review*. C. G. Montefiore, *The Bible for Home Reading* : Macmillan. L. H. Montagu, *Naomi's Exodus* : T. Fisher Unwin, 1901.

remained in the Church of his fathers. And when Gentiles came to him (as many did) to be received into the Jewish Church, he spoke in this wise: "Why do you wish to be received? You want to join us in prayer? The doors of our place of worship are open; come in whenever you like. You wish to read our Scriptures? No one hinders you. You wish to keep our moral laws? Do so by all means; you will be all the better citizen. You want to conform to our ritual? What good will that do you? It is the traditional discipline of a race, unsuited to you and a useless burden for you. You wish to be descended from Abraham? Ah! I cannot give you that. You say that I have taught you what is good? Well, if I have done so, go away and practise it and teach it in your own Church; and do not come here flattering me." I heard this long ago. Last week I went to the old Hebrew reformer, now nearly ninety years old, and asked him if the above is a correct account of his mode of treating would-be "converts." He gave his emphatic assent and his cordial blessing on my present attempt to encourage your aspirations. (He was a friend and colleague of De Morgan and Kingdon Clifford.)

I wish you Hindus would tell yourselves that European civilisation is, compared with yours, a very young child. He is a nice child, but noisy and troublesome, as are all healthy children.

A wise teacher once explained to an old race which was being dominated by a young one, the principles on which the relationship should be adjusted: "Render unto Cæsar the things which are Cæsar's, and unto God the things which are God's." Leave the child his material "activities"; they suit his stage of development. Never strike him, never grow angry. If he attempts to meddle with sacred things, such as your reverence for your Sacred Past, you can surely make him ashamed of his childish impertinence by a few judicious words.

You invited me to send a message of encouragement and hope to the learned men of India. Better for that purpose than any words of mine are some that were spoken to me long ago by a medical friend (Dr. Wiltshire) who was dying in early manhood of the results of an over-brilliant career in youth. He said to me: "The way to do good work is to live to be old; if you have genius, keep it fresh till you have also experience." This applies, I think, to nations as well as to individuals.

What we need is not that English visitors to India should tell us little scraps that they happened to learn there, but that Hindus should learn to speak our language, and teach us what they know. And by "our language" I do not mean the English of the market and the mission church, the law court and cramming school; I

do not mean any of the dialects in which people who cannot think for themselves repeat like parrots what they suppose other people to have thought. I mean the language in which the real thinking is done here by real thinkers. Tell learned Hindus that Boole's notation was invented by De Morgan and himself for the purpose of expressing *psychological* truth ; that it is an extension and development of that international shorthand in which Moses and Odin and the Brahmans of old talk across time and space to such men as Leibnitz and Newton, Boulanger, Gratry and De Morgan, over the heads of politicians and plutocrats, of pedagogues and priests. If Hindus will study the notation of Boole's calculus, so as to know how to express themselves in it freely, they may then help Europeans to found something like a truly human civilization, a truly intelligent education.

I end as I began. Tell Hindus to read De Morgan's Preface to Ram Chundra. Tell them that it is the voice of Mount Everest calling to India to awake and arise, and recover the treasures of its past.

With heartfelt gratitude to the memory of the Brahman who taught my dear uncle (not his special religion, but) the underlying principles of true progress,

I remain, dear Dr. Bose,

Yours truly,

MARY EVEREST BOOLE.

SUGGESTIONS FOR INCREASING ETHICAL STABILITY

Part II of this book appeared in "The Monist" (Chicago) of January, 1902, It was published in book form, with the addition of Part I, in 1909.

DEAR LADY AILSA,

You asked me to write out in terms of Logic the reasons which you and I had agreed on for not joining in the demand for the suffrage. The statement which I have drawn up in response to your request forms Chapter II of the following booklet. Failing strength prevents my arranging it in strict literary form; but I feel that it is a suitable introduction to the paper of "Suggestions for Increasing Ethical Stability," which I have been asked to re-publish.

M. E. BOOLE.

PREFACE

THIS book was written by a woman for women.

Men have their own modes of revelation; reminiscences of those intense moments during which the Laws of the Logos were being burned into the tissues of our male ancestors. Some man will no doubt interpret, in terms of the Higher Logic, the specially masculine experiences. The task of the present writer is to show to women that we became logical, not while herding in gangs or competing against each other or against the male sex, but while pouring out our hearts and lives in the shelter of our own homes.

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INTRODUCTION

THE reader of this book will find the comprehension of it much facilitated if she will kindly condescend to prepare herself for reading it by going through a simple preparatory mental exercise.

Make three clear mind-pictures :

(1) A cat lying comfortably half-asleep beside her sleeping kittens.

(2) The change which comes over the whole personality of the cat, physical, mental and moral, when a kitten wakes and cries.

(3) That other change which comes over the personality of the cat when some one from outside attacks the kittens.

The initial motive of both changes is the same. The cat, in each case, is drawn out of luxurious self-indulgence by the kittens' needs. In each case she is roused from egoism to altruism by some call from without. But the change in her muscular, nervous, and mental condition takes different form according to whether her attention has been roused immediately by the creature whom she loves or indirectly by some danger threatening the creature whom she loves.

On this difference depends the distinction between the two fundamental axioms of logic. The axiom which springs to the cat's paws, if not to her conscious mind, is, in the first case : "This creature [the kitten] and I form a united pair" ; in the second case : "This creature [the enemy] and I are antithetic and irreconcilable."

Logic begins at the point where some one is sufficiently evolved to be able to think : "This creature and I are antithetic and irreconcilable *in one particular* ; the relation in which we are so is a unit of thought. *Just while we are thinking of that relation*, but only for so long, it constitutes our Universe of Thought."

Countless instances besides that of the cat might be adduced to illustrate the principle above stated. But multiplicity of instances would only confuse the ground by leading the reader to suppose that the writer is trying to prove some theory as against the opinion of those who hold a contrary theory. The object in the present case is not to prove anything, but to bring to the reader's consciousness something which will become axiomatically evident to whoever clearly understands what is being stated. For this purpose one marked type-instance, thought of at intervals, is sufficient ; the reader will easily find others for herself.

Logic means the Logos, or *hidden* wisdom ; that which is not learned from without but revealed from within. The laws of logic are revealed to the pure in heart ; to the sincere ; to those who are not afraid to face the fact of their own ignorance and confess it to themselves and to God.

The laws of mechanics, such as gravitation, impose themselves on all material substances. The laws of logic were worked into the animal organisation along with dawning consciousness of the

relation of the individual to environment and especially to other individuals. They are in reality the laws of self-preservation from delusions ; of economy of nerve-force ; of maximum efficiency with minimum of waste of nervous energy.

PART I

THE PROCESS OF LOGICAL INDUCTION IN ITS RELATION TO HEALTH AND ETHICS

CHAPTER I

LAWS OF THOUGHT (EXTRACTS FROM GEORGE BOOLE)

THE general laws of Nature are not, for the most part, immediate objects of perception. They are either inductive inferences from a large body of facts, the common truth in which they express, or, in their origin at least, physical hypotheses of a causal nature serving to explain phenomena with undeviating precision, and to enable us to predict new combinations of them. They are in all cases, and in the strictest sense of the term, *probable* conclusions, approaching, indeed, ever and ever nearer to certainty, as they receive more and more of the confirmation of experience. But of the character of probability, in the strict and proper sense of that term, they are never wholly divested.

On the other hand, the knowledge of the laws of the mind does not require as its basis any extensive collection of observations. The general truth is seen in the particular instance, and it is not confirmed by the repetition of instances.

We may illustrate this position by an obvious example. It may be a question whether that formula of reasoning, which is called the *dictum* of Aristotle, *de omni et nullo*, expresses a primary law of human reasoning or not ; but it is no question that it expresses a general truth in Logic. Now, that truth is made manifest in all its generality by reflection upon a single instance of its application. And this is both an evidence that the particular principle or formula in question is founded upon some general law or laws of the mind, and an illustration of the doctrine that the perception of such general truths is not derived from an induction from many instances, but is involved in the clear apprehension of a single instance. In connection with this truth is seen the not less important one that our knowledge of the laws upon which the science of

the intellectual powers rests, whatever may be its extent or its deficiency, is not probable knowledge. For we not only see in the particular example the general truth, but we see it also as a certain truth—a truth, our confidence in which will not continue to increase with increasing experience of its practical verifications.

But if the general truths of Logic are of such a nature that when presented to the mind they at once command assent, wherein consists the difficulty of constructing the Science of Logic? Not, it may be answered, in collecting the materials of knowledge, but in discriminating their nature and determining their mutual place and relation.*

CHAPTER II

HUNTERS AND BROODERS

LOGICAL deduction may be likened to a tap by means of which we draw off for present special use as much as we want, for that use, of the contents of our mental storing-vessel. The means by which the logical cistern is filled is called induction.

The kind of faculty of scientific induction which grows up while a creature is hunting or "prospecting" or exploring or at war is of a different quality from that which grows up while a creature is brooding over one or two small helpless things, trying to find out what makes them uneasy and how to make them comfortable. As my husband pointed out, the two kinds of inference are totally different. It is by mistake that the same word (induction) has been used for both.

For thousands of generations males were practising the first kind (alternately with *deduction*) during nearly all the year; while females were practising the second kind (alternately with deduction) during a part of each year. The sexes had equal practice in deduction; but the males grew strong in the first kind of induction, and the females in the other. Then came Aristotle, Euclid, and Archimedes, who reduced to organic form the laws of deduction and of male induction, and of the connection between the two. Plato, somewhere about the same time, pointed out that there existed another faculty, still rare, weak, misty (that is to say, among males); but an actual, reliable, intellectual power. For saying this, Socrates was poisoned, Isaiah sawn in two, and Jesus crucified, by males.

The laws of the relation between this other kind of induction

**An Investigation of the Laws of Thought*, Chapter I.

and deduction remained inchoate for two thousand years after Aristotle. Then they in their turn were formulated and reduced to an organic system.

The new organisers saw that they were formulating the laws of a faculty hitherto not recognised as having any laws. A few of them saw that what they had done was to formulate the laws of a faculty still weak in men and very strong in women.

But the laws and conventions of parliamentary and official procedure had been growing up for two thousand years on the basis of Aristotle's canon, while the new logic has, as yet, no conventions as to conduct, no canons of procedure, no precedents.

Both are necessary to the well-being of humanity, to man's conquest over the forces of nature. Ultimately, they must take counsel together. But there is nothing more sterilising and disastrous than *premature* attempts at fertilisation.

If we suggest a parable, we can perhaps make it clearer what we mean by not wishing women to thrust themselves at present into politics. Suppose there were a nation of Vikings or Sea-Kings whose navy was somewhat de-moralised, while its land army was as yet only in the elementary or volunteer stage. Suppose that the sea-captains had hitherto been virtually kings, but had shown evidence of incompetence to manage land affairs. It would be easy to see that *both* were necessary for the well-being of the nation and for its power to hold its own against other nations. But what should we think of a proposal to clear up the chaos by giving to every undisciplined landsman a *vote* as to how the ships should be steered ?

The argument used about the "justice" of giving women a vote *because* men have it—as if a conglomeration of two unjust absurdities made one reasonable justice—is in itself a specimen of confusion between the two forms of logic.

At this point it will be convenient to drop the question of sex and to give to the two kinds of logical induction the names Hunters' induction and Brooders' induction, merely begging the reader to bear in mind that, for countless ages during which sex differentiation was being determined (the ages which preceded the dawn of human speech and the speaking ages which preceded Aristotle), the males did more hunting than the females and the females more brooding than the males.

We will now proceed to examine the respective characteristics of Hunters' and Brooders' modes of logical induction.

The hunter's experience brings the creature into constant contact with antithesis, choice, or alternative. ("This prey will be caught or will escape" ; "This foe will eat me or I shall escape" ;

"This fruit is fit to eat or it is not fit" ; "It will rain or it will not rain," etc.). All this depends on the assumed premiss : "A thing cannot possess a property and lack it at the same time." There is no reason in the necessary nature of things why thought should run in that groove ; but the necessity has been ingrained in brain by experience, which has made the equation

$$x \text{ (not-}x) = 0 \quad . \quad . \quad . \quad . \quad . \quad (1)$$

an incessantly recurring step in human reasoning.

The brooder's experience has brought into the human brain the sense of a unity made up of two parts :

$$x + \text{not-}x = 1 \quad . \quad . \quad . \quad . \quad (2)$$

All hunting, etc., depends on tense muscle, whereas brooding implies a much slacker condition of muscle. All legislation, etc., depends ultimately on tense muscle (at the ultimate the policeman's grasp). All brooding depends on the slacker condition (at the ultimate, the mother's caress).

The above is the reason why I venture to think that the suffrage, the whole apparatus of voting and legislation, belongs on the whole to the male line ; while silent influence is on the whole more appropriate to the female line.

All induction depends on an alternation between analysis (exercise of the sense of contrast) and synthesis (exercise of the unifying power). This alternation is the pumping action which stores the mind with knowledge and the brain with nerve-energy.

Both analysis and synthesis are simpler in the case of the brooder (as long as she is brooding) than in that of the hunter, warrior, explorer, politician, etc. The mother wild-cat is shut up with, and absorbed in, her kitten ; she has, for the time, no thought of any other union. When the kitten is attacked the mother and the attacker are irreconcilable on the one point on which each is intent, the fate of the kitten, and have no other relation to each other than is involved in the necessity for settling that disputed point.

The hunting animal, on the contrary, has to find his way and his prey by means of a complicated mass of slight indications. He has to distinguish apart shades of colour, shapes, varieties of smell, notes of sound. "This shade of brown is that of the fawn which I can eat ; that other shade warns me of the tiger which can eat me. This cry is the cry of my mate ; that, of my prey ; that other, of my foe. This note is made by water which I can drink ; that is only the rush of wind among the tree branches."

Then, having collected his data by a series of careful acts of

analysis (exercise of the sense of contrast), he next has to put together all his data and form a judgment as to which course it is best on the whole for him to pursue.

Wild animals of the male sex do sometimes get fits of going for their immediate object as regardless of ultimate consequences as political or religious partisans. Female animals do the same when driven mad by hunger or fear. But those who do so are usually soon eliminated.

As some simple instance of any law should always, if possible, be studied before one proceeds to investigate more complex instances, it seems evident that logical induction should be studied first in the simple relation of a cat to her kitten, before one enters on what is involved in more complicated communal relations. It will much simplify the application of logic, to both ethical and political discussion, if we take care to keep before our mental vision the fact that the most elementary and imperative of the laws of thought were ingrained into the texture of the brain by the alternation of mental action of a mother between times when her child is hungry and times when some other hungry creature wishes to eat her child.

Another point to be noticed is this: Suppose a baby were in danger from a poisonous snake or other foe, the mother's automatic effort would be to attack the foe. But supposing she scotched it without killing it, what next ? The thought of the civilised European woman would be : "Now that my child is safe, I will put this poor creature out of its misery." We hardly realise that there have been whole ages of evolution during which the inference, after securing the safety of the child, would have been : "Now I have triumphed over my foe ; I will torture it" ; and other phases during which the inference would have been : "This creature was an enemy ; now I can amuse myself by watching it writhing." Whereas, for the civilised mother, the next mental act is one of *sympathy with the snake.*

Some thoughtless critics will reply that the fastidious Englishwoman ends the snake's tortures for a selfish motive—that she does not *like* to witness suffering. Why not ? Because the sight of another's suffering gives her a feeling of suffering herself. Think what is implied in the very fact that she does not like to see it, and that she suffers with her fallen foe !

Now, all this change from liking to disliking the sight of a foe in agony marks the progress of the race in *logic* ; in conformity with the laws of the Logos. The facility with which we pass from antithesis to synthesis is the measure of our progress in that science which deals with the storage and the economic use of nerve-force.

In studying the problems of the present day, we have to bear in mind that the thought-life of the world is in chaos, owing to the confusion between the old logic and the new. The old began with an attempt to simplify the problems confronting creatures wrestling with a wide and complicated environment ; the new began by formulating the emotions of a mother-creature in her lair. The old began by positing as axioms certain generalisations assumed (without sufficient warrant) to be *universal* and *necessary* elements of Truth ; the new began by positing as bases the emotions which are necessary to *Humanity* for the simple reason that, but for their existence in our animal ancestors, no such phenomenon as the human race could have been evolved.

The old logic had its roots in irrational arrogance ; the new has its roots in unquestioning devotion.

The very conditions under which our faculties were evolved seem to me sufficient explanation of the apparent anomaly that most of us women do (as Hinton said) love the Leaders who call on us to lay down our lives better than those who advise us to take up our rights.

PART II

SUGGESTIONS FOR INCREASING ETHICAL STABILITY *

THE present paper is in no way concerned with any question of what is and what is not ethical conduct. Opinion on this point varies to some extent ; but there is a broad region of common consent among all civilised peoples ; and to this region of universally accepted duty our present inquiry will be confined. We all know that we ought not to endanger our own lives or other people's by carelessness ; to commit suicide in a mere momentary fit of disgust with immediate circumstances ; to kill our neighbour in petulent revenge for a trifling annoyance. We all know that we owe it to society to be cleanly, decent, sober, and at least moderately courteous, and to take pains with such occupations as we ourselves choose to pursue and wish to succeed in. On what does it depend whether we shall do these and other things which, at the start of life, we all intend to do ? The mere wish to do them is obviously not sufficient ; it is often momentarily suspended by fatigue or some slight nervous failure, or by mere absorption in

* My warm thanks are due to Professor Wm. James for valuable corrections and suggestions in connection with this paper.

some other interest. But in the meantime we have been forming habits (of sobriety, order, self-preservation, cleanliness, etc.), and these habits bridge over the momentary lapse of volition. But it may happen to any of us to go through a period of nervous breakdown in which the volition is suspended to a more serious extent and for a longer time. On what does it depend whether the good habit shall remain when the individual is, temporarily, not properly "responsible for his actions ?"

To take a few concrete instances : Suppose two women equally well intentioned ; both sober by taste and habit ; both accustomed to take a small quantity of wine with meals, and neither of them in the least inclined to exceed that small quantity. Suppose that both are attacked by some form of nerve depression for which alcohol is an immediate palliative. On what does it depend that the woman in one case takes the palliative at random and thereby sets up a craving for stimulant which ultimately lands her in dipsomania and in the other is not even seriously tempted to take alcohol out of her regular meal times ? On what does it depend whether one whose power of deriving normal enjoyment from food is in abeyance shall become merely indifferent to food for the time, or shall start a habit of abnormal craving for unwholesome kinds of food ? Whether one whose normal love of life is in abeyance shall become indifferent to his fate, or shall commit suicide during temporary insanity ? Whether one whose normal enjoyment of family ties is temporarily disturbed shall merely become indifferent for the time to his own wife ; or shall run away with someone else's wife, and tire of her in turn when the next phase of indifference comes on ? In general terms, on what depends the question whether the structure of good habit shall remain during collapse of nerve power ? If we could answer that question with regard to habits as to the value of which no dispute exists, each of us could apply the answer to finding out how to cultivate other virtues. Many factors go to the full determination of our question ; some of those factors are probably not known as yet to anyone ; others may be known to specialists but not to me. But one or two principles bearing on the subject seem to me to come out with perfect clearness when the ordinary medical knowledge is analysed ; and if these principles were emphasised and general attention called to them, that would not only do something in itself to diminish the quantity of ethical wreckage, but would also do something to facilitate the further investigation of points still doubtful.

The present analysis makes no claim to originality. The writer has no pretension to supersede or to criticise the work of medical

and other psychologists, or even to show that she is acquainted with the last new up-to-date work bearing on her subject. The information here contained is either possessed by, or readily accessible to, every adult accustomed to any kind of serious reading. But when a mass of heterogeneous material is algebraised, difficulties in the way of its practical application are sometimes got rid of. Various writers have contributed their quota of knowledge, each clothing his share in the language which his own life and habits have rendered familiar to him ; unless the whole mass is translated into an algebraic (*i.e.* neutral) notation, such elements as the accidental connotations of words, personal prejudices, and professional bias tend to create confusion ; it is difficult to see clearly the essential principles in which the authorities really agree, and the points on which they still differ and about which therefore further investigation is especially desirable. Two moral diseases due to opposite causes are sometimes called by the same name ; *e.g.*, Megalomania, a title applied by careless doctors indifferently to (1) an exaggerated idea of the value of some work which one really has done and undervaluing of all other work ; and (2) such utter absorption in the work and personality of some central type that one's own identity and acts are forgotten. The declaration of Edward Maitland that "we sought in the records of the past for experiences and teachings corresponding to those which we ourselves had received from sources purely transcendental, the result of such research being to show indubitably that what we ourselves had thus received far surpassed in plenitude and purity all that before was in the world ; and to qualify us to criticise, and to estimate the value of, any such system that might be propounded" (*The Unknown World*, March 1895), betrays a quite different kind of mental disease from that of the over-worked student who says, "Tim Mahony ? Who is he ? I never heard of him. Oh yes ! I think I did hear the name long ago ; but I forget where. *My* name ? Oh no ! my name is 'Huxley' (or 'Jesus Christ' or 'Spinoza')." A medical practitioner of any insight and experience would, by instinct, treat the two cases differently ; but the doctor, alas ! gets hold of the case only after serious and probably irreparable mischief has been done ; and as the *word* used by certain authorities in both cases is the same, relatives, who might do something to avert the mischief if they knew how, assume that precautions found, or believed, to be useful in preventing the one disease will be equally efficacious against the other.

A still more mischievous confusion prevails in the use of the word "Habit." Practical efficiency of all kinds depends on the setting up of "habits" ; a "habit," in that sense, being a chain of

impressions or acts so linked into a whole that one act of will starts the whole series, which then carries itself on while the will and attention are occupied with something else ; as for instance : I will to write ; and, that order being conveyed to my hand, it proceeds to write down, for the next hour or two, whatever words are in my conscious thought, without my attending to or feeling any choice about either the spelling of the words or the form of the letters. On this habit depends my *efficiency* as a writer.

But ethical quality depends on retaining the power *not* to form automatic habits of sequence in matters of importance, to keep each important element of life under the direct and immediate control of the will.

The ethical quality of a life depends largely on the will acquiring the "habit" of not allowing "fixed habits" to be formed except among those acts, ethically indifferent in themselves, which go to make up practical efficiency.

Now a large quantity of work has been done, by medical and other investigators, in the direction of finding out how fixed habits are formed. This work throws light, not only on the question what we should do with a view to promote efficiency, but also, by inverse application, on the question what we should avoid with a view to preserve the elasticity necessary for ethical quality : it is sadly evident that some educational reformers are applying the results of the investigation on the formation of habit directly in both regions ; they assume that one can form "habits" of reverence, justice, mercy, and kindness by similar methods to those employed for forming "habits" of holding a pen without inking one's fingers and of wiping one's shoes at the hall door. Whereas the truth is that the qualities of reverence, justice, etc., depend essentially on the habit of *suspending action till there has been time for a mental act of conscious sympathy with facts* ; while, on the other hand, such habits as wiping one's shoes on the mat cannot be too automatic ; they ought to be carried on without any interruption to conversation or meditation due to conscious attention to the outer act.

Then, again, to come nearer to the special subject of this paper : While the ethical quality of *normal* life depends on keeping up the natural control of the will over individual organs and faculties, and on not allowing this control to be interfered with by either automatic impulse or mechanical habit, this natural mode of telegraphic communication from the will to any special organ may be suspended by nerve failure or disturbed by nerve disorder ; either of these things may take place for a time or permanently. Ethical stability during nervous break-down must therefore de-

pend on having at hand some extra-normal, or what one might almost call supra-natural, mode of communication from the will to the special faculty. The will must be able, so to speak, to send to any given faculty this message : "Communication from me to you is suspended for the present ; therefore do nothing, but take a rest," or "Communication from me to you is disturbed ; therefore pay no heed to any message purporting to come from me to you till you receive the countersign to the effect that normal communication has been restored." The will must also be able to issue to any organ or faculty this final message : "Communication from me to you has been permanently destroyed ; therefore go into Nirvâna and leave all available time and energy for the action of faculties still under my control."

The two functions of the will, the normal and the extra-normal, are as distinct as those of the legislator who directs one how to act during life and the Pope or Deity for the sake of whose supremacy one is willing to die. Yet it is evident that some teachers have confused the two things under one misleading title : "Habit of self-control." And they think that if they can succeed in bringing the action of a faculty in health under the control either of will or of mechanical habit (they little care which) they have thereby done all that is necessary or possible towards ensuring absence of bad action in the event of its normal mode of communication from the will and of association with other faculties becoming deranged. In fact, the whole subject of ethical training is in chaos owing to words being used in an ambiguous manner, and much confusion is cleared up when the material is first algebraised and then retranslated into the vernacular.

The notation used by me in the preliminary process of algebraising or neutralising psychological material is that invented by my husband, Professor George Boole, that being naturally the one with which I am most familiar. I have no reason, however, to doubt that other notations, such as that of De Morgan, may be equally good. The point on which I would lay stress is that what follows is not any theory or speculation of my own (I hereby retract beforehand any portion of it which may prove to be so), but a retranslation into the vernacular of other people's statements after these have been passed by me through the neutralising filter of Boole's notation.

As soon as we attempt to reduce psychological material to order by means of an algebraic notation, we perceive that confusion is often created by the fact that such material is usually dealt with according to some primary classification based on some preferential opinion or sentiment. States of mind are divided into good and

bad ; or into altruistic and selfish ; or normal and abnormal ; or natural and supernatural ; or healthy and diseased ; or waking and visionary ; or earthly and transcendental : or, by those who consider themselves the spiritual-minded, as inner and outer ; illumined and illusory ; and so on. All such words expressing preference on one side or the other, besides leaving interspaces of debatable ground, commit the judgment at starting. It is always better to begin by making a primary classification about some simple matter not of opinion, but of admitted fact. This is made much easier by the use of a neutral notation. As this reclassification of data is my present aim, I must here forestall a few criticisms on my method of procedure which would be quite valid if I were attempting, either to make an original investigation, or to enforce some opinion about nervous disease as against some other. If I were conducting an original investigation on the treatment of nervous disease, it would be a valid criticism on my results to say : "You are generalising from too few facts. The fact that you happen to have spent a few weeks on visits to a lunatic asylum, and nursed half a dozen cases of hysteria does not give you a right to instruct the public on nervous disease." But I am here trying, not to show how nervous disease should be treated, but to clear away certain difficulties which hamper the general reader in his attempts to understand works on psychology. When one has nursed even one or two serious cases under an eminent nerve-specialist and observed where he lays down positive orders and where, and within what limits, he leaves the nurse free to experiment, one has gained something in the way of power to eliminate from the popular idea of the meaning of his printed works certain elements of error due to the words he uses being charged in the minds of readers with associations which cannot have been attached to those words in the mind of the writer. Perhaps it may be well to explain here one or two points on which much misconception prevails in connection with the use of mathematico-logical notation to classify psychological material.

Whatever kinds of data are being reduced by any strictly scientific notation, the *maximum* and *minimum* registers are cornerstones, or principal points of support, for the whole framework. For instance, when a mathematician is constructing a table of heat-averages, no one disputes his right to use, as an essential part of his material, the *maximum* and *minimum* temperatures of the period with which he is dealing. If I were trying to press the soundness of my opinion on any subject, as against someone else's, by reference to *authority*, I should have no right to quote as *authorities* any utterances except those of persons competent to judge. But,

as I am only making a logical analysis of experience on my subject, extremes of opinion on both sides form the points of support of my algebraic filter. *E.g.*, a young schoolmaster once said to me: "What we want is never to give the boys time to think." On the other hand, there are, or at least have been within the last half century, a few persons who mistook catalepsy for inspiration. I take these two (very foolish) opinions as extremes beyond which opinion does not go : no schoolmaster, however anxious to make life external and active, desires to prevent his pupils from sleeping quietly for a few hours every night ; no person in modern Europe, however superstitious, goes so far as to desire delirium or epileptic fits for his child. I therefore take *approval of catalepsy* and *disapproval of any moment of day-dreaming* as the two opposite "limiting conditions" of current opinion on the desirability of leaving a young soul "alone with the Lord."

Then, again, all mathematicians are familiar with the process of preparing the mind for the general solution of a Differential Equation by working out first a partial solution. The process is somewhat like that by which we prepare a child for understanding a method in arithmetic by setting him to work out first an individual example in small numbers : we do not attempt to generalise from the particular *result* to a general formula, but we do generalise from the *method* of reasoning seen to be valid in a small and manageable instance to, or rather *towards*, a method, analogous in structure but more complicated, which will enable us to deal successfully with difficulties of the same class on a larger scale. The difference between the two kinds of generalisation from a single individual instance, one fallacious and the other perfectly sound and legitimate, has been pointed out by my husband ; I will here only indicate that such difference exists. I would beg the reader to remember that though the *answer* to any question about how many marbles a child possesses is irrelevant to the solution of problems involving vast national interests, yet the greatest statistician must have learned his method of computation originally by thinking out such questions as "How many marbles at four for a penny can you buy for three pence ?" Just so, having before me the task of organising data tending to throw light on the great problem how to prevent negative failure of nerve-power from assuming forms positively bad, I framed a method of analysis by first thinking out a minor question (the one given in the sequel as Example *b*) ; viz., how to prevent a certain peculiar form of lethargic tiredness from drifting towards conditions universally admitted to be bad (delirium, epilepsy, etc.) and induce it to take, instead, the desirable form of normal and recuperative sleep.

The material used in the following pages has been gathered from such easily procurable works as *Life in Nature* and *Thoughts on Health*, by James Hinton; *The Unconscious Mind* and *Springs of Character*, by Alfred Schofield, M.D.; some works by Dr. H. Maudsley; Haeckel's treatise, *Monism, the Confession of Faith of a Man of Science*; sermons in Jewish pulpits and articles in various Jewish journals, in which the effect of hereditary and traditional monistic belief were incidentally touched upon; an address by Percy Furnival, F.R.C.S., on *Training*, in which he treats of the importance to morality of getting the whole muscular system under control of the will; addresses to parents by Helen Webb, M.B., on "Neurotic Children" and on "The Formation of Habit"; a work by Russell Reynolds, M.D., on Epilepsy; a valuable fragment by Père Gratry on "Inspired Intellectual Capacity" ("Les Vertus Intellectuelles Inspirées"), which occurs at the end of his *Treatise on Logic*. Several of the above-mentioned writers have kindly given to me, *viva voce*, a little explanation of points in their work about which I asked; the same kindness would, I am sure, be shown to any serious inquirer.

There are four determining causes which seem to account for large numbers of cases of moral failure. First, parents usually seem to suppose that the ethical condition throughout life depends largely on the ethical quality of the motives brought to bear on the child during its earliest years: the reasons on which this opinion is founded seem to collapse at the first touch of logical analysis; they rest on premises true in themselves but linked together by an unuttered fallacious assumption. The ethical quality of a life depends largely on habit. (True.) The *efficacy* of a life depends largely on *early* habit, because many useful habits are most easily and successfully formed before the age of ten, and there are some useful habits which, if not acquired before that age can hardly ever be formed later. (True.) It is therefore assumed that the *particular mental habits on which depends the ethical quality of a life* should be formed before ten. No writer with whom I am acquainted has attempted to bring forward any reason for jumping from the premises to the conclusion assumed. Nor do I know of any evidence from other sources in favour of that conclusion. There exists, it seems to me, an overwhelming mass of evidence pointing to the opposite conclusion: *i.e.* that the properly ethical life should not begin to be crystallised into habits until after twelve. Till ten or twelve there is plenty to do in securing efficacy; in gaining the use of the faculties; in co-ordinating movement, gaining control of temper, learning to obey rule, to endure cheerfully small discomforts, to be accurate in statement, observant of

outer facts, to keep apart in the mind the outer world of physical phenomena and the inner world of imaginative picture. It is highly important that a child should learn early to be able to do all these things and many others ; but I see no reason to suppose that he will do them any better for forming the habit of attaching the doing of them to any special dominating motive.

(Good temper is not necessarily ethical.)

That there should be a dominating ethical motive in the mind of the adult who is directing the child—a motive for the sake of which he desires to form good habits in the child—I quite believe ; but I see no reason to suppose that anything is gained, for either the present or the future, by the child's being under the dominion of any one ruling motive, or by his motives partaking of any specially ethical quality. The attempt to work too early on ethical and altruistic motives tends to wear out their stamina. The ultimately dominating motive normally begins to gain hold at a time which varies between the ages of eleven and seventeen.

The second of the causes of moral failure to which I allude may be described as the custom among parents and teachers of building up good habits in the pupil on a basis of motive within which does not fall the true centre of gravity of the individual's moral being. As, for instance, when a young person who cares for nothing except making creatures (human and non-human) happy is told that there is no value in mere kindness unless it is practised from some motive of abstract theology, with the practical result very often that she devotes herself, for the time being, to making happy the particular teacher who preaches that theology, instead of forming, as she would naturally do if left to herself, a general habit of kind action. Or when one, the core of whose being is some ideal of Science or Art, is over-persuaded to believe, or rather to suppose she believes, that Science and Art are worthless, except in so far as they are pursued with conscious intention of benefiting humanity.

The third cause is a slow, subtle sapping of the moral foundations by what may metaphorically be described as a water-leakage ; when some underground spring, pure in itself and necessary to life, may be draining itself away from the parts of the whole structure where it would be available for purposes of vitalisation, and be soddening and ruining portions which should, so to speak, have been carefully kept dry. As, for instance, when ideas are called into young minds, during the active hours of concrete study and eager competition, which should be as much as possible kept out of consciousness, except during pauses devoted to concentration and leisure. The fourth cause will be described later on ; we will now go back to the second cause of moral failure.

Miss Webb divides neurotic children, that is to say, all children except the most stolid and commonplace, into two classes, which she calls "the naturally protected" and "the naturally unprotected." This classification is not, of course, meant to be taken as rigid and absolute : a nervous system may be more or less naturally protected. But for purposes of investigation Miss Webb deals with ultimate types.

Now suppose that a teacher is trying to build up a structure of good habits on a basis of motive within which does not fall what I have called the centre of gravity of the individual, then, other things being equal, the teacher will be successful in proportion as the pupil is unprotected ; but in the same proportion will be the risk of the edifice collapsing, at some future time, in consequence of nervous failure or any shock or undue strain, or by the effort of the moral organisation to settle itself on its own centre of gravity. In proportion as the pupil is "naturally protected," the teacher will fail in his own aim of setting up good habits, but will set up instead a bad habit of self-protection; that is to say, a habit of resistance to influence, advice, and the wishes of others. This habit, and such others, good or bad, as the pupil may form for himself, will be comparatively little likely to give way under shock or strain. Or, in other words, taking the cases in which the teacher has tried to form good habits on a basis of motive unsuited to the individual, it may be expected that *in proportion to his success in forming "good habits" in youth* will be the number of cases of future dipsomania, suicide, and general nerve-wreckage in later life which he will cause. Also, the greater his influence (*i.e.* the higher the pitch of protectedness which he is able to overcome), the more intense will be the resistance called out against him in those who do resist. In other words, the greater his average of success in forming good habits, the more dogged in revolt against future influence, good and bad, will be those whom he fails to influence. Therefore I much fear that whenever an educational scheme is based on any definite motive which is proposed to all the pupils as the one which should govern their lives, the greater its success in forming good habits, the higher will be the percentage of moral wreckage for which it will necessarily be responsible. And there is little use in endeavours on the part of those who are carrying it out to minimise the evil by improving their methods ; for the evil is due, not to flaws in their method, but to the fact of its success.

Most Churches have arranged for some ritual (such as Confirmation, *e.g.*) to be gone through at the critical period of adolescence, in order to give to religious teachers an opportunity for ethicalising

life at the right moment. But alas ! in this matter, more perhaps than in any other, it is true that "priests were appointed to lead men into Truth ; but in all ages [and in all Churches] they have feared lest men should find the right road and walk in it." And the same may be said of a vast variety of non-religious teachers who undertake to steer the careers of young people, whether towards visible success or towards invisible Truth ; whether towards worldliness or towards "other-worldliness" ; whether in the interests of the individuals themselves or of Humanity at large. The majority of them, while sparing no pains to inculcate such habits both of thought and of action as they think desirable, omit to consider whether the basis of motive on which they are building the habits is one within which falls the true centre of gravity of the individual with whom they are dealing. Let me not be misunderstood here : no teacher worth mentioning omits to observe what motives most powerfully sway his pupil at some given time ; what I assert is that comparatively few find the true centre of gravity of the individual as a whole.

We have now to deal with the problem of finding the centre of gravity of an individual Will. All authorities agree that besides the conscious processes which go on in a human mind, some other processes go on outside of consciousness, which afterwards affect conscious thought. During some portions of a human being's time his discriminating mind is active ; either receiving impressions from outside through the senses, or else consciously at work on material so received previously. We will call this state of conscious discrimination *phase A*, and the action appropriate to it *P* action. There is an inner mind, the action of which is described as "unconscious cerebration" or "subliminal consciousness." We will use the term "inner mind," not meaning to endorse any special theory about the local seat of it, or its nature or essence, but simply as a convenient designation. We will call its action *Q* action. During phase *A* the outer mind is informing the inner, making there deposits of material which are thus being "lodged in memory."

During other portions of time the outer mind is passive ; and is either dormant or is passively receiving impressions from the inner. We will call these portions *phase B*.

There is a third possible alternative ; the two kinds of action may conceivably go on simultaneously. It seems more probable, however, that the two actions go on not quite simultaneously but in very rapid alternation. We will call the state in which action from outer to inner and action from inner to outer go on, either simultaneously or in rapid alternation, *phase C*. The whole subject of phase *C* seems to be in chaos ; and it would appear that little

is really known about it. It is evident that some forms of it are irregular and unhealthy. Perhaps I may be allowed just to mention here that I have often been asked to help, out of school hours, children who "cannot understand," or "cannot get on with," arithmetic, algebra, or geometry. The difficulty usually turns out to be due to the child's having drifted into a bad habit of setting up some anomalous forms of *C* ; and disappears, without much explanation on my part, as soon as I can get the mind to set up a normal slow alternation of *A* and *B*.

It seems to me that the faculty of mathematical apprehension depends largely on the power to keep *A* and *B* distinct from each other, to alternate them at will, and to distinguish clearly which portion of the work belongs to each phase. I suspect that when great ethical teachers in all ages advise their followers in various forms of words to live "in the world and for it, but not to be of it," what they mean might be algebraically stated thus :

Spend large portions of phase *A* in studying the facts of human life and the feelings, needs, and wishes of human beings in order that your inner mind may be fed with material which it can convert, during phase *B*, into suggestions which will make your actions during succeeding *A* phases profitable to mankind ; but resist the tendency of social custom to *drag you into phase C*.

All authorities worth mentioning desire (1) to make the alternation of *A* and *B* periodic, and (2) to place the alternation under control of the will. That is to say, they wish to set up a tendency to pass from *A* to *B* and *B* to *A* at stated times : a tendency strong enough to prevent the occurrence of *automatic* or *impulsive* irregularity, but not so strong as to prevent either phase from being either prolonged or cut short by an act of will.

It is obvious that the *direct* assistance which parents and teachers can give, by means of words, towards the forming of good habits must be given almost entirely during phase *A*. The teacher may rouse the pupil from *B* to *A* by a word ; but as long as *B* lasts, advice from the outside is not reaching the consciousness. But the stability of the good habits which are being formed in *A* largely depends on preventing phase *B* from setting up counteraction to the good habits, and teachers may do something to avert such disturbance : (1) by promoting normal and peaceful modes of *B* and averting as far as possible the occurrence of less healthy modes of *B* ; and (2) by adjusting the bases on which habits are being formed in *A* to the requirements of B in its normal modes. Teachers who do not know how to do either of these things have recourse to two dangerous substitutes : some try to minimise phase *B*, "never giving the pupils time to think," in order that all the

waking time may be spent "in books or work or healthful play," *i.e.* in various modes of *A* which the teacher knows how to direct. As it is impossible to make a brain go on living without some *B* action over and above that of sleep, what such teachers practically do is to set up a habit of phase *C*. The whole proceeding is about as wise as it would be to try to keep an infant always either feeding or in violent exercise whenever he is awake, so as to leave no waking time for digestion, because the nurse cannot see the process of digestion going on, and therefore cannot direct it. What she should aim to do is to regulate the feeding and exercise so that the process of digestion shall go on aright of itself without her interference.

Other teachers try to direct phase *B* itself, when the voice does not penetrate consciousness, by some unspoken influence; by "suggestion" of special thoughts or thought-sequences: a mode of intrusion into the sacred arcana of life on which I have only one comment to make, viz., that some people rush in where the great Prophets of Palestine and the great psychologists of Europe would fear to tread.

We must now pass in rapid review the principal modes or manifestations of *B*.*

All sleep belongs to *B*; so do day-dreams and that other allied but not quite identical state called "brown study"; religious meditation; certain anomalous conditions produced by morphia, chloroform, alcohol, and other drugs; the hypnotised state; all forms of coma, trance, of so-called clairvoyance and clairaudience and of automatic writing; as also delirium, catalepsy, and epilepsy.

Phase *B* also assumes another form, for which no popular name exists. I am tempted to call it pre-epileptic lethargy, but think it better not to rouse any suspicion that I am presuming to formulate new medical theories. I will therefore stick to my mathematical last, and call it the *M* variety of phase *B*. It is a rather sudden fit of intense tiredness. The patient is seized with an overpowering longing to lie down immediately and to be undisturbed. She is possessed by some haunting thought: not necessarily a foolish or bad one; sometimes it refers to some good project or holy aspiration. She is unwilling to attend to anything external or concrete; and, if forcibly roused to do so, suffers, sometimes acutely. The attacks are often mistaken, in slighter forms, for ordinary absent-mindedness, or perhaps for "sulks" or "affectation." Friends, as a rule, either ignore them or try to rouse the patient. But there is a look in the face and a curious coldness of the extremities which

* I must remind the reader that *B* is defined, not by the action *Q*, but by lack of certain kinds of *P* action.

should (though too often it does not) attract their notice and induce them to seek medical advice, or at least to be on the watch for the oncoming of graver symptoms. On the other hand, I have seen one heavy attack which might have been mistaken for sleep or for actual coma, so profound was the apparent unconsciousness; but it differed from sleep in the much greater difficulty of waking the patient by any ordinary means, and from coma by certain specific symptoms, *e.g.* by the senses responding to stimuli previously associated in the patient's mind with the special thought which haunted the *M* phases. If the patient is so fortunate as to have friends observant enough to see the need of medical care at the *M* stage, the doctor's verdict will probably be that some serious brain trouble (delirium or epilepsy) is impending, which may probably be warded off if the case is in the care of any one possessed of the necessary resolution. The most important precaution is to anticipate the *M* phase by getting the patient into bed a little before the time when *M* would come on (which is easy to do when *M* is periodic, as it often is), and, if possible, to induce sleep. This breaks the habit of falling into *M*.

During some modes of phase *B*, *Q* gives back to *P* material received from *P*; but not always in the form in which that material was originally received from *P*.

During its residence in *Q* the material is transformed.

The specific note or characteristic of *P* action is discrimination. The outer senses are mainly used in discrimination.

The specific note or character of *Q* is synthesis. "The unconscious brain of man is an organ which functions normally towards monism."*

Ideas and facts sent to *Q* from *P* as diverse or contrasted are returned to *P* unified: this may happen normally, or in any one of several abnormal ways.

One main function of *Q* would seem to be the formation of abstract ideas. Outer experience shows to an individual a round sun and a round moon, round fruits and round poison berries. Images of all these pass into *Q*, and from them is generated in *Q* the abstract idea of "roundness." This is normal action. If the individual jumps to the false conclusion that the sun is a fruit or that poison berries are harmless because they are round like an apple, this may be due, not to any abnormality in the *Q* action

* Monism in this sense means, not a special philosophic opinion, but a condition in which various experiences and images are fused together in the mind. Gratry believed that much monistic work of the inner mind goes on during sound, refreshing, and dreamless sleep. One main use of the waking *B* phases, he believes, is to prepare the inner mind suitably, so that its monistic work in sleep shall be of profitable kind.

itself, but to the fact that there has not been sufficient action of P to counterbalance normal Q action ; as distortion of a limb may be due, not to any abnormal action of the pulling muscle, but to the fact that some other muscle does not do the counteracting pull necessary to make the whole action normal.

One of the two forms of so-called megalomania mentioned above is often purely negative. I have known several persons who believed themselves to be monarchs, or who took the name of some eminent writer. Some of them are remarkable for a calm, unobtrusive modesty. What is lacking in them is the power of accurate discrimination. What attracted them to the person for whom they mistook themselves was not his importance but his representative character.

When the mathematical doctrine of singular solutions is better understood than it seems to be at present, it will be seen that no act of mind is more essentially sane and normal than that of testing oneself by putting oneself in imagination in touch with a central type-figure. The type-figure must be sufficiently like the group of individuals to which it belongs to be governed by the same laws as the group, but so related to the other individuals that some of the laws apply in an inverse way.

I would recommend fanatics who talk of getting rid of monarchy to study this subject carefully. It would lead too far from my present purpose were I to try to discuss it here. I wish now only to emphasise the fact that so merging one's personality, during phase B, in that of a type-figure as to lose all sense of one's own identity is a perfectly normal mental act ; but if the power to discriminate has been insufficiently cultivated, some kind of adhesion may take place. Extreme forms of this adhesion find their way into lunatic asylums in the shape of persons who mistake themselves for some other person. Milder cases are very common outside : the patients fail to discriminate which of the laws governing the type apply inversely to the other individuals of the group ; they do not see in what respects the type-figure should *lead* the group and in what respects he should only *represent* it ; where the other individuals should imitate him ; and where he has acted for the rest, to leave the rest free for other things. They imitate some points in the conduct of the type which, though right for him, should be inverted for them ; as, for instance, when those of the nation who can afford it imitate as far as they can the splendour and fashions of the court, though the reason which justifies the splendour of the monarch is that he *represents* in that matter the whole nation.

Confused personality is not exactly anti-ethical in itself ; but

it leads to many catastrophes and anti-ethical actions and to much national insanity. The preventive consists in a steady habit of never accepting as final the verdict of the mind in either phase until it has been endorsed in the other phase. Mere negatively insufficient action of either phase produces acts virtually insane.

There are, however, modes of the *B* phase which are in themselves abnormal and injurious. About the sleep mode and the epilepsy mode no difference of opinion exists : all authorities agree that a moderate amount of sleep is desirable, and that epilepsy is undesirable, for all persons. About other modes of *B* differences exist. Most of these differences, however, are due to the fact that writers and speakers, on one side or the other, or on both sides, are ignorant of information which exists in the world, and which usually they might have obtained had they desired to do so. There are parents and teachers who disbelieve in the value of "day-dreams" and abstractions and "brown studies," and who consider all indulgence in such "waste of time," if not even positively injurious. Such persons simply have no adequate knowledge of the nature of the mental action of abstract thought which goes on in day-dreams.

In such conditions as those called clairvoyance and clair-audience, the action of *Q* seems to be accompanied by some disturbance or stimulation of the cerebral portions of the organs of sight, hearing, and touch which produces, without external stimulus, a sensation as if of seeing, hearing, or being touched. There are some who attach enormous values to these sensations, as tokens of a condition of revelation from the Unseen. Such persons appear to be unaware that revelations of Unseen Unity, from *Q* to *P*, are of frequent occurrence in the life of every normally rhythmed brain. They also disregard as "materialistic" the wise cautions given by brain-and-nerve specialists, that the stimulating of the anomalous sensations is a danger to moral stability and to continence of nervous energy. There *are* even persons who believe in the spiritual value of trance and catalepsy, in which the power to pass at will from phase *B* to *A* is suspended. But even supposing all the facts adduced in support of this opinion to be proved true, they do not seem to me to constitute any evidence that catalepsy, trance, or clairvoyance are more valuable states, spiritually, than the more ordinary modes of *B* ; and their danger to moral soundness seems indisputable. For it surely must be a bad precedent for the constitution, so to speak, to encourage sense-organs to act, in the absence both of habitual association and of appropriate external stimulus, and under mere wafts of impulse from *Q*, in a manner withdrawn from the control of the will.

But, on the other hand, nothing could be more unwise than to teach young people to believe that visions, voices, etc., are mere delusions and are not signs of inspiration or revelation. They *are* signs—though irregular and useless ones—of a condition in which the consciousness is being informed from the spiritual centre within man, wherein is being perpetually generated the conception of Eternal Unity. However much teachers may deny this great truth, evidence of it may burst upon any individual during severe illness, and upon a highly neurotic subject even without special illness. It may burst in with such suddenness and force as to endanger the reason. And even if the shock of evidence is not sufficient to injure the subject directly, it is likely both to shake his confidence in his teachers and to weaken any good habits which may have been formed on the basis of disbelief in his direct inspiration. It is surely safer to accustom young people to know that inspirations towards Monism are a normal part of every human life ; that the phase in which they occur is sacred and should be respected in oneself and others ; that the organisation should be trained to fall into this phase at regular and convenient times ; but that in case the phase is ever accompanied by specific physical sensations (as of sight, hearing, etc.) such sensations are a sign of something slightly wrong, and indicate a need for care of health, for the avoidance of mental excitement, and for careful moral self-restraint.

There remains to be considered the condition of what is called automatic writing. Gratry says that if a student sits every day at the same hour in a room alone with a pen in his hand and "makes silence in his soul" (*i.e.* suspends conscious thought), he will write down suggestions about the Unity of Nature which will sometimes prove of great value for his future studies : suggestions which, when he reads them over afterwards, will seem to him quite new, and which therefore he might have lost if not written down at the moment. Many medical authorities disapprove entirely of such practices. Two points seem to me clear. Though Gratry knew of some valuable results of this automatic movement of the hand under the impulsion of Q, he cannot have had a sufficiently wide experience to decide that it is productive of no harm in the long run. On the other hand, the medical authorities who denounce all attempts thus to use the hand as a recorder of processes going on in Q can seldom have had the opportunity of watching an experiment of the kind carried on in the sober and orderly manner described by Gratry. On this point, therefore, we may say that there exists a genuine difference of opinion among authorities worthy of respect, owing to lack of adequate knowledge of facts,

not merely on the part of ignorant persons who might know if they would, but in the world as a whole. Evidence here is still a desideratum. I would venture to suggest, also, that those who object to the practice of automatic writing seem to me to be somewhat misled by a false analogy. The arguments against encouraging clairvoyance and clairaudience do not apply to automatic writing, which is not a conscious sensation or sense-perception, but an act, often almost or quite unconscious. Any argument against it *a priori* would apply to all artistic improvisation in music and painting: a fact which almost disposes of such argument by the method of *reductio ad absurdum*. One precaution, however, I feel sure all authorities would agree in recommending is: the individual should decide for himself, in some fully awake phase, whether he will or will not allow himself to become an automatic writer. If, in phase *A*, he decides not to do so, he should not let himself write during phase *B* till fresh consideration or fresh evidence has altered the waking judgment of phase *A*. There is another caution, given by Gratry, which my own experience and that of others with whom I have conversed endorse:

What is written "under inspiration" is addressed to the individual: it is the record of a message sent, as it were, from his subconscious organ of Monism to his conscious intelligence. No one but himself is likely to understand it rightly as it stands; for it refers to material lodged in his memory and there fused into unity. It is, moreover, often expressed in a symbolic shorthand, the vocabulary of which is not possessed by any section of the public.

An analogous and very important caution is that, however clear may seem, during phase *B*, the advisability of making any change in the course of outer life, no such change should be actually made or attempted until the verdict of *B* has been endorsed by *A*. If this principle were taught as a general canon of ethics, and brought into conscious recognition during normal health, it would spare many moral tragedies.

We can now formulate a definition of an *ethically stable* nervous system as one in which has been cultivated from adolescence the habit of acting in phase *A* on motives revealed during phase *B*; and of abstaining from acting on any motive revealed in *B* which the *A* phase has not passed in review and endorsed.

Now as to the motives which sway the individual phases *A* and *B* respectively, and which govern the formation of habits.

These may be divided into three classes, as follows:

Y. Motives which act in phase *A*, but which are suspended and inefficacious in *B*.

Z. Motives which are felt to be potent during *B*, but which to the

waking reason of *A* seem either fantastic, chimerical, or too refined, too altruistic and exalted, to be acted on under the present condition of things.

X. Motives revealed to conciousness during *B* and which the waking reason of *A* endorses.

Motives *X* form the stable basis of character for the individual ; the centre of gravity for his moral being lies among them.

The lines of demarcation between *X*, *Y*, and *Z* vary in different individuals : a motive which is *X* in one individual may be either *Y* or *Z* for another brought up in the same rank of life, the same religious or political community, even in the same family.

Though a teacher seldom has direct access to phase *B*, though words spoken by him while *B* lasts seldom enter the mind otherwise than by first rousing the subject into *A*, yet a teacher can often find out what topics interest a pupil, what motives sway him, during *B*.

Now it seems obvious that ethical stability will be best secured by basing good habits on motives *X*, rather than on motives *Y* or *Z*. There may be no motive of class *X* which is found as potent in phase *A* as is some motive of class *Y* ; nor as stimulating during *B* as some motive *Z*. The wisdom of the educator will be shown by his choosing to work slowly at founding good habits on *X* rather than to produce results perhaps more immediately satisfactory by exploiting the temporarily greater but less persistent potency of either *Y* or *Z*.

The teachers who have what is called "the practical common sense given by wide experience" err on the whole in the direction of exploiting motives *Y*. They have wide experience of the course of life which sends children out of school in a condition apparently satisfactory, and which keeps them steady and industrious for a few years after leaving school. They also know what methods produce a high percentage of brilliant results. But they know little about the percentage of real wreckage and failure in middle life owing to breaking down of an erection of good habits based on a foundation within the compass of which the true moral centre of gravity of the individual does not lie. Wreckage often results also from the influence of inspired and devotional teachers who appeal to spiritual and altruistic motives which for many of their pupils belong to class Z, not to class *X*. Such a teacher often does become cognisant of the after-wreckage, and bitterly laments that so many of his followers have left him and reverted to "the world" ; alas ! what is far sadder than his disappointment is that the pupil too often finds himself in the world without any provision of habits

of acting sanely and morally on any motives suited to his true and persistent self.

Every religion which asserts a dominant motive of action is, at the first, selective : those who feel its motive an inspiration accept it as their ideal. But when a religion begins to take itself for granted as having rights, as able to provide the normal motive for all, its power to induce physical, intellectual, and moral wreck is great in proportion to its immediate influence for good. And this is necessarily the case, however true may be the religion in itself. Victims are truly sacrificed to the Moloch of religious fanaticism, however pure in itself may seem the ideal of the religion under which they suffer. Odin was originally a prophet who taught the worship of the *All-Father* ; yet men were burned to death in his honour. "Crucifying and burning were merciful inventions compared to laying the seeds of nervous disease in the constitutions of children . . . which is what people are now doing in the name of religion."

The first of the causes of moral wreckage during nervous breakdown is, then, the wearing out of the moral sentiments too young ; the second is inducing young people to base their moral lives on a motive which does not appeal to them in all phases of the intellectual life.

Before proceeding to investigate the third great cause of future moral wreckage, it may be well to work a few examples. The reader is requested to take the following, not as a summary of ethics, but as isolated examples of the working of an algebraic notation analogous to the practical examples which follow the theoretical portion of a chapter in a treatise on arithmetic. They are intended, not to dogmatise about conduct, but to illustrate the working of a method of investigation.

(*a*) Supposing one had charge of a person whose medical advisers ordered him to be kept awake for a certain time (*e.g.* one suffering from an overdose of opium, etc.), what mental condition should one try to generate ?

Ans.—Appeal to motives Y rather than X ; and beware of motives Z. Also endeavour to fix attention on thoughts of discrimination, not of generalisation ; of conflict rather than of unity. If the patient is fit for conversation, speak of any topic as to which he differs from somebody else, rather than of any topic, however interesting and exciting to him in health, his interest in which is of an abstract nature or depends on seeing unity among apparent opposites. Before he is fit for conversation, one may be ordered to shake him or to slap him with wet towels : one should not apologise, or tell him one was doing it for his good ; but rather

try to irritate and to rouse the sense of antagonism. One should not adopt a kindly and pitying tone, but rail at him for perverseness and wilful laziness; rousing him, if possible, to protest that he cannot help going to sleep. (This example has been worked out by me on purely abstract grounds. I have had no experience of opium-poisoning, nor do I know what mode of speech is advocated by medical practitioners in such cases.)

(*b*) Suppose one had charge of a person subject to *M*. The medical orders in such a case are to forestall each fit of *M* by inducing normal sleep a little before the time when *M* would otherwise come on. Having got the patient into bed and warm, and having administered a little light food, how shall one so direct his thoughts as to prevent *M* turning into some form of *B* universally admitted to be bad (delirium or epilepsy), and induce it to take instead the form universally considered good, *i.e.* normal sleep?

Ans.—If the patient is a well-protected neurotic, do not try to direct them at all. Explain to him, once for all, the general direction to be taken by the treatment. Tell him that the usefulness of his whole life depends on his own docility and courage now. Bid him find out for himself what is the real core and centre of his heart's interest; what he cares about in all moods alike; what is "the soul that makes him one from first to last." Tell him to fix his mind on that sacred object whenever he lies down. When you have got him into bed, do not talk to him at all, except in response to his wish. If he likes to be read to, read what he wishes.

But if the patient belongs to the unprotected class, he will probably be unable to find his way in the tangle of morbid impressions; and you will have to direct him. Trance and epilepsy involve what may be called an irregular *fall* into an abnormal form of phase *B*. Therefore avoid as far as possible any appeal to motives *Z*, in order not to precipitate a too rapid fall towards *B*. Avoid also motives *Y*, lest you prolong *A* till the too rapid fall comes from over-fatigue. Appeal entirely to motives *X*; and occupy the mind, not with abstract thoughts of unity, but with the *unification* of some ideas which the patient himself has lately been seeing in contrast or conflict.

This answer also has been worked out by me algebraically; but, besides working it out, I have had a little opportunity of observing the efficacy of the method; especially in one case where a physician warned me that some terrible collapse, perhaps epilepsy, was imminent unless I could change *M* into normal sleep at once. The patient, a girl of seventeen, had been fearfully overstrained owing to family worries and had then been half-hypnotised by a powerful preacher who was himself in a state of unhealthy agitation about

what he considered the pernicious influence of a certain scientific philosopher.

Now I venture to think that almost any one who had to treat this case by the light of empirical common sense would have decided to discourage the girl from thinking of either home cares or religious controversy, and would have tried to interest her in other topics. But it would be difficult to fix the attention of a patient on any fresh topic while so overstrained a state lasted; and, even if one succeeded, it could only be by introducing a new subject of excitement powerful enough to override the two already in possession of the field. Algebraic analysis suggests a different way of carrying out the medical instructions, viz. the *unification* of the antithetic tensions. I told the girl that her pastor's agitation was due mainly to verbal misunderstanding; and that what was chiefly needed in such a case was the presence in his home of a calm, wise woman capable of furthering his main aims by correcting the mere accidental errors into which his very earnestness led him. I filled her imagination with the ambition to become a woman who might render such service to some inspired teacher of the future. I thus pulled together, so to speak, the tension on womanly duty of her active home life and the tension on religious ideals of her religious dream-life. And, every time I got her into bed, I read to her passages from the works of the obnoxious philosopher which expressed aspirations similar to those of her pastor but clothed in language which the latter could not understand. The success of this treatment was so marked that I was more than consoled for the storm which burst on my head when the divine learned that I was indoctrinating his most promising catechumen with the views of the infidel whom he had denounced; he had the discretion to be silent about my iniquity in presence of my patient; and I here mention his anger only as an instance of the difficulties which hamper teachers in the attempt to carry out medical advice.

(*c*) What should be the dominant characteristic of thought when preparing for repose?

Ans.—Unity: rather than classification, discrimination, contrast, or strife.

(*d*) What should be the dominant characteristics of active study?

Ans.—Classification, specialisation, contrast.

(*e*) How can an adolescent minimise for his future the risk of accident from carelessness (by fire, being run over, etc.) during fits of brown study; and of suicide during some short period of mental aberration?

Ans.—By linking all habits connected with self-preservation, during the process of formation, with some motive connected with a cause revealed to him in a day-dream and approved by his waking judgment.

(*f*) What should be the ideal present to the mind during private prayer ?

Ans.—Some ideal which has not been merely thrust into the mind from outside, but which has been revealed to the individual from within in some inspired moment and afterwards recognised by his reason as worthy of devotion.

(*g*) What should be the characteristics of a religion publicly taught for the purpose of establishing ethical conduct on a safe basis ?

Ans.—It should be neither polytheistic, nor dualistic, nor purely monistic, neither should it be in any sense idolatrous. It should not present any conceivable ideal of any sort as an object of actual *worship*. The object presented for worship should be an inconceivable Unity from whom emanate all differentiations, and who wills that men should differentiate and discriminate. This leaves room for each soul to find for itself its own ideal of motive.

(The reader is requested to observe that the above is given as the answer, not to any question about the nature of God, but to a question about what is the kind of public religion most conducive to ethical stability in man.)

(*h*) Are there any precautions which an adolescent can take towards the protecting of his future self from the risk of becoming, in middle life, a morphia or alcohol maniac ?

Ans.—Convivial drunkenness is under the control of the will at the time : the man should avoid it by avoiding company where he is tempted. But a habit of solitary nipping, begun to relieve nervous symptoms, may overtake any neurotic, however strong his intention to avoid it, unless he has prepared himself by two precautions beforehand. He should form in youth a steady habit of connecting the care of health and the regulation of diet with the desire to maintain his fitness for some work the value of which has both been felt by him as an inspiration and been believed in by his reason. And he should avoid taking, during solitary day-dreams, any more than his usual allowance of fruit, lemonade, sweets, or anything specially enjoyable. It may be well to exceed that allowance occasionally ; but it should be always, if alone, while engaged in reading or some active pursuit ; if in company, while talking of external things, not while engaged in the endeavour to arrive at inner principles.

Few things are more important for ethical stability than the

habit of connecting dreamy moods, not with extra physical indulgence, but with slight extra physical abstinence. (This caution in no way relates either to general asceticism or to severe fasting at any special times. The nature and quantity of the food taken should be settled by each individual under medical advice. The special psychological caution is that impulses towards special physical enjoyment should not be obeyed in phase *B*.)

This habit of abstinence from extra indulgence during all dreamy moods is the habit that confers on the organisation the extra-natural power of which I spoke, of arresting the action of an organ which the will cannot for the moment guide. It is the secret of longevity for the higher mental faculties.

(*k*) How should a girl under twelve be taught habits of neatness in dress ?

Ans.—By being sent back to make herself clean and tidy whenever she has neglected toilet operations. This should be done in a cheerful, matter-of-course way, giving no reasons and appealing to no motives. The child should be left to find out for herself whether her motive for taking pains is pride in her personal appearance, or the wish to avoid being sent back, or the desire to please her mother. If she asks why one should be neat, she should be told, in general terms, that one should form the habit of doing accurately whatever one is bound to do at all, either by duty or by necessity or as hygienic exercise ; and be careless only about things done for no purpose except to facilitate absolute relaxation.

(*l*) Suppose a girl has the essentially artistic temperament : she has the natural tendency to arrange life and thought on artistic rather than ethical, religious, or scientific lines. What mode of education is least likely to cause her, supposing her health gives way, to become either conspicuously slatternly or excessively extravagant in dress ?

Ans.—We will suppose, first, that she is prepared for confirmation by an enthusiast who denounces the lust of the eye and the pride of life, and dwells on the simple tastes and ascetic tendencies of great saints, the beauty of holiness, and the wickedness of spending money in vain show which is needed by the Lord's poor. This exhortation passes down into the girl's inner mind all the more plentifully because the preacher is to some extent hypnotising her by his earnest personality. It is there seized upon by her own true temperament, and fused into an ideal of simple living which is artistic in its essence but is mistaken for a religious ideal. It of course begins to externalise itself in frocks of severely simple cut and devoid of ornament, in little economies, and in contributions to charities large for her means.

All this has been dominated by a *Z* motive. Her waking, external self has seen the "beauty" of many things besides holiness and nun-like costumes. She has resisted the temptation to see the loveliness of the outer worldly world as a wile of Satan. But every time she has seen it it has done something to unsettle her puritanism. If she remains fairly healthy, she will, on reaching maturity, gradually "out-grow" her religious phase and probably adopt a mode of dress dominated principally by artistic quality, but all the more artistic and picturesque because, during her ascetic period, she acquired a *habit* of simplicity. But if the breaking down of the artificially induced religiosity should happen to coincide with nervous break-down and general failure of mental power, she has not the force necessary for reconstructing her life. The artistic nature may assert itself so suddenly as to carry away all habits, and so imperiously as to set up a tendency to buy at random whatever she feels momentarily capable of using in any artistic combination, regardless both of suitability and of cost.

Now suppose that this same girl had not been religiously impressed, but had been captivated by a refined woman of the world, who showed to her the beauty of a society where each individual dresses and behaves with regard to "fashion," that is, to the prevailing taste of the majority at the moment, rather than in conformity with her own personal taste. Fashion, as a social factor, is seen, in *A* phase, to have an ethically artistic value as a social combiner ; the girl throws herself eagerly into the task of making herself socially irreproachable. But every now and then, in *B* phase, the deeper nature within her reveals to her that humanity consists of many parts besides fashionable "society," and that fitness for that society is a very partial mode of taking one's place in the great whole ; and, in particular, that all true artists would like the effect of her dress better if it were less fashionable and more really artistic. Every impression of this kind weakens the foundations on which her habit of care in dress is being built up. If she remains healthy, she will gradually shift the habit of attending to her dress on to a more really artistic basis, one more conformed to her true self, and therefore more stable ; and then the habit itself will be of great use in assisting to carry out her new and deeper conceptions of what is suitable. But if the discovery of the foolishness of fashion coincides with a failure of power, the whole habit of attention to appearance is likely to give way, and she may drift into the habit of a slovenliness which is often sordid, and yet, by fits and starts, very picturesque.

But if the girl of artistic nature falls into the hands of a teacher who inculcates both simplicity and neatness as factors of a harmo-

nious existence, her dress may be at first neither as simple as under the former of the two modes of treatment described above nor as careful as under the second. But the simplicity and the neatness will probably be of lifelong growth. If she preserves her health, she will probably combine with them some form of artistic career—whether as painter, musician, poetess, or novelist. But should her mental power give way, she will remain daintily neat and quietly picturesque in dress, and perhaps become moderately successful in some art on an amateurish and domestic scale.

. . . . .

We now come to the third cause of moral instability: the one which I have likened to a water-leakage. The majority of teachers try, as I have said, to keep their pupils out of normal monistic phases, to an extent not sanctioned by any great psychologist. All sorts of excuses are made for this: the need to use up time in learning to know the outside world; the examinations looming ahead; pressure of competition, etc., etc. These excuses seem genuine, until one notices that the manner in which the practice of average educational practitioners differs from that of great educational authorities is reflected in other regions where no such motives can possibly have any sway. For instance, in a large lunatic asylum where I have stayed on visits, the doctors and nurses seemed to me as kind and conscientious a set of people as I ever saw; but, thinking of their conduct in the light of certain admitted principles of medical psychology, I often found myself wondering whether they or the patients were the more insane. The whole staff seemed to me to be simply mad of a monomania for pulling patients out of phase *B* into phase *A*, because they did not know how to guide phase *B*. On one occasion I was sitting in the part of the grounds reserved for the more intelligent and cultured patients, when a somewhat glaring case occurred of irreverence on the part of a good-humoured and kindly nurse towards a patient's attempts to recover a lost clue of memory. When the nurse left us, a conversation took place among the patients, of which I remember the following scraps:

"We are here not to be cured of a disease, but to be taught to lie." "No one helps us to guide our minds"; "none of the authorities know any psychology." (Some of the patients knew enough psychology to be excellent advisers to each other.) I should like to hope that the staff of this institution were more ignorant than such officials elsewhere.* But the nurses showed me a printed

*Asylums kept by members of the Society of Friends are said to be superior to most others in this respect. The Friends have the hereditary habit of respect for silent communion with the Unseen.

examination paper set to candidates for a certificate of competence to undertake the charge of patients suffering from mental disease as to which I could only ask myself, "Is it possible that any sane man could have drawn up such a document in a world wherein great masters of psychical science have lived and written?"

The ordinary teaching of any religion differs, in a similar direction, from the precepts of its founder. Every great founder of a spiritual religion aims at so organising thought and action during *A* as to make it act on *B* in a way which causes each *B* phase to react usefully on subsequent *A* phases: the ordinary teachers of the religion make of the very words of the founder on that subject part of the apparatus used by them for the purpose of keeping pupils in phase *A* and out of phase *B*; as, for instance, when parents occupy what should be the Sabbath repose time in making children learn and repeat and paraphrase passages from Scripture about the duty of keeping Sabbath and the unity of the Divine Essence; about communion with God, and about not grieving the Holy Spirit.

The truth would seem to be that commonplace persons of all kinds fail to understand directions given by great teachers for the sanitation and guidance of phase *B*; but they understand how to pull the pupil or patient from *B* to *A*; and, as that is all they know how to do, they suppose it to be all that is worth doing. All kinds of mental treatment tend, when they become popularised, to slip down hill, from the attempt to sanitate phase *B* towards attempts to eliminate it.

But no intellectual culture is possible without some monistic action of the mind; teachers therefore interrupt *A* action every now and then to insist that pupils shall set up irregular short scraps of *B* action in the middle of *A* action "Think, children, think, what does this remind you of?" "Don't you see that . . . ?" They expect to receive immediate answers to questions sprung on the class in the middle of work: questions of a kind which should have been asked only at the end of the class, and left to be thought out at leisure and answered on some future day. This of course tends to weaken and disorganise the faculties of comparison and the grasp of general principles in the majority of pupils. But there are always a few "naturally protected" monists in each generation whom teachers may to some extent harden and make inefficient, but cannot turn aside from their true function. Some of these become what are called philosophers: men who spend their lives in writing ponderous books to prove simple truths which ought to occur naturally to everybody. These men present to the outer consciousness of their readers and hearers ideas which should

never come into consciousness except as the latter is informed by the unconscious or inner mind. The path of such a teacher is often marked by a broad track of nervous and moral wreckage: a phenomenon which seems to astonish many persons, but which appears to me as little to be wondered at as the digestion wreckage which would follow in the wake of a physician who should insist on feeding his patients with ready-made chyle. Few things are more important to mental health than that each individual should be able to generate within himself as much monistic philosophy as he is ready for, and should have the instinct to avoid absorbing any more than he is fit for.

Ethical teachers in years gone by, observing the baleful results of teaching to the masses any monistic or pantheistic ideas, used to rail at those ideas themselves and declare them to be contrary to religion and dangerous to morals. They had better have directed their attack at the attempt to put in from without what should have come out from within. Pantheistic philosophy is not in itself more dangerous than the great generalisations of algebra, geometry, or logic, which also should come out from within after the facts have been put in from without.

The truth, however, must be faced that *all* monistic work, when done on a serious scale, brings with it its own peculiar dangers. This brings us to the fourth cause of moral wreckage: lack of due preparation for the visits of the Great Inspirer.

A mathematician once said, in allusion to some of his own discoveries, "There are some things that could never be done unless some men would consent to be ill in order to do them." He meant to designate by the word "ill" a condition not morbid in itself, a condition strictly physiological not pathological, a condition which resembles parturition rather than disease. It is normally attended by some symptoms often associated with illness; and, without being disease, it is a condition favourable to the setting up of certain forms of disease unless special precautions are taken to prevent it. No great original work in abstract science, no great generalisation in any natural or physical science, is made, nor is any great work of art generated, without the author having gone through one of these singular phases. Parturition in science or art is a special mode of phase *B*, in which the faculty of monism goes through a period of work unusually profound and prolonged; the externally discriminating faculty being wholly or partially in abeyance for a longer period than usual. The individual is absorbed into communion with τὸ πᾶν, the I AM, the Great All, with whom a thousand years are as one day, and to whom all that is made seems good alike. Now the Greeks have told us how Pan manifests

himself to many of those who commune with him without due preparation.

No human being, however good his intentions, can be sure that when he is in a deep fit of scientific or artistic abstraction he will be able to feel, to any ethical purpose, the difference between lemonade and brandy; between an innocent sweetmeat which pleases his palate and some nauseous drug which gives him experience of new sensations; between the sensuous sting of a self-flagellation and the sensuous sting of a fleshy lust; between his own wife and other men's wives; between other men's sisters and his own; between a woman and a child, or a man, or a beast. All habits of moral discrimination may be suddenly merged in one flood of monistic generalisation; and if the constitution has set up a habit of indulging, during phase *B*, any kind of freaks of physical caprice or curiosity,* there can be no security against any sort of sudden crime in some such phase, or against its becoming the starting-point of a vicious habit. The only kind of habit which is a safeguard is that of abstaining in all dream-moods, and as long as any haze of dreaminess remains, from all stimulation of strong sensation, from all modes of gratifying caprices of appetite, and from all active and positive violations of the established routine of one's ordinary life. The condition to be aimed at for creative moods is, not physical discomfort, but physical neutrality—the possibility of forgetting, as far as may be, that one has a body. This neutral condition should be prolonged till the outer *A* consciousness has been fully re-established. On the other hand, slight departures from routine in the negative direction are eminently desirable in dream-moods. A little less indulgence than usual in any kind of food which is either a special pleasure to the palate or a special strain on the digestion; a little less stimulant; and especially less indulgence in witticisms, jokes, and flippant conversation should be a matter of course during moods of creative generalisation. Any compensating indulgence which may be thought necessary should be taken afterwards.

The tactless mother, sister, or young wife who worries a man possessed of any originality with such remarks as:

"You are working so hard just now, I am sure you need more food than usual, and you are taking less. I am sure a glass of wine couldn't hurt you. Why won't you eat lobster salad this evening? You generally like lobster salad. Are you ill? Is your stomach out of order? Why are you so unsociable? What makes you look so solemn? What have I done to offend you? I don't believe you

*The combination, or rapid alternation, of monistic thought with attention to physical sensation constitutes a form of phase *C*.

care for me as you used to do." Or, "Why won't you take Lydia Featherhead out to hear the nightingales ? Don't be such a prig : her liveliness doesn't mean any harm ; it is only her manner. How can you be such a bear to a girl who admires you so much ?" etc., etc., may be doing worse than merely making herself a nuisance ; she may be preparing the way for some ghastly tragedy, by breaking down the fences which the man is instinctively building up for the protection of his future life from moral ruin. It is pitiful to observe how strong is the instinct of self-protection in this matter in most young people possessed of real genius, and how frequently it is undermined by conformity to the wishes of friends or to social custom. Probably some of the most revolting forms of decadence in literary and artistic circles have owed their origin to academic symposia where youths discuss the underlying principles of life and science and art in a luxurious atmosphere, where what is only meant for a graceful hospitality favours indulgence in choice fruits, coffee, and cigars, with a very moderate quantity of specially flavoured wines, or even without any wine at all. He who is to do great original work, either of abstract generalisation or of artistic conception, must be a consecrated priest of holiness if he would not become an agent of evil. Monistic perception of relations among the most innocent-seeming material, if undertaken under unsuitable conditions, is a long step on that downward road which is paved with good intentions, and at the end of which stands Pan, the satyr, grinning at the foulness in which all things are confounded.

Neither piety nor habits of general asceticism seem to be of much use here : fasting prolonged till one feels painfully hungry is as dangerous as drinking till one feels gloriously drunk. The most pious saints, those who most habitually mortified the flesh, have been among those to whom Pan appeared in his vilest forms. Nor, on the other hand, does mere attention to physical health seem much of a protection ; disease is as often a consequence as a cause of a career of bestiality ; such a career may easily be slipped into from a condition of buoyant health.

But, in spite of all dangers, monistic generalisations must go on, and mankind must find out how to make them safe. Because the heavy monistic dream-state in which great ideas are conceived has some of the symptoms of mental disease, and also is one in which mismanagement easily induces disease, it has been too hastily supposed that that state itself is in its nature unhealthy. The fertile union of polar opposites is an essential element of all true being. No medical system would be considered sound if its only notion of minimising the dangers of parturition consisted in making

as many people as possible barren : sound medical science aims at making fertility a socially manageable factor and parturition individually safe. So also sound educational science would aim at making monistic mental action not a danger, either to social order or to the sanity of the individual thinker. The worship of unity is the first commandment in the ethical decalogue. If associated always with meditation and abstinence, it is the first step on the road which leads "to those fountains whose streams run never dry ; to those holy heights of Being where all resentments die" ; and where, to the purified soul, all things alike are pure.

BROTHERHOOD

1903 February—Ethics and Psychology of Scientific Progress. March, April—Commercial Dogmatism. May—The Mark of the Beast. 1903, June–1904, February—THE BUILDING OF THE IDOL (Reminiscences and Reflections). 1. The Darwin Movement. 2. The Influence of Judaism. 3. The Contribution of the National Church. 4. The Parson. 5. Hereditary Caste. 6. The Question of Clothes. 7. The Contribution of Theology. 1904, March—A Model Village of To-day. April—Two Ancient Eastern Recipes. October—The Propagation of Altruism.

ETHICS AND PSYCHOLOGY OF SCIENTIFIC PROGRESS

PROFESSOR PERRY has been raising a storm round the fact that students of engineering and electricity cannot use their mathematical knowledge to facilitate their study of real forces to anything like the extent which they would do if their knowledge of so much arithmetic or other mathematics as they have learned were real and vital. This has caused a revival of interest in a question which has been almost entirely ignored in England for a generation or two, though sixty years ago it received the earnest attention of some of our most learned scientific men ; viz., *What are the conditions which favour a vital knowledge of mathematics ?* It may surprise some readers to be told that those conditions are almost entirely moral and spiritual, rather than intellectual ; but such has always been the verdict of the deepest students. Quite lately a teacher called on me to compare notes with me on the subject. I knew nothing of his views ; and I soon found that he knew little or nothing of those expressed by the past thinkers under whom I studied long ago. He has been experimenting, and groping his own way towards the truth of the matter. We found ourselves in entire agreement on three capital points :

1. The great hindrance to the vitalization of arithmetic teaching in past ages was the desire of the clergy to prevent any development of logical faculty which might lead the masses to doubt the evidence brought forward by them in favour of religious dogmas.

2. One great hindrance *now* is the desire of the classes in possession of the country's wealth to give themselves the emotional luxury of imagining themselves *Christians*, while retaining their hold on physical luxury in a world where the poor are starving.

3. Only *dead* mathematics can be taught where the attitude of *competition* prevails: *living* mathematics must always be a *communal possession.*

It was highly refreshing to find these forgotten doctrines of the sound old school reproducing themselves as the result of fresh investigation in the twentieth century.

There is one point on which I venture to express an opinion without the need of support from anyone.

The excitement of what is called "sport" (*i.e.*, killing animals for amusement) is necessary to some creatures, and to savages at certain stages of development. It is possible that the uncultured classes of Europe still need a certain amount of both sport and gambling; about that I do not feel competent to form a judgment. But certainly the need for these things would fade away in presence of even a small modicum of any *true* culture. If the education of a country is so arranged that the classes which can command the most appliances of culture have most need of gambling and killing as recreations, then the education is so arranged as to make the development of living mathematics and logic impossible. Any class or race which cannot do without those amusements will see the management of the earth's electricity pass into the hands of those who can.

COMMERCIAL DOGMATISM

1. A NON-THEOLOGICAL DOGMA

RECENT discussion about the Education Bill has brought to light one fact: that many people in England dread the influence of religious teachers on education, because they object to Scientific Education being sacrificed to dogma. Have such objectors realised to what an extent Scientific Education has been sacrificed to dogma during the last thirty years?

The dogma in whose clutches Scientific Education is struggling does not happen to have been formulated by priests; and it was not, so far as I know, written in ancient Greek. But, except for such trifling details, it has all the characteristics of the worst dogmas. It is false, irrational, imposed by the irresponsible authority of persons ignorant of Science; and it is fatal to scientific progress. Why should we tolerate a tyranny just because the supporters of it do not happen to wear mitres and cassocks? Surely that is as superstitious as to tolerate another tyranny because its supporters do.

Well, here is the dogma:

Everything worth knowing can be learned under conditions of competition.

2. DIFFERENCE BETWEEN "DEAD" AND "LIVING" SCIENCE

I am going to speak of my own subject, Arithmetic, because one is less liable to drift into errors of detail when one is writing about a topic with which one is quite familiar. But the general principle which I am going to illustrate is true of all sciences alike. About any process in Arithmetic there are some things that can be best learned under conditions of competition between the members of the class, and other things which cannot be so learned at all. About the process of Multiplication, for instance, there are some points which are best learned while each member of the class is eager to answer as many questions as possible, and other points which cannot be understood unless the class is in a quiescent condition, all personal eagerness being suspended. At these points, as one great logician expresses it, a *silence* must be made in the soul, that the Voice of the Unseen may be heard. The difference between the two portions of the subject is already perceptible at the stage of common Multiplication; by the time we get on to Fractions and Proportion, it is very great. Now, if we collect together all the portions of each process which can be taught under conditions of eagerness and competition, they constitute a complete system of what I described in the February number of BROTHERHOOD as "dead" Arithmetic. The other portions—those which cannot be so taught—constitute that extra element which transforms "dead" into "living" Arithmetic.

Now dead Mathematics suffices for all purposes in which only dead facts are concerned, *i.e.*, facts concerning the numbers of things or the measurements of quantities. Living Mathematics prepares the mind to understand the "behaviour" of living forces (such as electricity).

3. THE FREEDOM THAT MUST BE INSISTED ON

The living element has been to a large extent squeezed out of our schools by the presence of the dogma: "Everything worth learning can be learned under conditions of competition." That dogma has been forced on us, not by the clergy, but by the commercial classes,

Dr. Clifford and many other people seem to suppose that the great crime of the clergy against Science consisted in devoting time and money to the direct inculcation of dogmas. I, who lived in the thick of the great agitation against clerical influence on education, half a century ago, know that something far more serious than time and money was at stake. Had the clergy been content to use the lion's share of time and money for the direct inculcation of dogma, leaving us in peace to use the small remainder as we saw fit, our hostility would have been very slight. They claimed to interfere in the quality of our teaching ; to devitalize it in such a way that the children should not grow up logical enough to dispute their dogmas. It was *that* which roused the wrath of such men as De Morgan, and made us all determine that, come what might, we science teachers would no longer be priest-ridden.

The clergy now, whatever else they do wrong, do at least not attempt to interfere with the quality of such science-teaching as we are allowed time for. Comparatively few clergymen would wish to do so now. Those that would, dare not ; they know they would be discouraged by their own bishops, and laughed at by their own colleagues. It is the commercial dogma which now chokes the life out of Science. Let anyone teach commercial Arithmetic in a school all the year round, and give me a free hand for one hour in a month, and I would undertake to convert that dead Arithmetic into living Arithmetic. But, if I did so, the children would be prepared to doubt the truth of the great Commercial Dogma which in England, now plays the part of Nebuchadnezzar's Image ; and the commercial classes will not allow it to be doubted.

And now, again, as happened fifty years ago, living Science is rising in wrath and declaring that the class which has degraded Science in the interests of a dogma shall no longer control the education of England.

4. WHO ARE THE "RETROGRADE"?

Everyone who now doubts the wisdom of letting the competitive spirit make a corpse of Science is called "retrograde." (The word has taken the place of the old word "Atheist," which, forty years ago, was flung at whoever doubted the omniscience of the clergy in matters of natural history, etc.) Life always moves in a spiral ; therefore, whoever can read the signs of the times must always seem retrograde in a sense. We go back to the old position, but on a higher plane. The clergy got their lesson and have profited by it. Let us hope that the commercial class will profit by theirs.

WHAT WE ARE SACRIFICING TO MOLOCH

At classes in elementary or secondary schools may often be witnessed a painful scene. The teacher asks a question. Hands are put up by such children as think they know the answer. The teacher selects one of the volunteers and requests her to give her version. When the one selected has done speaking, the teacher perhaps orders "Hands up, those who think Mary not quite right. Alice, tell why you think Mary not quite right," and so on. The method is admirable. It must have originated in the minds of teachers well qualified to give to the young a training for organised thinking for communal inspiration for arriving at truth by an orderly combination of mutually-corrective partial truths. But, in practice, it is too often perverted and made the means of fostering the most vulgar and frivolous kind of personal ambition. As soon as the teacher has selected the one who is to answer, hands begin waving and waggling all over the room in a manner expressive of eagerness to be *the* one to speak. Lips twitch with hardly-restrained exclamations of impatience; sometimes, indeed, the exclamations are actually audible, while the child selected is giving her version of some serious historic problem, some marvel of astronomy, or some delicate process of vegetable growth. How can a community learn the art of communal investigation while each member's mind is full of the desire to be *the* one to speak first? Thoughtful head mistresses sigh over the impossibility of giving any real education under such conditions: "But what can we do? The parents encourage the tone of competition; our assistants cannot be persuaded to see the evil of it; other schools permit it; it is the spirit of the age." Parents complain that the schools cultivate bad manners, that children learn to interrupt, that the art of listening to and profiting by rational conversation is decaying. "But what can one do? Competition is in the air; it is the spirit of the age."

No one who has paid the least attention to the psychology of history can doubt that the finger-waggling impatience in class, with all that it involves and implies, is preparing a disorderly mob, not an organised community; no one who has the most elementary knowledge of medical psychology can fail to see that it is excessively bad for both nerve-stamina and intellectual development, that it is fostering the tendency to shallow, feverish, scrappy, irregular thinking. Who or what is the "spirit of the age" which claims the right to over-ride, by its irresponsible authority, all considerations of nerve-health, good manners, individual develop-

ment, and communal culture? Would it not be as well to call it Moloch at once? Then we should know what we are about, and have the experience of the past to guide us in dealing with it.

Here is another aspect of the matter. Suppose I am teaching, say, the process of multiplication. There are two things which the pupils can get out of my instruction: (A) skill in performing the operation of multiplication itself; and (B) a little of the power to find out for themselves how to do other arithmetical operations. Every process that I teach ought to be so taught as to add something to the pupil's chance of some day making out a rule for himself without the aid of a teacher.

If we add together all the A'S of a child's arithmetical career, they constitute what I called, in a former article, the *body* of his arithmetical knowledge; if we sum up the B'S, they constitute what is called its *life*. The sum of the combined A elements constitutes the ability to reckon the bulk or number of dead material and to keep accounts according to any system chosen by an employer. The sum of the B elements gives the extra power of bringing one's knowledge to bear in forming a sound judgment on problems connected with living forces—*e.g.*, on the probable behaviour of a charge of electricity under certain conditions, or the probable honesty and stability of a certain commercial enterprise.

Now the A element in any mathematical lesson can be imparted while the class is alert and eager; the B element cannot be imparted except under the peculiar condition called by some mystic writers "Silence in the soul" awaiting further Light.

The two states, the alert and the passive, alternate in any good educational *régime*; the alert phases being very much the longest, the passively recipient ones short but quite undisturbed.

But under stress of competition the passive mystic phases of study are being crowded out.

The head mistress of an important Church school expressed to me, in touching terms, her thankfulness that the Rector, who is virtually school manager, gives her freedom to use a few minutes in the day, an hour now and then, in evoking in the children what I have called the B phase or attitude. She and other thoughtful teachers have assured me that they would be most unwilling to take posts under any existing Board or Educational Committee, because no such body allows time for the cultivation of the B elements. This objection to work under Committees and Boards is so far from being the result of religious prejudice that some of the ladies who have expressed it to me are themselves avowed freethinkers, and give no religious instruction of any kind. The

reason is that England is so saturated with the spirit of advertisement that, in any given committee, the majority are almost sure to be against the teaching of anything for which there is nothing to show at the *next forthcoming* examination. Now, it is the peculiarity of the B elements of study that, while they add greatly to the pupil's chance of knowing his subject well in years to come, they cannot be made immediately evident at examination.

A certain logical thinker, who has had a good deal to do with primary education, suggested to me a conscious motive for the antagonism of Committees to the B elements, viz., the reluctance of the commercial and financial classes to permit any sort of teaching calculated to stop the supply of gullible victims, and to train employés too profoundly intelligent to be convenient. For my own part, I prefer not to attribute conscious wrongdoing to anybody; to lay the blame on our impalpable foe, the "Spirit of the Age." But if he is really the guilty party, I would suggest that it is high time he was summoned forth out of the darkness in which he is shrouded, and made to give an intelligble account of himself. At present he seems to be as impalpable, as ubiquitous, and nearly as harmful, as ever was the theological Satan.

THE MARK OF THE BEAST

THE MODERN ATHANASIAN CREED

"WHATEVER is worth learning can be learned under stress of competition.

"Whatever is worth doing can be done rapidly and on a monster scale.

"Whatever is worth having, its value can be tested by a money standard.

"Whoever wishes the Progress of Humanity will seek to aggrandize his own Nation.

"Whoever loves his own country will seek to benefit his fellow-citizens by aggrandizing himself.

"Whoever is philanthropic will desire a colossal fortune; will acquire it, if he can, without regard to any injury inflicted on others in the process, and will then give a certain portion of it to public aims or to charities intended to undo some of the mischief which his commercial or financial transactions have caused.

"Whoever abstains from making a large income or acquiring

notoriety on any such excuses as that he can be a more useful citizen while he is content with a moderate income and an obscure position, is either a knave or a fool ; probably both.

"Whosoever will be respected must thus think. For this is the true faith, which, unless a man do keep whole and unquestioned, without doubt he shall perish socially, and have no good influence on mankind, now or hereafter."

Such, obviously, is the creed of Commercialism !

One of the great forces of clerical tyranny in England half a century ago was the notion that had got into the minds of the masses, that Protestant Dogmatism was, somehow or other, a "bulwark" against the Church of Rome, about which there existed at that time an unreasoning but not unnatural prejudice. This had grown up out of traditional legends about "Bloody Mary," Torquemada, and the Spanish Inquisition. Of this evil trinity, the Scarlet Woman of the Apocalypse and the Mark of the Beast were supposed to be the consecrated symbols and the Pope its living representative. Many nonconformists consented to the ascendency of the Established Church, many liberal-minded people refrained from lifting their voices against Evangelical Dogmatism, because they feared that any weakening of the force of the Protestant tyrannies would by so much strengthen the hands of Rome. We scientific reformers got our freedom to teach in England by steadily refusing to recognize any essential difference in spirit between "Bloody Mary" and the clergy who boycotted Babbage, hounded down Colenso, and condemned dear, gentle, innocent, childlike, Charles Darwin to everlasting torment. Our best allies were not those who declaimed against the Established Church as such, but those who pointed out that its claim to be "free from Popish error" was a delusion ; that the tyrannical parson was only a tyrannical priest in a different costume ; and that Protestantism, whatever it may have been in Luther's time, had now become Popery, minus historic associations and artistic value. We thus enlisted on the side of freedom that traditional horror of "Bloody Mary" and the Inquisition, on which the English clergy had been previously relying to support their own claim to keep out of the schools whatever was beyond the comprehension of "good Protestants."

It was an awful time that we went through. A nerve specialist, in the worst of the anti-Darwin hubbub, said to the present writer: "Crucifying and burning were merciful inventions, compared to torturing thinking men into insanity and heart-disease and laying the foundations of nervous disease in the con-

stitutions of young children for the sake of unnatural theories; and that is what people are doing now in the name of Religion."

The new snob-ocracy of competition is the old clericalism in a new dress. It has substituted hypocritical mock-patriotism and mock-progress and mock-culture for hypocritical mock-piety. It is even more blatant and vulgar than our old foe of the fifties and sixties, and ought to be so much the easier to get rid of. But it sometimes enlists on its side the services of honest people, by professing to be a "bulwark" against clericalism, just as Protestant bigotry enlisted the services of honest men by professing to be a "bulwark" against Rome. Permit an old woman, who lived in the thick of the former campaign, to recommend a piece of polemical tactics to the notice of you who are now fighting Commercial Dogmas. Do not let us waste our own force by disputing among ourselves as to which of the masks of tyranny we most object to, the Theological or the Commercial. Let us recognize that tyranny is one and the same under all masks; and let us enlist against it all that accumulated force which the Darwin war has bequeathed to us and which the spirit of Competition is trying to turn to its own advantage by pretending to be the opponent of "religious tyranny."

There was a time, within the memory of us old folk, when good Protestants were supposed to hold (as I have said) that the Mark of the Beast, spoken of in the Revelation of St. John, was the special distinction of the Church of Rome. We have been forced to recognize that the said mark is neither the brand of any one organization nor an external label which any set of persons has the right to affix to any other. The Mark of the Beast is an eruption from within, which appears spontaneously on the surface of any principle or cause which has caught the dangerous disease of taking its own special righteousness for granted. Moreover, so far from being a proof of essential badness in the patient, it is found that if the infection has been caught the mark comes out more strongly in proportion as the original constitution was stronger and sounder.

In some Educational circles in England now, if any suggestion is made as to the importance of cultivating certain mental faculties which cannot be cultivated in an atmosphere of competition a curious expression of mingled impatience, disgust, and fear comes on many faces. The very same expression appears on the faces of many asylum patients suffering from some delusion, but otherwise reasonable, when the subject of their special monomania is called in question. I have no doubt that it appeared on the countenance of Nebuchadnezzar when he learned that there were

men in his city who ignored the golden Image. The special heresy which called forth that look thirty years ago was the suggestion that the range of the Divine Education might be wider than the definition of it given by any man or text or clique. It is the peculiar stamp of Idolatry, in the strictest sense of that word ; that is, to-day, a partial apprehension put for the whole ; not merely negatively, in simple ignorance of the existence of any larger whole, but positively. It is the mark of limitation enshrined as sacred and held as final, and not to be questioned.

The Mark of the Beast is not this or that profession of Faith, but the desire to trample down and root out such elements of culture or of spiritual insight as do not happen to come within the scope of one's own powers. Nebuchadnezzar was surely not to blame in that he offered some of the material he best loved to make an Image of the highest ideal of Deity that he could conceive. The sin which drove him mad was that, when he came across people whose Ideal was more comprehensive than his own, he would not leave them in peace.

The competitive spirit crept into English Education in the guise of the highest ideal then possible. It came as the remedy for very serious evils, as a protest against tendencies which were eminently anti-social and anti-ethical. No more generous impulses ever swept over England than some of those the unintelligent misapplication of which tended to carry the principle of competition to its present position of evil dominance in Educational affairs.

The history of Educational Reform, if it were understood, would be a warning to young reformers of what their reforms may lead to if they allow themselves to think that the truth, the whole truth, and nothing but the truth is on their side of any disputed question.

THE BUILDING OF THE IDOL

REMINISCENCES AND REFLECTIONS

"Nebuchadnezzar the King made an Image of Gold" ; offering the best he had in the attempt to carry into realization the best he knew of. This, so far as it went, should have been accounted to him for righteousness. But when he found that there were men who offered more spiritual gifts than his, to a more comprehensive Ideal, he determined that all further progress must be arrested in honour of that which his mightiness had seen to be worthy of his homage. At that point he went mad, and offered human victims

to his Eidolon, and became a fit companion for unreasoning unprogressive cattle. The story repeats itself from age to age, in every country and under many forms The ridiculous Idol which is now sitting on the neck of culture in England was manufactured out of a great variety of items, each being a childish perversion of something admirable and good in itself. Let me recall some of these in their true and good condition.

No one who has at heart the cause represented by "Brotherhood," can fail surely to take an interest in tracing the causes which have led to the present system of sacrificing true culture and science to the object of training children towards competitive, and therefore shallow, modes of learning, and away from communal, and therefore solid and serious, study. Blue-books, statistics, and historic documents are invaluable material for the investigation of the past. But personal reminiscences sometimes throw a side-light into corners which official records leave obscure. An old woman's gossip about little things that happened in her own little corner of a great battle-field will perhaps do nobody any harm.

1. THE DARWIN MOVEMENT

In 1859, a certain theory, which had long been shaping itself among a fairly large group of Naturalists, was presented to the general public. It may be shortly summarized thus :

Physical faculties and certain forms of shallow cunning are developed gradually, by competition among individuals, those in each generation surviving who possess these qualities in the greatest degree. The higher mental and the moral qualities are developed gradually by competition among races, that race surviving which possesses in the highest degree the instinct of devotion, and the power of communal organization and mutual help.

The evolving of this theory, and the accumulating and organization of evidence in support of it, was one of the finest specimens of intellectual work ever done on this planet since the dawn of history. The collaborators gave to the world not only the theory and the scientific evidence of it, but also an object lesson, which should, one would think, have made it impossible for the most stupid person to mistake their meaning. One of the students was an invalid, the most unambitious of men, and one who certainly could never have come to the front in any sort of competition or struggle for precedence. He had, in scientific matters, that rare literary gift, an exquisite sense of moderation and balance. Into

his lap other students poured all the treasures of their science and observation, leaving him to organize the whole. The result, as might be expected, was a piece of work worthy of Port Royal.

The sensible section of the clergy, who, I believe, were in a large majority, at once perceived that the question at issue lay outside of any region within the sphere of their jurisdiction. It seems a pity that so few of them had the courage to say so. But the attempt to talk reason on this subject evoked terrible wrath in a noisy minority, who seemed to be seized with a desire to make the publication of *Origin of Species* the occasion for a competition among themselves as to which could write and preach the worst nonsense. Everyone who doubted the fitness of pious people, as such, to dogmatize on obscure points of natural science, was summarily disposed of as an "Atheist," just as, for the last thirty years, everyone who doubts the wisdom of handing over the education of the nation to persons possessed by the spirit of competitive rivalry is called "Retrograde"; just as, in the beginning of the late War, the epithet "pro-Boer" was hurled at everyone who doubted the wisdom of the Government's action. Whenever that singular disease, Gadarene-swine-fever, seizes on any section of a community, and impels them to a suicidal rush down-hill, those who remain sane, even if in a majority, are prone to stand aside and wait till the rout has gone by. The sane majority of the religious world held its peace on the subject of Darwinism and let the vulgar and self-assertive have it all their own way. The hubbub soon died down, and the so-called Darwin theory was accepted.

But two sad consequences remained from the short explosion of pious self-assertion. Numbers of intelligent young people had learned to treat the word Christian as a synonym for "ignorant" or "anti-scientific"; and the words "struggle for life," "survival of the fittest," "success in competition," etc., had become associated in the public mind with the idea of learning, culture, progress and refinement. Little notice was taken of the fact that the great discovery about struggle had been made, not by competitive struggle, but by communal study. Darwinism was a triumph of mind . . . and Darwinism was about, and therefore was supposed to favour, ruthless competition. The disastrous effect which this inverted mis-association of ideas has had on Education can hardly be over-estimated.

2. THE INFLUENCE OF JUDAISM

I must now tell my readers something about the Jewish People which seems to be little known to the general public. It is nothing to the discredit of the Jews themselves; rather the contrary, though the blundering of non-Jews has often caused it to be productive of disastrous consequences all round. The remedy is not to rail at Jews, but to amend our own stupid ways.

The subject of the special vitality, adaptability, and elasticity of the Jewish People has been under investigation by scientific men for at least a century and a half. Among the most earnest investigators were my husband and one or two of his friends.

Before one can understand the subject, one must have formed some clear idea of the relation of various kinds of mental effort to each other. This can easily be done by reference to the classification of physical energy.

First there is Labour, *i.e.*, effort directed towards the achieving of certain external work. Secondly, there is something which we call Gymnastic. It has for its object the strengthening of certain muscles and the training of athletes. Thirdly, there is Fidgets, a half-voluntary kind of movement which has for its primary object the gratifying of immediate impulse and the relief of restlessness. Fourthly, there is something which used to be called Calisthenic, though it is often loosely included with the second class under the term Gymnastic. Its function is simply to promote health. It is arranged according to the laws of muscular action. It takes up all kinds of movement, even those belonging to class three, and arranges them in such pairs, groups, and sequences as have been found to promote elasticity, health and general muscular tone. Musical drill, Swedish drill, and the various performances with dumb-bells, poles, hoops, etc., which we witness at "Displays" in girls' clubs and schools, belong to this fourth class. The practice of Calisthenic, begun early and persevered in steadily, has, amongst other good effects, these: if the faithful follower of the system takes up any pursuit which keeps him in a cramped position during work-hours he suffers less from the cramping than he otherwise would do, because of his periodic Calisthenic; if, on the contrary, his occupation involves excess of physical toil, he will stand it better than if his muscles had not been rhythmed in childhood. If he goes in for special training as an athlete, he is less likely to break down under the strain, because of his previous preparation.

If the reader will kindly translate the above into terms of mental

effort, he will find that it throws light on much recent discussion on educational Psychology.

What orthodox Jews call their Religion, consists to a large extent of a mild sort of Calisthenic. Most forms of Christianity are sadly deficient in that element.

I am not here speaking about the truth of any set of doctrines or the ethical value of any moral precepts, but simply of the hygienic value of a calisthenic system. The Protestant religions are very deficient in that element. The Roman Catholic régime contains more than Protestant systems ; in fact, it contains just enough to enable one to compare it with Judaism, and to see how inferior it is to the latter in vitalizing power. I repeat, I am speaking here entirely of the comparative value of the two religions as producers of mental stamina and the power to resist adverse circumstances. With their theologic truth or spiritualizing value this paper is in no way concerned. I will now ask leave to tell a parable.

The rulers of a small country in Asia conceived the idea of getting their whole nation to accept the Calisthenic and part of the dietary code by means of which the Egyptian aristocracy preserved health. There was no use in talking science to the masses in those ignorant days ; a much more effective device was adopted ; one that has often been employed before and since. The rulers said to the people : "We have a tribal god who has picked us out from all the earth to be his special favourites. He has promised that if we will do as he bids us, he will never let us be conquered or exterminated. He will be present at our tables, though invisible ; and his presence will keep away the devils who make good food disagree with men. But he is very particular about his food ; he dislikes many things which you do not dislike. You must only have such and such things on your table ; and the saucepans must be scrupulously clean, else he will smell a bad smell, and not come ; and the devils who like bad smells will come, and will give you stomach-aches and make you thin. There are parts of the insides of animals (the parts which go bad in a hot climate) which the god hates ; but he delights in the smoke of them when burned ; therefore when you kill a beast all those parts must be burned as an offering to the god."

So much was easy to arrange. But a more difficult task remained to get the calisthenic part of the discipline carried out. Poor people could not afford to buy an apparatus of dumb-bells and poles ; had not room to keep them in their homes ; would not have patience to go through the drill. What was to be done about that ? Order the people to use, as calisthenic apparatus, the

implements already existing in and necessary for every household. The Calisthenic was imposed thus :

"The god requires certain incantations to be performed in his honour ; unless he sees these proofs of submission and respect, he will not sit at your tables nor walk about your fields. Before you sit down to a meal, take up your drinking vessel, hold it firmly in your right hand, wave it six times from front to back and six times from above to below, stretching your arm at each movement as far as you possibly can. Then take the vessel in your left hand and repeat the same exercise. Whenever you are going to use a rake or a hoe, begin by grasping the handle in both hands and raise the tool as high as you can towards heaven ; then lay it in front of you on the earth. Repeat this exercise twelve times before you begin to use your implement and as many times after using, before you put it away. Tell your wife to do the same with each fagot before laying it on the fire, and with the broom-handle before she sweeps. Marry no woman who will not consent to perform this ritual faithfully. Teach your little children to go through it punctually with every toy or tool which they learn to use. Thus the god will be perpetually reminded of us, his chosen people, and will remember to bless us in all our undertakings."

It is not literally true that the authorities in Palestine imposed any such system as the above in matters of physical exercise ; but it is literally true that they imposed something exceedingly like that, as a mental discipline, and it is carried on faithfully to this day wherever there are orthodox Jews.

The natural consequences of the Jews' Calisthenic is that, even when deprived of what we call "culture," they never lose mental elasticity to the extent that non-Jews would do under similar circumstances ; on the other hand, they are always ready to use opportunities of culture as fast as these are opened up to them, and when an educational system is unhygienic in itself, especially if it contains an unhealthy excess of the element of competition, Jews, on the whole, can stand a far greater amount of it than the majority of non-Jews. What I have called the Jewish mental Calisthenic is carried on by means of an apparatus of facts essentially secular in their nature ; by reference to questions of days and hours, cooking and eating ; but it has been placed under the sanction of a religious system. It therefore passes unobserved by most Gentiles as part of the Jewish religion, with which non-Jews are supposed to have nothing to do. Being essentially communal and non-competitive, it enables Jews to stand a great deal more than we can of the special kind of strain induced by a too exclusively competitive secular education. Therefore, wherever Jews

and Gentiles compete together educationally, the latter are at an unfair disadvantage, handicapped from the start by lack of normal neutralization and of the mental elasticity formed by the early practice of mental Calisthenic. That is one great cause of educational difficulty in England now, and of the excessive competitive strain. Our people are forced into an amount of competition unhealthy for them, in order to hold their own against the more elastic Jews.

So far as I can see, there are only three possible issues to such a situation. One is, for Gentiles to go under. I know more than one educationalist who thinks that is going to be the issue in the near future ; but I do not agree with them. We are English, and going under is not, I hope, in our programme. Another possible issue is to persecute Jews, and forbid them access to our colleges and schools. We, in England, are not likely to do that. There is a far better way out of the difficulty, *i.e.*, to Calisthenicize our own children. We are, I believe, going to do that ; and very soon.

No one, of course, is thinking of imposing on our people either Jewish theology or the Jewish type of morals or character, but we are going, I hope, to impose on our children, by means of a mental apparatus arranged by our scientific men for the purpose, that vitalizing Calisthenic rhythm which the Jewish religion imposes by means of a clumsy apparatus invented in Asia.

As I said before, our scientific men began investigating the subject a century and a half ago. We can imagine a scientific man repeating, with a well-made pole, some incantation performed by an Asiatic with a spade-handle, in order to try the effect on his own muscles. My husband and his friends did just that. They selected the subjects of number and Geometric form as being accurate and easily manageable, and tried on their own brains, and those of their pupils, the experiment of treating these subjects according to the mode of sequence adopted by Jews in their dealing with matters of (so-called) religion. A similar experiment had been tried in France by an engineer and his friends, in the middle of the eighteenth century.

When the experiments were tried with questions of number and size, etc., the results came out as special "branches" of mathematics, and were supposed to concern only mathematicians. Sometimes they were tried with questions of Logic, or Metaphysics, and the results passed as "branches" of those subjects. I have conducted a series of experiments, using colour as my material ; for some years my coadjutors and I were supposed to have founded a new school of embroidery in colours.

Men such as those of whom I am now speaking do not explain

themselves fully in print directly an idea occurs to them. Like the early Darwinians, they kept the nature of their investigations to themselves till they could express their conclusions in forms likely to be generally useful. The scheme seems fairly complete now ; it has been tried quietly in several schools ; all such schoolmasters and mistresses as know anything about it seem ready to adopt it.

Of course this Calisthenic rhythm will be introduced only into the secular teaching. No one proposes to interfere with children's religion. We are not going to speak to English parents of a god who requires incantations to put him in good humour ; we know that (as the great reforming Prophets of Israel asserted) One Great God made all the tribes of mankind. But when the spiritual Prophets ask us—as they often do—"What does God require of us but to do justice and love mercy and walk humbly ?" we shall reply, as the experience of the Jewish ecclesiastical authorities has always in effect replied, in answer to their spiritual reformers : "The One God requires of us not only devotion to sublime ideals, but also regard for scientifically ascertained facts. He made all the laws of the universe, and gives different blessings in reward for obedience to different kinds of law. All the sublime altruistic sentiment in the world will not confer on town-dwellers good digestions if their food is insanitary and gross, or confer mental elasticity if we spend all the week in competing with each other, neglecting communal study and mental Calisthenic."

This, then, is the task before the English Government of the near future : to save us from the dangers of a too largely competitive scheme of learning, by getting the nation to accept a system of hygienic mental Calisthenic. The task would not be simplified if a suspicion got about that the Government were either disrespectful to English Religions or prejudiced in favour of Asiatic Theologies.

3. THE CONTRIBUTION OF THE NATIONAL CHURCH

In discussions about Disestablishment and Disendowment, one common feature strikes me. Those who object to an Established Church do so almost entirely on one of two grounds—Either : "The Doctrines taught by the Church are not true ; the State ought not to pay men for teaching exploded fables," or : "Even if the Church doctrines were true, it is not just to give to one sect official predominance over the others." Now, it seems to me that, apart from all questions of doctrine, the very existence of an

Established Church contains within itself an enormous potentiality of evil, which must become actual evil unless the clergy recognize the true meaning and purpose of State-establishment—an evil which lies in the encouragement they will unconsciously give to that spirit of competitive ambition, to neutralize which should be the function and purpose of establishment. This special evil would not be lessened, even if the Church taught no dogmas at all or only such unsectarian ones as that twice two make four or that granite is harder than butter. Even such harmless doctrines as those would be a source of moral danger to the community if taught by an Established priesthood who had, as the English clergy seem to have very generally done, mistaken the meaning of their own vocation. It seems to me also that Church doctrines were never meant to be forced on the laity. Their purpose was to keep the clergy in order. An Established Church is, *ex hyphothesi*, not a religious sect. Owing to the general muddledness of human affairs, every Established Church tends, in barbarous times, to get itself entangled with the doctrines of some religious sect ; but, if its ministers realized the essential difference between a *Church* and a dogma-teaching sect, if they understood the meaning of their own appointment, dogmas would not be thrust on the laity ; and, even if erroneous, would do very little harm.

That is how the matter looks to me. I will not attempt to support my view by arguments, but will tell the story of an experiment which I saw tried, subsequent meditation on which has led me to form the opinions above expressed.

My father was a country clergyman. When I was almost an infant, he became ill, was supposed to be consumptive, and was ordered to give up work and live abroad. He had at that time private means, and took the opportunity to study, under Dr. Samuel Hahnemann, the mutual interaction of body and mind—a subject to which, at that time, neither physicians nor clergymen had as a rule paid much attention. He also collected books on ancient occultist science. After some years, the true cause of his illness was discovered and removed ; and shortly afterwards a financial crisis in the country deprived him of his fortune. Had he not been a clergyman, he would have had to face poverty and begin life all over again. As it was, he came back to his parish, to a rectory cottage, and a small but assured stipend. Such an experience could not but set a conscientious man thinking about why incumbents of parishes are spared the risks and anxieties of other professions and what it is which they owe to the State in return ! He settled down to work out his ideas on this question, together with certain other ideas which he had formed during his time of

retirement and study. He took me from school, taught me a little in an erratic fashion of his own, and set me to work to assist him in teaching my young brother, and in the parish. As soon as I was old enough to understand at all the attitude of the neighbouring clergy, I perceived that my father was considered an anomaly amongst them. He was censured for not being loyal to the Church, for neglecting to maintain the dignity of his order, and for spoiling his poor parishioners and putting them out of their proper place. Hints of this kind puzzled me at the time. My father had, I knew, an absolute cult of the idea of National Church as a bulwark against the dangers of Sectarianism. The dignity of the order seemed to need no maintaining from his side, by reason that it seemed never to be either questioned or ignored by any one in the parish, whether Churchman, Nonconformist, Roman Catholic, or even by the solitary Atheist who resided there. Father used to say that people who thought they got more spiritual benefit from the sermons at Chapel than from his, had a perfect right to judge for themselves; but the fact that they thought so in no way interfered with his duty to them as parishioners. The Baptist minister was as much a "parishioner" as any one else; and gravitated to the Rectory for help when difficulties arose between himself and his congregation.

I cannot recall a single instance of rudeness or discourtesy to myself from any parishioner of any age, sex, or rank; not even from men whom I sometimes met on the road the worse for beer. The magic words: "our parson's da-ater" seemed to be always around me both as a halo and as a shield. There was, I fear, a good deal of spoiling done in the parish; but the parishioners were the spoilers, and "our parson's" children the spoiled. I can recall no wish or whim of mine which it was possible for any parishioner to gratify, which was not gratified at once, at any sacrifice, and at the cost of any toil, and quite irrespective of the question of remuneration. "My dear, you went about the village like a queen," said an old lady to me when I revisited the place long afterwards. Perhaps she remembered a day on which she kindly escorted me home, when I had been resting for a little while in her house, after being overcome by the heat. As we passed down the street, it was lined with eager faces, watching to see how I looked. I afterwards asked one of the girls who had told them of my slight indisposition. "Every one seemed to be telling me," she said—"it came down the street like wild-fire that Miss Mary was ill." It was indeed royalty, at its very origin and inception; royalty with all its natural power, and with none of its artificial restrictions.

Looking back at my life's experiences, none of them seems to

me so astonishing as the steam-bath of perpetual adoration in which my father's parishioners kept me immersed. It was, in some respects, a bad preparation for life. But simply as a fact, as a psychological phenomenon, it may be worth tracing to its cause. We certainly did not purchase the allegiance of the parish by gifts of money ; my father was poor in comparison with other rectors in the neighbourhood ; and we had little to give away. We did not earn the homage of the parish by any excessive exertion ; the Rector worked no more hours per week at his profession than the lawyer and doctor, the grocer and farmer, the brewer and baker, did at theirs. I did a certain quantity of work in clubs, Sunday School, and choir practice ; but nothing worth comparing in amount with what many ladies do. The explanation of the mystery must be sought quite outside the region of any personal deserving of our own. Such facts prove, I am sure, some very noble quality latent in the heart of the people, even of many who seem degraded and vicious ; and they are worthy of study, for any rational explanation of them must surely throw light on many obscure social phenomena. It was a cause of vague wonder to me why a woman who had worked more in any one of the last forty years than I had done in all my life, should look out of her door as I passed, to say : "Don't walk too far and tire yourself, my darling." James Hinton gave me, long afterwards, the explanation of that and many other anomalies. Nature, he said, has provided man with altruistic generosity enough to meet all, and more than all, needs. It pours itself out lavishly, in the direction of least resistance ; in any direction, that is to say, where it is not obstructed by artificial hindrances. The remedy for the world's evils therefore is not to stimulate altruistic emotion, which already exists in abundance ; but to correct the false theories which obstruct its flowing towards useful purposes. This was Hinton's doctrine. If it be true, what an appalling power—for good or ill—is given by the mere fact of being placed in the path of least resistance ! It makes one sick of fear to think what opportunities one has had, and, to a large extent, used carelessly.

The "Parson" is *The Person* of the parish, the individual in whom it incarnates its communal individuality. If he wishes the parish not to ignore this function of his, he must begin by remembering it himself.

Some overwhelming unseen force seems to be impelling men of various orders to combine and form organic groups ; but there are obstructing forces, conflicts of interests, diversities of culture, friction of tastes. Any one who has leisure and opportunity can become almost an object of worship by simply allowing himself or

herself to be made a centre of harmonization, through which the combining force may flow freely. The one condition is to abstain from importing into the relation elements which disturb it, because they are logically inconsistent with it. The minister of a National Church seems to me to be potentially in possession of a natural sort of omnipotence by virtue of his mere leisure and his emancipation from the need for entering into the struggle for livelihood. But most of the clergy whom I know miss the opportunity thus afforded them of becoming a harmonizing centre, by imagining all sorts of things to be their duty from which their very office should absolve them. They think of themselves as bound to maintain the doctrines of a special sect, and also the status and privileges of some special social rank. Either of these positions seems to me absolutely inconsistent with the conception of a National Church.

When we first returned to the parish after our long absence, the Curate-in-charge was a High-Churchman, and the Nonconformists were, as my father soon discovered, rampant and aggressive, professing superior piety as against the Church, which was felt to be lax on the question of what literature and amusements are permissible. The Rector took the matter in hand, encouraging the Church members in all kinds of innocent diversions among themselves; but voting on the Nonconformist side on questions at issue at the Mechanics' Institute on the ground that, though he personally knew of no harm in what the Church-party wished to do, he knew it was the business of the National Church to set an example of respect for other people's religious feelings. On returning home after one of the Institute disputes, he told my mother that he believed he had now clipped the wings of Nonconformist aggressiveness, and that there would be no further trouble; and so indeed it turned out.

I can remember, on one of my first visits to the day school, being assailed with a little hail-storm of mutual complaints: "Please, Miss, isn't Church better than Chapel? They called us Church Rats." "Well, you began; you called us Chapel Mice," etc. A year or two later, very few persons in the parish dared raise a sectarian question in presence of any one from the Rectory.

My father used to tell us that his function in life was, "to find good temper for everybody," and he found it accordingly, in his own absolute belief in his divine function. Personally he was anything but a naturally placid man, having a hasty and masterful disposition aggravated by nervous disease. The unquestioned supremacy exerted by him excited the envy of the High Church clergy in the neighbouring parishes. I am sure that it was mainly

due to the fact that he never claimed respect, either for himself, as a "gentleman," or for his opinions, as being necessarily truer than those of Nonconformists. I have often heard him say that the National Church had got so far entangled, at the Reformation, with the opinions of a certain sect, as that her ministers were required to read aloud its formularies; but that this fact in no way justified a clergyman for misusing the national pulpit for the purpose of thrusting on parishioners his special views of the meaning of those formularies. On the many burning questions which at that day divided "Puseyites" (*i.e.*, Sacramentalists) from "Evangelicals," no parishioner, I believe, ever succeeded—I am sure that I never succeeded—in extracting from him any expression of opinion, except this: that when two clergymen of the National Church disagreed on such topics, both ought to be unfrocked; because the fact of their discussing such subjects at all proved that they did not understand, and could not properly discharge, the duties of their office.

There was, of course, a rule in the village schools that no child whose parents objected need learn the Church Catechism; but it was practically a dead letter; most of the Nonconformists would have felt rather hurt than otherwise, had their children not learned whatever was considered good for the others. This must have been mainly due to my father's interpretation of the paragraph about our duty to our neighbour. When I was promoted, in Sunday School, from teaching infants to a Catechism class, I asked him how I was to interpret the clause: "Behave lowly and reverently to all my betters." He said: "God is my betters; I don't know of any others." So I told my class that, as God teaches people by suffering and the experience of life, the sick and aged poor were the "betters" of us girls, and that the Catechism required us to attend respectfully to them. Some of these old people were Nonconformists; but I do not remember any objection being raised by them to the Catechism being taught to their grandchildren.

My father's views of Church discipline were not quite peculiar to himself, even in those days, for F. D. Maurice was beginning to be heard of. My father's tastes were scientific rather than literary or theologic. Long after his death, I got into work under Maurice, whom I found to be an impassioned theologian and the most hopelessly unscientific—not to say anti-scientific—of men. Yet his conduct in practical matters was almost always directed on the same lines as my father's, owing to the similarity of their views as to the function of a National Church. I must often have been a trial to him, because of my ignorance of theology and my

preference for the scientific side of things. Yet he consented to my being appointed to superintend the Sunday teaching at the Industrial School attached to his Church ; and repeatedly took my part against both his own inclinations and the wishes of more avowedly religious members of his party, giving, as his reason, that he had sworn at his ordination to uphold the Athanasian Creed, which forbids us to "divide the Substance" of God. What, he asked, could be a worse dividing of the Substance than to deny that God may have inspired the scientific portion of mankind with valuable truths unintelligible to the theologic section ? Therefore he would not allow my wishes to be opposed, till he had first taken every possible pains to find out whether I had some good reason for them, not obvious from his point of view. Like my father, he believed that the formularies and creeds should not be imposed on the laity ; that their true function is to keep clergy and thought-leaders in order by supplying standards by which their conduct may be judged.

I am sometimes asked how I can be so fond as I am of the Athanasian Creed, which to most people seems a jumble of antiquated nonsense. My answer is that I have seen Frederick Maurice using it as a hand-rail, to steady himself amid storms of passion and prejudice which threatened to sweep him into unjust conduct.

Long before Charles Darwin was heard of, my father used to define man as, "a species of monkey which has been raised, by the infinite condescension of its Maker, to the position of being able to understand some of His purposes and help in carrying them out" ; and he used to tell me, as a good joke, that there are specimens of the race who imagine that titles and dignities of their own monkey-devising are as great an honour as helping the Almighty.

We ourselves liked music and studies ; and as circumstances made it possible for us to indulge these tastes, we frankly and selfishly did so to some extent ; but such a notion as that this indulgence showed us to be superior to those who grew our corn and made our cheese could not grow in my father's house. It never occurred to me that any amount or kind of book-learning, superficial refinement, accomplishments, or smart hats, could make me the "better" of an old woman who, after a long life of toil, could still do kindnesses to a neighbour's children out of a parish allowance of half-a-crown a week and a loaf per week ; when anyone suggested anything of the sort, the ludicrousness and bad taste of the idea struck me, I fear, more forcibly than its impiety.

The impudent manners of the poor, so much complained of now, are very much a reflection from the insolent ideas current among the gentry of former generations about those by whose toil they were living in ease, on a false pretence of serving the country by setting an example of chivalry and good manners. One hears a good deal, too, about the upstart airs of girls who have learned to think themselves above honest toil. Did not this originate in the coarse language of the gentry in the past, about "menial work," "kitchen-maids," and "the lower classes"?

If a National Church has any function at all, it should surely be to provide disinfecting centres, points of neutralization for all these dangerous follies, by providing in each parish some man who is a gentleman by culture, and by position the servant and representative of Jesus the Carpenter. A country clergyman who is socially a sort of squire is an incomprehensible anomaly.

Once, and, so far as I know, only once, did my father depart from his rule of not expressing his opinions on points of doctrinal theology. In return for some service rendered by him to a nobleman in the next parish he had been given to understand that the next presentation to the best living in the gift of the noble family would be offered to him. When the old incumbent died, my father was invited to the Manor House. His Lordship had by that time fallen into bad health, and his wife, a fanatical Evangelical, virtually managed the estate. When father returned from his visit, he told me that her Ladyship had asked him whether he "believed" so-and-so; using phraseology of doubtful interpretation, but which, as he assured me, meant to him something profoundly true. He took pains to explain to the lady that he did not believe it in any sense which *she* would feel to be sound. He told me that he knew he had destroyed his chance of promotion; and that it made him a little anxious about the future, chiefly on my account, as I should be left badly provided for. I am sure that the question of social position, the loss of opportunity for associating with county families and ecclesiastical dignitaries disturbed him not at all. As for myself, I had never heard of the promised promotion till I was told that the chance was over; and then, I remember, the lost opportunity for taking my place among county people presented itself to me in the light of an escape from intellectual starvation.

I had, of course, come in contact occasionally with what is called Society, and my experience thus far had brought me to the conclusion that Society people did not understand logic. Looking back now, down the vista of long years, the whole incident strikes me in quite another light. A man who receives, from national

funds provided for religious culture, a salary secured to him even in illness, and independently of any special exertion, pledges himself, by the very fact of accepting it, to settle down steadily to the position thus made for him, to banish the desire for increased wealth and social rank, and to make of himself a reservoir, on behalf of the nation, of those qualities which ambition, however honourable, and the necessities of the struggle for life tend to destroy in ordinary men.

4. THE PARSON

Mingled with the affection of the parish for my father there was, I think, a distinct element of awe—in some cases of something very like fear.

The Catholic notion of the priest's power to give absolution must have originated in some such power as my father exerted. The doctrine must have been at first rather the recognition of observed facts than the assertion of a claim. My father certainly made no such claim ; he used to say in the pulpit that the Church of England calls her officials "ministers," which means "servants"; he exhorted the congregation to remember that he was not their master but their servant, and had no authority to impose his ideas on them. Yet I have known a woman not dare enter the church again, because last time she went, he looked at her, and she felt sure he had heard of some particular wrong-doing of hers. After some weeks of this silent and self-inflicted excommunication, she came and confessed her sin to me, begging me to intercede with "parson" and get him to "forgive" her. Father was well aware of this singular power of his to make his presence felt in his own parish as the very presence of God. It was a power distinctly priestly rather than personal ; no one outside the parish, so far as I know, thought of him as personally more spiritual than other good men. Within his parish he incarnated the force of the communal conscience, the right of the community to insist on individual self-control and self-denial.

The man who is to do this must not pose either as the representative of an old-world Theocracy, or as the exponent of a special theology, or as the leader of any fanatical religious sect. Nor must he who claims to rule his flock by right Divine keep himself so ignorant of the action of those unseen forces which go to secure the allegiance of mankind as to think it would add to his dignity if he could get away from his parish, be made a dignitary, sit in Parliament, and be called "My Lord." I confess that I do not

understand a man who mixes up incompatible ideas and aspirations in this way well enough to judge him as an individual; but what I do see is that the very existence of him and his kind must have had a great share in building up our modern Idol, the Competition Monster.

It is true that few clergymen possess, in the same degree as my father did, the power to incarnate in their own person the claim of the community on the individual. But the Church of England recognises and provides for the exercise of such power. Now, imagine a man who should exert even a moderate amount of it and at the same time set an example of personal ambitions, even of the kind considered legitimate in ordinary men. What an influence towards greed must emanate from him! It is a matter of world-experience that whatever is connected in consciousness with any emotion of awe, tends by that very fact to gain a great hold on the nervous system of those affected; the emotion of awe fades away in time, leaving the other concomitant of the compound in possession. A National Church must therefore always be a source of exaggerated and dangerous ambition in the masses, unless its ministers do really feel that the fact of serving men is a greater honour than any which man can bestow. The parish pastor must be, in modern civilization at least, an anomaly and a danger, unless he is "too proud" of being the Lord's servant "to care from whence he came," or with whom he and his children associate.

Strenuous effort, hard toil of mind or body, anxiety about the supply of life's necessities, any of these things tends to prevent the development of certain kinds of quality the potentiality for which resides in certain organisations, and which, in the suitable organisations, develops naturally under conditions of leisure and assured maintenance. One of these qualities is that known as aristocratic charm; another is that known as priestly power. Society has a right to maintain, if it chooses, the possibility of the existence of these things. In spite of all utilitarian theories, we still grow flowers as well as corn; inspired music is quite as dear to some of us as the sound of bustling traffic. We are no nearer, so far as I see, to getting rid of aristocrats and priests than of roses and symphonies.

But if society is going to maintain members who toil not nor spin, because their mission is to distil the power to influence, to attract, to harmonise and combine, the accepting of the maintenance must be held as the acceptance of a solemn trust, to be loyally fulfilled and honestly accounted for.

My father's idea of a National Church was that there should be some one in each parish whose profession it is to be a perpetual

object-lesson in Christian Socialism, and who allows no question of "getting on" to interfere with that main business of his life.

Was he behind his own age ? Or was he in advance even of the present time ?

My father's idea of his function was illustrated in his treatment of the church building. It was nearly (if not quite) the finest old church in the district ; and by far the most conspicuously and picturesquely placed. The parishioners had seen fit to adorn it externally with a coating of pink lime-wash. Then came the Oxford High Church movement ; and with it, the Archæological revival. Rectors near us consulted architects and did their best with their own inferior possibilities. It is needless to say how they longed to see advantage taken of the greater opportunities which (they considered) my father was wasting. That pink-wash was a scandal and an eye-sore. He steadily resisted all pressure put on him in the matter. He was custodian of the church, he said, on behalf of the parish ; the lime-wash could be scraped off at any time and would meanwhile do no permanent harm ; when the most cultured of the parishioners themselves arrived at that stage of development at which one prefers granite bare rather than colour-washed, they would no doubt take steps to see their wishes carried into effect ; but while they preferred it pink, pink was the right colour for the parish church to be. He would allow no Oxford-bred theories of art to interfere with the normally slow development of the local art sense.

Similarly with regard to church music. In an age of ecclesiastical crazes for church organs and Gregorian chants, my father insisted that the primary use of church music is to stimulate local talent. An organ would have made the church services independent of the efforts of all the men in the village who could play (more or less well) violin, flute, ophicleide or double-bass. When the parishioners wished for an organ, father said, they would procure one ; but it could never be the rector's duty to start such an idea prematurely. He stood in front of the parish, to ward off ecclesiastical fashions and fads.

More than one painter who has visited me when I have been staying in the dear old village in later years has remarked on its wonderful wealth of *intime* and quiet beauty. It is far more lovely now than when my father lived there. Wherever you go, you meet with something to gladden an artist's eye. Yet it is no longer a purely agricultural parish ; breweries, a mineral-water-factory; and the finding of brick-clay and minerals, ought, one would think, to have uglified it, and have, on the whole, done the reverse. This is due to the care taken by all classes to avoid needless destruction

of pretty things, and to repair what loss cannot be avoided. In the back garden of a cottage, one finds a carefully-preserved bit of old wall fringed with wild ferns, of which the owner is as proud as of a prize geranium. I am often shown something that some one has planted to hide where brick-clay was dug ; or I pass the mouth of a strontium pit which is a picture, because the brambles are allowed to fall over it. A bit of land comes into the market ; and some one buys it—who, as an investment, would have preferred not having it—lest some rash person should seize upon it and cut down picturesque trees. The feeling seems very general all about the place ; but it centres mainly round one family ; the same which two generations ago took the lead in the matter of instituting the pink-wash. Whence one may perhaps infer that my father was not wrong in supposing that cramming correct theories of art down people's throats prematurely is not the last word of commmunal art-culture.

On the Sunday after my father's funeral, the sermon was preached by the Rector of the next parish, who frankly said that he, in common with the other clergy of the neighbourhood, had often and much disagreed with the late Rector, adding : "but we were all obliged to confess that he did carry out the commands of Christ to an extent that it had never entered the minds of any of the rest of us to conceive it possible to carry them out."

When I go back on visits to the old parish, one of the things that most strike me is that the impression which we seem to have left in the life of the place had very little to do with *what* we taught. When I call on toil-worn grannies who, half-a-century ago, were my pupils, they do not talk piously, or quote formularies or texts of Scripture ; they speak of "the happy times when you and we were all girls together." Yet it is clear that I stand to many of them for a visible symbol of consolation and faith. God is nearer and the future life more sure, not because of the sentences in the Creed, but because we were all girls together. Some of them have not always been models of all the proprieties ; a few perhaps know too well the way to the beer-shop ; but to me as well as to them, God seems the nearer now, and immortal life more sure, because "we were all girls together."

NATIONAL CHURCHES AND THE CATHOLIC CHURCH

Since writing the above, I have been asked to state what are my views about the relation between National Churches and the Catholic Church ; and especially whether I do not think that the

latter was founded in Jerusalem at the first Pentecost after the death of Christ. My opinion has not much weight in such matters ; but I give it for what it is worth. I think the Catholic Church was founded, *at latest*, the first time that a man helped his wife to protect their baby. Surely if the Catholic Church and the Communion of Saints do not exist wherever two or three combine for an unselfish aim, they do not exist at all. What was founded at Pentecost, I suppose, was not the Church itself, but an organic and intelligible *science* of the nature of Church and Communion. A National Church is a more objective, temporal, and concrete entity than the Catholic Church can be. It comes into existence when any community decides that it will, out of its resources, emancipate a set of men from the need of providing for themselves and their children, in order that they may have no work, no profession, and no ambition, except to be at the service of whoever may happen to need help.

5. HEREDITARY CASTE

The old doctrine of Heredity came to a point where it was seen to separate into two branches. It had been assumed that people would do best that which their ancestors had succeeded in doing well. Some crude notion of this kind was the excuse for the caste system as it existed in Europe. It was supposed that descendants of rulers were the fittest people to rule ; that ancestral culture made culture come easier ; that the practice of handicrafts gave mechanical skill ; and so on. Therefore every child was to be instructed to seek his field of duty in that state of life into which, by the Will of God, he was born.

Later on, it began to be seen that there was another side of this question. Faculties may wear out in the course of generations. There is perhaps a need for lying fallow.

The Government threw open the matter to fair experiment, by throwing open to competition certain civil and military functions, the exercise of which needed a certain amount of culture, and which had hitherto been a monopoly of the so-called "cultured classes." Let young people of other classes show—if they could do so—that they were as capable as those ancestrally in possession, of profiting by education, and fitting themselves for the posts.

Nothing could have made the experiment a success except the hearty determination of all classes to try it fairly and to abide by the issue. If only the classes in possession would have realized that a grand experiment was on foot, intended for the solving of a

National Problem in the interests of all parties concerned! But no. Many members of the hitherto privileged classes seemed unable to look at the new suggestion in any other light than that of an attack on their privileges.

One instance of the tone of many of the gentry recurs to me vividly. A branch of a certain county family had tailed off into an only son, a boy of fourteen, who showed remarkable aptitude for concrete business, but who, in spite of the most careful teaching, had never learned to read. In the light of the then new scientific ideas, it was suggested that it might be well to train him as a carpenter. The suggestion was angrily suppressed. "A *clergyman* could not disgrace his order by allowing his son to become a mechanic." Any such suggestion as that the clergy existed for the purpose of encouraging people to follow the example of the Nazarene Carpenter was held in those days to add impiety to insult. Jesus was God, not man; what He did was not for us to imitate.

How could an experiment be fairly carried out in contact with such illogical absurdity as was shown by many of the gentlefolk of that day? The privileged classes were determined that it should not be tried at all if they could prevent it.

My young friend whom no one had ever been able to teach to read was of course an extreme case; but there were thousands of gentlemen's sons as essentially, though not as glaringly, unfit as he to profit by any professional culture which depended on book-learning. As a measure of self-defence, this created a class of special examination coaches, heavily bribed to destroy the experiment, and outwit the examiners, by keeping the posts out of the hands of the poor, and in the hands of those able to pay for giving to essentially unintelligent youths a surface semblance of knowing the subjects proposed as examination tests. Gradually the poison spread downward and all around. The education of the majority of children in all ranks has now drifted into the hands of persons who, on their own showing, are so much examination-coaches as to have no time to think about becoming in any true sense teachers.

The interfusion of classes has indeed come in spite of all opposition; but the educational reform which should have been its concomitant has been vitiated by the tactics of the opposers; and all classes are now suffering in consequence. The children in many schools are kept so busy learning mere tricks for passing examinations that they have no time to learn any subject properly. The interest of the class is kept up by a kind of fictitious excitement which lays the foundation for many vicious habits, and especially for the gambling-fever. The children enjoy school life; but many

of the thoughtful ones are growing frightened, I find, at their own incapacity for being really interested in anything when left to themselves and deprived of the stimulus of class-competition. Indeed, so essential to enjoyment is the feverish excitement of antagonizing someone else, of trying to oust someone else, to keep someone else in the shade, that the examination system no longer suffices to keep attention alive. As I described in a former article,* a custom has grown up of encouraging children to indulge in ill-mannered tricks intended to attract the teacher's attention and secure the privilege of answering questions out of proper turns. It is said that this detestable custom was first observed in Board Schools, and that the infection has spread thence to others. However that may be, the tricks resorted to are an obvious reflection of the ugly devices by which rival candidates at elections strive to secure the right to rule the kingdom or to educate its children.

6. THE QUESTION OF CLOTHES

One concomitant of the breaking up of the caste system was a change in costume. Domestic servants had not, at that time, adopted the black dress and white streamers of the present day, which, like a nurse's dress, mark function rather than social rank, and which are discarded when off duty. The poor, as such, were expected to distinguish themselves from the well-to-do by marked differences in colour, style and material. This distinction was to be kept up even—I might say especially—at Church. In my young days the rigid distinction was breaking up ; the elders of a peasant family still bought, for Sunday wear, what would be next year's working-costume (a carter's smock or a servant's gown) ; the younger members of the same family would come to Church in some sort of imitation of the dress of gentlefolk.

Such a change could not take place, under the best auspices, without risk, owing to the extra pressure on pecuniary resources. Sunday school libraries of that day were full of tales, mostly written, I believe, by the wives of clergymen and country squires, about village girls who came to grief, in various ways, by imitating the dress of ladies.

My father was one of the clergymen who considered that the officials of a State Church are responsible to the nation for steering popular movements towards possible and safe issues. He took up the dress question seriously. It was then the fashion for ladies to

*p. 1011.

wear the hair in curls ; an artistic and picturesque mode which at least cost nothing, and was equally suitable to girls of all ranks in life, when not engaged in actual labour. (The sense of fitness suggested tucking the curls away during field or house work.) But the custom prevailed of telling poor girls, not that their duty to social order required the tucking away of curls in working hours, but that their duty to their "betters" required them to sacrifice those ornaments altogether. My father took his stand against this pretension of gentlefolk to keep God's gifts for their own sole enjoyment, by giving out in the village school that he liked to see nicely brushed curls.

My share in the reform was to set the fashion in the village of wearing costumes which, while "lady-like" in style and colour, would, when the first freshness had gone off, be serviceable for working clothes. The tone taken about all this by some really well-meaning ladies in the neighbourhood seemed to me at the time quite unintelligible. Kindly, affectionate warnings were given me of the wrongness of encouraging poor girls to look lady-like on Sundays (in plain washing-dresses and with no ornaments but what nature had endowed them with).

Looking back on it all now, I understand it only too well ! I see that a hideous element was being imported into the dress-question, by ladies who chose to look at the matter from the point of view of the "rights" of their own order. They were opposing the change, not on account of danger to the poor, but as an invasion of their privileges. I often heard wives of clergymen and squires (who themselves aped fashions set by the aristocracy) condoling with each other on the impossibility of preventing their servants from looking like ladies in Church. The movement, which should have been one of National Art-Culture by means of the study of the picturesque and suitable in dress, was turned into the channel of vulgar competition by the self-centred opposition of those whose duty it was to set an example.

On the other hand, I remember one lady in Ireland, who encouraged her servants in dressing smartly, giving to her friends as her reason, that if they saved money they would be able to marry or emigrate ; it would be easier to keep them in service if they spent their money as fast as they earned it.

Is it any wonder that the servant class so often took up the dress question by the wrong handle, when their mistresses set them such an example ? I often think now, when I hear young housekeepers complain of housekeeping difficulties : "My dears, you can get no good servants now, because your grandmothers were so determined to keep slaves."

7. THE CONTRIBUTION OF THEOLOGY

People whose conscious thought-life dates no further back than twenty or thirty years, connect the doctrine of the "Divinity of Christ," chiefly, with some form or other of what is now known as "The Gospel of Divine Humanity," *i.e.*, the belief that Jesus possessed or incarnated in an absolute manner certain powers or qualities latent in germ in all men, which can be developed, more or less, in any man, on condition of his consenting to sacrifice such lower aspirations and aims as are found to interfere with the normal evolution of those powers. But there was a time, and I remember it well, when Jesus was supposed to be, in a quite different sense from this, God; possessed of certain ultra-human powers of a kind which could never, in any measure or degree, be either possessed or understood by any other man The ethical difference between the two doctrines is enormous. In the one case, Christ is "God," and does all sorts of things; and man, mere man, has to "believe" something he cannot understand, and to find his own way through this puzzling world without much practical guidance from Christianity. According to the newer view, God, the Eternal, does all sorts of things through various agents; when He wants towns bombarded with hot minerals, He creates volcanoes, whose appointed work it is; when He wants throats cut, He makes wild beasts and half-human savages, whose line of life that is. But if a man feels a calling to become a highly-developed man, a leader of Progress, a teacher of Religion, a Light for the World, the way is clear; the type and model is Jesus Christ. The Christian knows that "the lowest place was that which the Highest chose"; and arranges his life accordingly. There is no use in trying to mix up, in one limited life, ideals which are (within the scope of a limited life) incompatible with each other. As the Christian leaves crawling in mud to creatures whose constitution it agrees with, not blaming or despising them, but understanding that their modes of life would not suit his aims and ideals, so he leaves greed and ambition to men whose spiritual health they suit.

In the old days, if any man wished to lead a reasonable, simple, hygienic life, spending on himself only so much of the earth's material resources as really served the needs of his healthy development, thus setting himself free for spiritual effort, it was possible for his "Christian" wife or mother to tell him that Jesus indeed could do such things without loss of dignity, because He was God; but ordinary men cannot; they must not presume to think of imitating Him. On the other hand, if anyone wished to defend

war, the argument was handy : Christ (in His capacity of Creator and God) bombarded towns with hot minerals ; why should not our rulers do the same in their capacity of "followers of Christ" and vice-gerents of God Almighty ?

We are getting the logic of the matter a little clearer now. Imitating God Almighty, as such, is not our business, because He is too many things at once for any finite creature even to aim at imitating Him, but imitating Jesus Christ (who is not God Almighty, but typical developed man) is the business of cultured and civilized philanthropists and reformers. The old doctrine leads to intellectual confusion and moral chaos ; the newer one is intellectually simple and morally progressive. And, as the normal order of Evolution is from chaos towards organization, from confusion towards simplicity, and from contradiction towards logic, it was never, from the first, doubtful which doctrine would prevail. There was found to be a certain amount of noise and outcry before the new doctrine could establish itself ; but the change was sure to come ; and evidently it is now fast coming. We say : "Yet a time, and then cometh the harvest," but, if we lift up our eyes, we shall see that a good many fields are ripe already for the harvest.

But my present point is the curious deposit on the educational world left by the ignorant opposition of theologians to the inevitable simplification of Christian Theology. In theory, one of the attributes of the humaniform, God-Almighty Jesus, was *humility ;* but, in practical teaching, the "humility" ascribed to Jesus was not an essential quality, but a decorative external garment. The tone of the Churches was not : "Let us be humble because Jesus was humble" ; but "you lay-people must be humble, because you are *not* like Jesus ; because no one except Him, *and the priests to whom He has delegated a share of His power*, has any right to be self-assertive." That this was the real meaning of much so-called "Christian" orthodoxy, no one who listened to it attentively could fail to see. But it was, as I said, disguised under an ornamental veil of words, until the day of deliverance for the reasoning faculty of man dawned, when Jesus was preached, no longer as Omnipotence masquerading under the guise of a gentleman, but as a true Incarnation of Humanity at its highest level. Then the devotees of the old idea were forced to "show their hand." The decent veil fell off ; they attacked the innovators on the ground that these latter were assailing the dignity of the Lord Jesus and robbing Him of His rights. That was the whole point. His Rights, His Dignity and Honour. Not an idea seemed to enter most orthodox brains, either that the dignity of God Almighty (supposing Jesus was God) is very well able to take care of itself, or that the sort of

man whom Jesus was (or at least impersonated), though he sometimes asserts Powers, never either claims Rights for himself, or wishes disciples to do so for him. It never seemed to occur to them that God might do very well without the moral support of human adulation, or that a God who, on their own showing, had left Heaven for the good of man, would probably be more interested in steering the development of human thought towards sane and harmless issues than in fussing about the titles given to Himself. They could not see that their duty to their Master required them, first of all, to abstain from importing dangerous and bad ideas into the young movement of progress. I do not wish to make harsh comments on any one ; but the impression left on my mind by many of the sermons and theological conversations which I heard in the sixties, is, that the speakers alternated between flattering Bishops as if they were little deputy gods, and talking about Jesus as if He were a big Archbishop, and would bestow benefices and dignities in Heaven on whoever flattered Him hardest on earth.

Between the two conflicting doctrines, a generation grew up impregnated with two ideas, viz., on the one side that Jesus was an Ideal of Humanity, a model for human character; and on the other, that Jesus was eager above all things for prestige and titles of honour.

Of course, whenever the two ideas came together in the *conscious* part of any mind, they were seen to be contradictory alternatives, or rather half-truths ; conflicting presentations of some common truth, each charged with some error which brought it into conflict with the other. And conscious and logical comparison of the two tended to cast the erroneous element out of each. But when a dispute of this kind is going on, it too often happens that the rival ideas are not consciously compared ; each, alas ! makes its own separate impression on that subliminal region wherein is perpetually going on an automatic functioning towards unification. By its unreasoning combinations of incongruous elements is generated the stuff that dreams are made of ; thus also is generated the material of those waking dreams of which individuals and nations go mad.

The change from the Jesus of Theology to the Ideal of Divine Humanity is taking place as quickly and completely as if no fanatical theologian had ever opposed it ; the opposition has left as its deposit the nightmare dream that self-assertion is an element of character in line with the highest development, and specially necessary to cultivate in the children who are to become the "governing classes of the Future." This dream is blocking the way to real progress in the Science of Education.

The Christ of mediæval theology, that anomalous bundle of contradictions—now, thank God, almost banished from the conscious minds of sane men—has left behind it other legacies, even worse than the belief that self-assertion is a quality the over-fostering of which tends in the direction of the higher development.

One of these bad consequences is due to the worrying to which the reformers were subjected at the hands of the devotees of the old Theology. There would be very little religious persecution in the world if fanatics realized its effect. Torture, whether of body or mind, tends to create, by the mere law of Association, an involuntary shrinking from, an unreasoning terror of, the ceremonials, words, ideals, for the sake of which it has been inflicted. As the Inquisition gave to many Jews and Protestants an irrational horror of priestly vestments and the Catholic Mass, so, by reason of the family worry inflicted on thinking men and the horrible distortions brought about in the thought-processes of children, in honour of the theologic Christ, many intelligent and devoted people contracted a habit of turning aside whenever the words "God," "Christ," or "Spirit," were mentioned, with the instinctive feeling: "Now someone is going to worry." For thousands of intelligent people of my generation and the next, the word "Christ" carried, as its chief association, the idea of a claim by fanatical ignorance to disturb the family peace of thinkers. And the spiritual energy, thus diverted from its normal channels of study, went to strengthen the forces and adorn the temporary triumph of a self-centred materialism.

The False Christ of Theology is also, it seems to me, largely responsible for the horrible fact (a fact it most undoubtedly is) that—

Co-operation for selfish or evil purposes has something like a monopoly of the force given to co-operation by the use of the most powerful kinds of automatic correctors.

No effective co-operation, for any purpose, good or bad, is possible without the aid of automatic correctors; and these must function with mechanical regularity, or they are useless. To take the simplest instance—persons who wish to combine for purposes of worship or philanthropy must use clocks (or the sun) to indicate the hour of meeting; they do not expect or wish that their clocks should go fast or slow, in sympathy with their individual time-sensations; the very use of the clock is as a *corrector* of individual time-guesses. Or again: Fire drill in a school is conducted for the humane purpose of minimizing the risk of injury to children; but the fire drill itself must be carried out with as much automatic precision as military drill, or it is of no use; the master must not

allow the children to be dragged hither and thither according to the impulses of persons who do not understand the drill ; the drill is a *corrector* of such benevolent impulses. To make it effective for its benevolent purpose, it is necessary that the drill-master should be cool, calm, and impassive, and the drill itself absolutely mechanical.

Now, the so-called abstract sciences are intellectual clocks or drill-machines, correctors of impulse. The simpler forms of them can be learned by everybody in the course of an ordinary education; but to use the more powerful and complicated kinds of abstract mechanism, is the business of experts who devote the best part of their lives, each to the practice of his own branch.

All bodies of men, who are trying to co-operate on a large scale for wide aims, find it necessary to invite the aid of experts, who can use powerful impulse-correctors.

If men are co-operating for a bad or selfish end, the expert can speak freely, at least to those who are employing him ; the latter do not, of course, bind themselves to act entirely on the advice of the first expert whom they consult. They may prefer to take several independent opinions and strike an average between them. They may know facts or have motives which they do not wish to confide to any expert outsider, and which modify their conduct. But they wish, first of all, to know what is the automatic and logical resultant of such data as they do lay before experts. They may deceive the public as to this point, but they wish to get at the truth for themselves ; they know that knowledge is power ; and they wish to possess all the power that a good automatic corrector can give. Therefore they do not wish the expert to alter the functioning of his mechanism in deference to the opinions or feelings of non-experts.

But the whole atmosphere of philanthropy and of socialism is pervaded by unconscious reminiscence of the theologic Christ. The theologic Christ was supposed to have left a Throne in Heaven to "go slumming" (so to speak) on earth, for the salvation of men ; and yet he cared so little for their salvation, after all, that he condemned to eternal torment every scientific expert who ventured to know more of his own speciality than did the clergy (who claimed to represent the Christ) ! The influence of this past delusion is still so potent that if an expert in logical analysis is consulted by a group of persons associated for any humane purpose, for the spread of peace principles or of socialism, for the improvement of education, for the minimizing of vivisection or the prevention of cruelty, he is expected to *de-mechanicalise* his machinery, and to vitiate its results, in deference to the "feelings" and crude guesses

of non-experts. If he persists in working out as accurately as he can the resultant of the data supplied to him by those who have consulted him, he is almost sure to be exposed to two forms of insult. Though he may be giving his professional services gratuitously, and without asking or wishing for any sort of recognition, he will be told that *they* care for suffering humanity, but *he* cares only for abstract sciences ; and the very persons who have consulted him *as an expert in the use of an automatic* impulse corrector, charge him with conceit and intellectual pride, because he ventures to state his results frankly without regard to the guesses or sentiments of the benevolent persons.

The whole atmosphere of benevolent and religious association is charged with that subtle falseness which is shown not so much by trying to deceive others as by insisting that others shall assist one in deceiving oneself. The result is that experts in the use of automatic mental machinery are discouraged from trying to assist in the safe-guarding of benevolent schemes.

The science of combined action took, fifty years ago, a new start forward. A gigantic apparatus of automatic error-expellers was then created. Wealthy co-operations for anti-social purposes (commercial syndicates, etc.) purchase and use freely all the advantage given by the use of these powerful combiners ; whereas associations for human purposes are still using, as mind harmonizers, such old-fashioned and weak mental mechanism as could be managed by non-experts half a century ago. Ignorance of mental mechanism, contempt for those who understand it, are held to be concomitants of benevolent sentiment.

This state of things is as disastrous as it is absurd. The science of social order is gasping for breath, half choked by the dust which gathered round the Christ of mediæval Theology, and which flew out in clouds when that Theology fell. But the dust is now beginning to be cleared out of the way ; and we can all do our share in getting rid of it. Let us hope that the day is not far distant when associations for the service of humanity will be able to secure the use of automatic error-expellers and of automatic combiners, commensurate in power (though different in form and adjustment) with those by means of which dishonest syndicates and trade "corners" have, for the last half-century, been gaining power to crush the life out of honest and intelligent work.

I fear some of us have let ourselves be misled by a careless misreading of the parable of the inspired shepherd who attacked, with a simple pebble, the armour-clad Philistine giant. God rewarded the lad's faith and courage by momentary success ; but we forget the end of the tale. David, elated by his victory, grew conceited

and fell into ghastly moral confusion. Goliath, in the shape of trade syndicates, is triumphing now, because the Lord's Anointed (Humanitarianism) is foolish and conceited. It will be good discipline for the Lord's Anointed to have to learn to use Philistine tools. "God hath, it is true, no need of human learning ; but *still less hath he need of human ignorance.*" Not the learned but the pure in heart shall see God ; that is true ; but it is also true that not the ignorant, but the meek who are humble enough to learn, shall gain power to rule on earth, and to establish here below the Kingdom of Peace.

A MODEL VILLAGE OF TO-DAY

A reader of *Brotherhood* sends privately to me a criticism of some of my articles that have recently appeared. I should like to answer him in the journal itself.

"It (*Brotherhood*) speaks of men working for a crust and straw. Why, in this parish all the men have full work at good wages ; the bettermost have their parlours, etc. As one walks down the village, one hears, in many of the houses, children practising on the piano ; and the children in the Sunday Schools are beautifully dressed. All this is, of course, as it should be ; and as, I imagine, it actually is in many other places."

My correspondent's statement is not in the least exaggerated. The place in question is a manufacturing village ; in fact it is a brewery village. The ancestors of the present brewery-owners were yeomen-farmers, wheat-growers, and cheese-makers. I am blaming no individual for the change which has taken place. The quondam farmers were obliged to take to some other business, or else starve and let their workmen starve with them. Farming "does not pay" ; there is "agricultural depression" to be reckoned with. But there *are* the congested slums in towns. And there *are* the masses of unemployed.

I am not going to talk of politics ; of Fiscal Policy, or Free Trade or Protection. I know nothing about such things, and have no desire to talk of what I do not understand ; because that is the sure way to talk nonsense, to waste ink and paper, as well as valuable space in the journal, and the time and temper of readers. I prefer to talk of my own subject, which is logic.

"Agricultural depression" ; "farming doesn't pay."

What are the facts locked up in those two phrases ? Amongst others, these : if a man chooses to take up, as his life-vocation, the business of growing food for his brother-man, he is punished by a life of terrible privation for himself and his wife, and by the degra-

dation and chronic semi-starvation of his children. Therefore every man who wishes to be a self-respecting citizen and a good parent must betake himself to some other occupation than the *production* of food. He may "make" cocoa ; which is useful, though not a necessary ; or he may be brewing beer, which may be a legitimate occupation. (I do not wish to pose as a teetotaller.) But, in either case, he is not *growing* food-stuff out of the ground. If he dares to do *that*, he himself must starve. It seems to me that in a country which starves its corn-and-potato growers, to offer them, by way of consolation, the light of the prosperity of brewers, is adding insult to injury. To wrap up all this in fine phrases, is adding self-delusion to our national sin. We had better face the fact and see what we are doing : whoever would enjoy a fair share of necessary comforts must earn it by consenting to provide his fellow-citizens with only non-necessary, and often harmful luxuries. I may be mistaken ; if so, I hope some reader will correct me ; but it seems to me that the more foolish, savage, or vicious, is the taste to which any avocation panders, the better paid (on the whole, and speaking generally) are the men and women who pursue that avocation.

Lads and girls from starving agricultural villages go up to towns (where no food stuff can possibly be grown), on the chance of "bettering" themselves. This going to town is a risky speculation ; many do "better" themselves by doing things useful, but not necessary ; many by producing luxuries and amusements which injure those who enjoy them ; many by ministering to depraved tastes and vices. But the rest swell the ranks of the unemployed, who cannot get food because they are prevented from growing it. It seems to me that when a nation has got its affairs into that state, the first duty of every one in the nation, who has any brains at all, is to try to think how that state of affairs can be altered.

The first problem of a national education is so to train children of all ranks that, as soon as they are old enough, they shall begin thinking about this point, and not leave off thinking about it, till farming does pay and agricultural depression is a thing of the past.

But there is another aspect of the charming, prosperous, contented, well-to-do brewery village. It is, I am credibly informed, a rather remarkably sober village. Those who take "too much" of the goods which they manufacture are first reprimanded and then, if they transgress often, dismissed. Drunkards cannot be trusted to manipulate the process of making beer. Besides, the masters are conscientious and estimable gentlemen ; all that one hears of their behaviour towards, their influence over, their employees is much to their credit. But the question occurs to one's mind : If all

the people in other villages and towns drank only the strict amount prescribed for them by medical science, would the brewers be able to give their men such comfortable wages ?

And what becomes of those unfortunates who are found not sober, cleanly, and accurate enough to be trusted to make beer ? We do not yet provide them with euthanasia in a Lethal Chamber, as we do to ill-conditioned dogs and cats. What becomes of them ? Do they drift into other occupations elsewhere ? Into town slums ? Finding employment as journeymen bakers perhaps ? Or slaughtermen ?

The happy and refined home of the genial and kindly employer, whence he and his family emerge on Sundays, to meet at church his well-to-do work-people and their charmingly dressed children is a delightful picture to contemplate. I frankly confess that the mere sight of it is more refreshing to me, and gives me a keener sense of artistic contentment, than any painting or symphony could do. But—but—but—at what cost has it been produced ? The question opens up a curious vista.

Why *will* people ask awkward questions ? Logicians have a habit of asking awkward questions. The Crucified Carpenter asked some in His day ! Perhaps that was also one of the reasons why He was hustled out of the world.

TWO ANCIENT EASTERN RECIPES

RECIPE I

To make a true Prophet, or Servant of the Holy One, or Revealer of the Divine Unity.

Take a rather sensitive and fairly intelligent child. Accustom him to study the relation between shadows cast by material objects and the solid objects by which they are cast. Get the idea of the relation between substance and shadow well into his consciousness ; not as a fact which he vaguely knows to exist (as everyone must know it), but as a habitual and familiar subject of accurate study. When his ideas of that relation are perfectly definite and precise, begin to accustom him to think of all solid objects and of the varying phenomena of the earthly life as the shadows of facts happening in some higher condition of things not directly cognisable by man. This higher condition or region, the law of which we can only infer by a careful study of the earthly life treated as a system of shadows, was called, of old, either the "ideal"

or the "Mind of God." It is now the fashion to name it "the Fourth Dimension." But however we may name it, an orderly manner of investigating it by means of its earth-shadows is essential to the training of a true seer or prophet. The mere reading about the Fourth Dimension in books written by other people is useless except as a clue how to conduct one's own personal studies. The *habit* of inferring four-dimensional facts from its earthly, or three-dimensional shadows, by one's own personal investigation, is indispensable for the training of a prophet.

Another indispensable thing is as follows:

As soon as the child is old enough to understand, introduce him to the idea that his vision of the unseen is properly incompatible with a life of ambition, self-seeking, competition, fashion, or luxury. Train him in the *noblesse oblige* view of his position as a son of the unseen Unity. Tell him that he must learn and labour truly to earn his own living by fitting himself to do, thoroughly well, something or other which society wishes to have done and will pay for, and the doing of which is in itself beneficial to society; but that, having once *seen*, he must never put before himself, as an object of aspiration, the being widely known or much praised by mankind.

(In declining middle age or old age this last rule may be temporarily departed from if necessary as a means to a useful end, but we are talking now of the training of the prophet whilst still young.)

RECIPE II

To make a sorcerer, evil wizard, or incarnate devil.

Carry out Part I of the above instructions, exactly as in the training of the good prophet; and *invert* Part II. Accustom the aspirant to think of his own Vision of the unseen as an implement by means of which he may combine an easy life free from strenuous toil with the gratification of luxurious tastes, vanity, ambition, and the cheap pleasure of being popular and superficially beloved.

The *rationale* of these recipes is obvious. Whenever the great centre of will and conscious attention is intensely occupied about some *unseen* idea or ideal, action on the earth-plane of things is directed by the automatic centres; and these respond to immediate *sensation*, except where otherwise directed by automatic *habit*. It is therefore of vital importance that those who are trained to see into The Unseen should also be trained in a *habit* of suppressing immediate desires, or at least of suspending an attempt to

gratify them till the centre of will and attention has come down from the clouds and taken the helm of physical action. If this habit be not formed early, there is no guessing to what depths of depravity, selfishness, and cruel self-indulgence the person may sink.

In ordinary times, when school teachers are content with stuffing into children's heads what they (the teachers) already know, the distinction between a Prophet and a black Magician can hardly be said to be one of national importance. The average schoolboy, if left to his own instincts, can safely be trusted to think a cricket-ball, a plum-pudding, a Latin exercise, or a flogging, far more real and substantial than he does the "divine idea" from which these earth-shadows are severally projected. And on the other hand, the "priest after the order of Melchisedek," the born Seer, who takes, of his own accord, to seeing all things as shadows projected from some substance existing in the mind of God, can usually be trusted, if left alone, to develop, along with his Seerhood, the ascetic instincts which are its normal safeguard. And the number of parents who will take the trouble to carry out effectively Part I of the above dual Recipe is so small that the nation can afford to treat them and their children as a negligible quantity. But if anything arouses in school teachers the desire to train masses of children in the habit of seeing The Unseen, it is then high time that the rulers of the nation should take cognizance of what is going on, and should take steps to secure that the schools shall turn out true servants of God and not agents of evil forces.

Now, a mathematical revival, such as is now in progress, essentially means a time when children are being trained to see into The Unseen. The nature of the connection between living mathematics and Seerhood is easily explained. For the present I only state the existence of such a connection without fear of challenge from any one who knows anything about the matter.

England is now going through one of these crises known as revivals of living mathematics. Whole groups, whole schools, full of young children are to be made Seers of the Unseen.

It is startling to observe how ignorant the majority of Englishmen are on this subject ; how little many of those who are clamouring for "popular control of Education" realize the nature of the movement which they claim the right to control and guide.

THE PROPAGATION OF ALTRUISM

Ants and bees have brought altruism to an ultimate (though on a small scale). Now among them, altruism is the reverse of heredi-

tary (if we understand heredity to be individual from parent to child). What is hereditary among them is a racial tendency to differentiate each generation between selfish physically fertile and altruistic physically infertile. Devotion to the community is absolute and universal, except in individuals specially exempted from devotion, who propagate the race physically.

Wild fruit trees develop no qualities but those useful to the individual tree or its immediate posterity, the only apparent exception being that each puts out so much colour, scent and flavour as it finds useful in attracting other creatures, who render service to it and its own posterity.

Man "cultivates" the tree into a condition in which it puts forth qualities useless to its own physical life and that of its own descendants. The cultivated tree is "altruistic"; it grows pulp and flavour that are of use beyond its own family circle. But when we have got our tree to its maximum of altruism, how do we propagate this good quality? Not by sowing seeds from the cultivated altruistic tree. We fall back on the old self-centred, selfish, wild growth; we take a seedling of natural, brutal, sturdy, wild growth, and graft on it a twig from the highly cultivated tree.

These are only analogies and *prove* nothing; but at least they disprove the validity of all theories of heredity which rest on partial apprehension of scientific theories *supposed* to be "proved" by analogy with the processes of Nature, and thus leave our imaginations free to face the facts of human history in an impartial spirit.

What are the facts? Is there any evidence that the children of pious or philanthropic men turn out, on the average, the best citizens? On the whole, the contrary is the case. There are exceptions, of course; humanity has not yet settled into its onward stride; and no rule is yet absolute. But, on the whole, there is evidence to show that persons of exceptional piety towards God and devotion to Humanity as a whole are likely to transmit to their physical posterity, not altruistic tendencies, but disturbed nerve-centres. On the other hand, the daughter of a selfish, worthless mother often develops an extraordinary power of devotion to the little brothers and sisters whom the mother is neglecting.

Aptitudes, modes of skill, are hereditary, though sometimes in alternate generations. But as for the tendency to use one's skill or aptitudes for good or bad purposes, for selfish or altruistic ends, that is quite a different matter, and one about which very little seems to be as yet certainly known.

MISTLETOE AND OLIVE:

AN INTRODUCTION FOR CHILDREN TO THE LIFE OF REVELATION

These papers appeared first in "Brotherhood," 1904-05, and were republished in book form in 1908.

TO THE DESCENDANTS OF

CECILIA SARAH MARKS

The venerable Leader of Reform Judaism long ago sanctioned my offering to his grandchildren this attempt to illustrate the connection between the Religion of orderly Progress and the logical doctrine of Unity. You should need such information as it contains less than most people. But it is a sacred pleasure to me to link my name with that of one of the women whom I have most revered.

MARY EVEREST BOOLE.

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I

GREETING THE RAINBOW

Oh, the colours! God's own colours!
  Mother, see them all aglow!
Gold and purple, blue and scarlet,
  All together in one Bow.

Oh, the standard! Israël's standard!
  See it gleaming in the sky;
Man hath known it, God hath shown it,
  In the blessed times gone by.

Greet the standard ! Israël's standard !
As in sacred days of yore ;
Love shall show it, man shall know it,
God's own Law for evermore.

II

GOD HATH NOT LEFT HIMSELF WITHOUT A WITNESS

A tribe of savages had found out so much about astronomy and natural science, that they knew the sun from the moon, and berries fit for food from poisonous ones.

Among them dwelt a medicine-man, a wonderful, strange person, who gave poison berries to the sick people of the tribe. At first the others thought him a very wicked man ; for to them it seemed virtuous to give fruit to one's own kindred and poison to one's enemies. To give poison to one's friends was a shocking thing. But it turned out that the sick people who took the drugs of the medicine-man did not die, but grew better. Wherefore the tribe said that he worked miracles. He explained to them that the great Father made all berries ; and that whether these kill or cure depends on how much is taken, and when. The tribe found it easier to call him a Prophet than to learn what he tried to teach them.

The medicine-man one day had a great inspiration. He was inspired with what is now called an "abstract idea." He saw, outside of himself, many round things ; but he also saw, inside his mind, roundness—the roundness of all sorts of round things. He saw that, though the sun and moon and fruits are unlike each other, yet roundness is in them all.

The medicine-man sat by a pool, thinking about this roundness, which was in his own mind, and yet was not any *thing*. He happened to throw a stone into the water. Instantly roundness appeared upon the water ; and, behold, it not only *was* there before his eyes, like the sun, but it grew bigger and bigger as an apple grows (but faster).

Anyone can make a ripple by throwing a stone into water. But when a thinker does so he reflects on what it is that has happened. The medicine-man said : "I am a Creator ! I am a son of God and heir of His power to create roundness !" He called his tribe about him and told the joyful news, how that man is the son of the Creator. The tribe listened to him gladly, because they had seen

the miracles of healing which he had done, and they hoped to get some benefit by listening. And he thought that they understood. He told them how roundness is in the sun, and yet is not a sun ; and is in the moon, and yet is not a moon ; and is in the berries, and yet is not a berry ; and how it is not in water until man makes it come there. Then he showed how he could make it come there by throwing in a stone.

In the middle of all this, two women became very ill and feverish and the medicine-man treated them. When they were quite well again, he started on a missionary expedition, to carry to neighbouring tribes the good news that man is a son of God and heir of His power to impose on matter his own ideas.

One tribe to whom he came were very angry. Their forefathers had had a miraculous medicine-man of their own. It seems that this medicine-man of old had spoken, not of roundness, but of the shape of branches. He had taken especial pleasure in the thought that he was able to break a forked twig off a tree—a tree that God had created—and to turn it upside down. Any boy can break a branch off a tree ; and, if he likes, he can turn it upside down. But when a man of genius, a great thinker, does so, he does more than merely break the branch ; he wonders why he does it ; and how he came to be able to do it ; and why he has fingers to do it with, while his dog has none ; and what it all means. So the medicine-man of the long-ago time had wondered very much why he should be allowed to turn a branch upside down after God had made it upside up. And he had said : "God is like a Father, who lets his child play with His things ! I must be a real son of the Unseen Maker of the branches !" But the other men of his tribe had not understood that a clever man could be serious and joyful over so simple a thing as turning a common stick upside down ; they had thought there must be something miraculous in the particular sticks of the medicine-man. And they had invented a false notion that the man who showed the forked branches was a son of God because he was unlike other men ; and that the sticks he held possessed magical powers. So when the new teachers came saying, "I and all men are sons of God ; we can make roundness come in water as God makes it come in fruits," the tribe said that nobody could be a son of God except the man of the forked sticks, whom their great grandfathers had known ; and, moreover, that this new religion was a shockingly blasphemous one, because nothing so worldly as apples, or ripples, or water, or the sun, could have anything to do with religion. True religion, they said, meant believing in the sacred forked sticks, and never had meant, and never could mean, anything else. So they persecuted the new

medicine-man, and tried to kill him. But he escaped out of their hands and hid himself in the depth of the forest.

After a time he found his way back to his own tribe. Alas! they were in sad confusion. They were all trying to teach their children to believe in roundness, but what roundness was they could not agree upon. One part said that roundness is something shiny and hot; another that it is something wet and cold. Some said that it shines, but only at night. Some said that roundness is good to eat; others thought it was a poison; some said that it has healing virtues when taken from the hands of an inspired medicine-man, but is deadly poison if administered by anybody else; others again averred that roundness is a god which dwells within a medicine-man, and makes him the equal of God. And the two women who had been ill swore that they had seen roundness coming forth from the mouth of their beloved healer; that it had rays like the sun, and a mild radiance like the moon; that it had touched them, and felt soft like water, had cooled their aching heads, and washed away stains from their hands; and that they had heard it uttering wonderful words of consolation and prophecy, foretelling that they would feel better in three days; which very thing, they said, had happened, exactly as the roundness foretold when it came forth from the medicine-man's mouth.

From all this conglomeration of nonsense, the wise healer gathered one true idea, viz., that it is very difficult to make ignorant people understand correctly either scientific notions or inspired Truth. He retired to the woods, and spent his time in meditating on the marvel of abstract roundness; and in comparing it in his mind with the other marvel—man's power to turn upside down the things which God makes grow as He wills. When he felt very low-spirited, he used to take a forked stick in his hand and say to himself: "I found it growing *this* way, and God lets me turn it *that* way; even so shall the stupidity and ignorance of my tribe be upset in God's good time." Holding the stick upside down in his hands seemed to strengthen his faith by bringing him nearer to the thinker of the long-ago time, who had been so misunderstood by his own people; and whom he, the thinker of an alien tribe, had understood, at last!

And one day, while he held his stick in his hands, a brilliant idea shot into his mind, which he proceeded at once to put into execution. He tore from a tree a strip of bark, and stuck a long thorn through each end. Carrying in his hands this precious instrument, he returned to his tribe. "Now, my brothers and sisters!" he cried, "I will show you how to make roundness. You need never disagree again about what it means; because I can show

you a revelation (that is to say, an unveiling or explanation) of roundness." Then he stuck one thorn in the earth, and scratched a circle with the other.

The savages were puzzled. They did not see the use of scratching up the earth, except to find roots or grubs. But they did it because the healer wished it; and they wished him to remain among them.

After his death they continued to do it, at first from affection, afterwards from superstition. In the course of time it got to be an accepted doctrine that "religion" means scratching the earth with a thorn; that "roundness" is a mystery which no man can understand or ought to inquire into; and that "revelation" means two thorns and a strip of bark. And mighty wars ensued, caused by difference of opinion as to what length of bark and what species of thorns constitute a true revelation.

But in spite of the wars, or perhaps because of the wars, the practice of drawing circles became a popular religious exercise. And at last somebody found out what the medicine-man had meant to explain: that a circle is at one uniform distance from its centre. And that was the beginning of the science called Geometry.

The other tribe continued to do their religious exercises by turning forked sticks upside down. And at last someone understood the meaning of the action: that man has the power to learn by inverting the order in which things are presented to him in Nature, by putting unity where he found division, and division where unity was. And that was the beginning of the science called Logic.

Or, at least, such may have been the case, for all that anybody knows to the contrary. If the two great abstract sciences of Mathematics and Logic did not originate exactly as I have described, they must have arisen in some not very dissimilar way.

III

OUT OF EGYPT HAVE I CALLED MY SON

When once people had found the open doorway into the Kingdom of Logic, they grew so clever and wise, that no tyrant could make slaves of them. Wherefore the rulers said: "We will not let the people learn Logic any more, or else we shall have no slaves." But the people had become accustomed to learn Logic as part of their religion; and they were furious when the forked stick was not brought forward at religious festivals. So the magicians said:

"Let us deceive the people; let us give them Logic-sticks; but let us teach them fables about the meaning of the sticks."

So they brought to the festivals forked sticks that had funny thorns sticking out in many directions; and they said: "This stick is sacred because it represents the horns of a beetle; and that one is sacred because it looks like the legs and tail of a monkey." The foolish people at last grew to believe what they were told; and they left off learning Logic; and they grew stupid, and the tyrants took them for slaves. (See Note at end of this article.)

But at last there arose a terrible and mighty medicine-man. And he said to the magicians and priests: "You wicked deceivers, how dare you lift up before the Lord your ridiculous misleading tools? My forked stick is straightforward and plain, it has no horns or tails to frighten silly people; it means Logic and Science, not sacred monkeys and beetles; and I will shew you which sort of stick will turn out master in the end. Anyone who likes may come along with me; and we will have a country of our own, in which there shall be no slaves, because there shall be no sacred monkeys or beetles; every man shall be priest, because every man shall know Logic and Science for himself."

So he took those who followed him away from the priests; and he found a road, by his science, through the desert and across the sea; and he made all the people learn how to choose wholesome food, and to wash themselves, and to take a thorough rest once a week, and to trust in the Creator, whose children they were, and not in any things that were created. And all the tyrants of the earth have hated that religion, but it lives and prospers to this day. And perhaps in memory of the forked sticks which their forefathers held upside down to show how man is a favoured child of God, or perhaps in memory of the bark-and-thorns with which circles were drawn, this same tribe still holds up, every Sabbath, two sticks joined at the top by a scroll, whereon is written out plainly the story of deliverance from the land of bondage and from the priests of false religion.

There is written on the scroll a quaint fairy-story about how the rod of the good medicine-man swallowed up the rods of the wicked magicians; which, of course, is meant to show that truth swallows up every sort of cunning and humbug. But there are people who try to make out that the old fairy stories actually happened, and that sticks turned into snakes and ate each other! Fairy stories don't really happen; they are meant for parables, to make holidays pleasant for children.

All forms of Art may be dedicated to the service of God; but only for so long as they are not allowed to lead men away from

Truth. And if we persist in believing in pretty fables instead of Truth, we run risk of being prevented from writing and reading fables at all; just as Moses prevented his tribe from making beautiful statues of Mystery and Wisdom, like those which great artists had made to ornament the approach to the Temples, but which silly Egyptians mistook for real gods.

The People of the Scroll have a pretty old custom. Before they take their scroll-and-sticks out of the cupboard in which it is kept, they sing a hymn * about how the Law of God and the Word of the Lord came from the Eastern City where their forefathers used to live. This makes people think that the "Law of God" means two sticks and a scroll; and that the "Word of the Lord" means letters on a scroll. Also some fancy that nobody ever had a right to deliver man from bondage except the medicine-man who lived so long ago, and who showed the wicked magicians the proper way to give Logic lessons. But sensible people know that the "Word of the Lord" is written, not on scrolls, but on the hearts of honest boys and girls; and that every man has a right to deliver his own family, and as many more people as will listen to him, from bondage and tyrants and false priests, in the name of God and of good Logic; just as the great medicine-man, Moses, did thousands of years ago.

NOTE.—An objection has been made to my presentation of the Branch Ritual, because ancient documents prove that Ritual to have been, at various times, connected with fleshly and sensuous religions. It certainly was so. Those who consider that fact a disproof of my view must have approached ancient systems from the outside, and with minds saturated with European ideas of classification and distinction. The true line of cleavage between good and evil, in religion, lies, not between this and that ritual, but between the simple and the perverted use of the same ritual.

A water-dowser taught me the traditional method of cutting and handling the forked Divining Rod. Without entering into the question of the effect of the Rod on the dowser's power to detect water, I have little hesitation in affirming that the process which I saw was the remains of some ancient and solemn ritual. I went through the performance repeatedly with the Hazel, as instructed by the dowser, getting a collection of plain forks. I then tried the experiment of cutting, on exactly the same method, forked sticks from all the trees and shrubs in the district. When I had taken off the leaves as directed, I found that I had produced a collection of

* "From Zion shall the Law go forth; and the Word of the Lord from Jerusalem."

things, some of which suggested horns of beetles, of oxen, and of stags ; others might represent monkey worship and other absurd and evil religions.

This experience illustrates how easily the symbols of a pure religion may slip over into symbols of degrading idolatry ; and how unwise it is to treat an ancient ritual as, in itself and necessarily, bad, only because priests have perverted it. It should never be forgotten that Adonis, the god of wasteful, sensuous pleasure, is the same name as Adonaï, the Fertilizer-Inspirer of the Hebrews. Pan, the horrible satyr, is "The All," the Unity of Nature, identical with the "I am, the Unity," Who delivered Israel from bondage.

The whole reform in the teaching of Arithmetic and Geometry, now in agitation, depends essentially on whether pupil-teachers can be got to understand that the chalk in the teacher's hand becomes, at a given moment of the lesson, a revealer independent of (and, for the moment, superior to) the man who holds it ; a Teacher of teachers, King of kings and Lord of lords. Yet how easily that essential doctrine of Mathematics slips over into the slavish ideas which ignorant people connect with the so-called doctrine of Transubstantiation ! And how wisely did the English Church decree that the "Transubstantiated" bread shall be eaten at once and not *preserved* as sacred ! We do not wish our children to attach superstitious ideas to the chalk when once the demonstration is over ; but if there is to be any vital reform in method, we must make the young teacher realize that, for a few moments at each lesson, he and the chalk change places, and the chalk, not he, is the true intermediary between the Unseen Revealer and the class. We cannot continue to boycott all vital Mathematics, just because stupid people have talked grovelling nonsense about the doctrine which is its essence. It has, therefore, become a matter of primary importance to familiarize the imaginations of children with a dual presentation of "religious" Truth—the truth itself, and the grotesque perversion of it by superstitious priests in the pay of tyrants.

IV

HOLDING UP THE LEADER'S HANDS

Two children are supposed to be watching at a distance the battle described in Exodus xvii.

Joseph :

The Leader is flagging ! Oh dear ! oh dear !
Now what will the People do ?

There's no one to help him ; and what will become
Of mother and me and you ?

Miriam :

Mother told us, on Sabbath, that Israel's shield
Is God, the Eternal, Unseen.
He sent us our Leader ; He saved men of old,
Before preachers or prophets had been.

Joseph :

But see, my dear sister ! the Leader's weak hands
Are dropping the Sacred Rod.
That must be upheld ; for so we were told
By Jehovah Himself, our God.

Miriam :

It must be upheld ; and, of course, so it will ;
For see ! where the Leader stands,
There stand now beside him two sturdy friends
To hold up his weary hands.

Joseph :

But Aaron and Hur are only mere men.
We could trust the Great Leader through all ;
But they might mistake ; and oh ! if they should,
Then the Sacred Rod might fall ;
Might fall in the dust, and be trampled down ;
And perchance be broken in two.
Then all would be over ; and ruin would come
To mother and me and you.

Miriam :

Don't be frightened, dear brother ; the Great Leader's Rod
Was cut in the coppice, close by.
There is many another where that came from ;
We can find them ourselves if we try.
If the prophets should fail him, the Great Leader's work
Would be left for THE PEOPLE to do.
If there's nobody else, then God will make use
Of Mother and Me and You.

V

GREETING THE DARKNESS

A beautiful bird has been flashing
  His great white wings in mid air,
Bringing knowledge that men had gathered
  Through ages of toil and care.

But now there is something looming
  Between us and the glorious Light ;
It is darkening all the horizon !
  Oh ! the awful wings of the Night !

Great blackness of night ! Whence com'st thou ?
  From regions of gloom and chill ?
Bringing whispers of sickness and sorrow ?
  Bringing visions of terror and ill ?

Ah ! fear him not ; for his pinions,
  Though dusky, are soft and warm ;
The Formless now brooding o'er us
  Is *Love* without limit or form.

Day sends on to day the record
  Of the learning our teachers had stored ;
But night after night, in the Darkness
  We are left all alone with the Lord.

Those great black wings enfold us,
  Shutting out sound and sight.
Oh ! Silence, how full of wonders !
  Oh ! Dark that prepares for new Light !

No Angel or Saint is needed
  Our homes or our hearts to guard ;
For Love, the I Am, the Eternal,
  Keeps over us watch and ward.

From men we can learn no more lessons
  Till a new day shall bring us new Light ;
We are going to God in the Darkness ;
  Dear father and mother, Good-night.

VI

BLIND GUIDES

Motto : Blind guides strain out a gnat and swallow a camel.

About forty years before the rising of the Maccabees, a Hebrew nobleman was pondering over the problem : How should he organise the education of his only son ?

The times were difficult. The influx of Greek learning and ideas was destroying much of the true Jewish life ; and, as a natural consequence, the recoil against Hellenism was creating in the minds of pious Jews an unwholesome tension on the mere details of old Jewish customs. This again tended to make the religion of Israel contemptible in the eyes of Greek teachers and their pupils.

The child of whom we are speaking was one of rare promise ; and the father desired to do the best possible to develop his intelligence. After much deliberation, he decided that each secular subject should be taught by some Hebrew, skilled in the newest Greek methods, but not prominently accused of heterodoxy in religion. For a teacher of Hebrew Literature and Religion he at first thought of choosing some Rabbi of unimpeachable reputation for orthodoxy and zeal. He reflected, however, that any hyper-orthodox Rabbi would probably feel it to be in the line of his duties to protest against the introduction of Greek books and sculptures ; and the father was by no means minded to confine his boy's knowledge of Science and Art to the amount permitted in the old Jewish schools. Even for the sake of the boy's religion itself, it would be well to avoid raising any discussion around him as to what he should be permitted to learn.

There lived in the neighbourhood an old Poet, the author of several Hymns. This dreamy and gentle old man had been accused of laxity in certain ceremonial observances ; but he was essentially pious and God-fearing ; and lax rather from absence of mind than from indifference to religion. He became, occasionally, so enraptured in the contemplation of the beauty of Mosaism as a whole that the details escaped his memory. His Hymns expressed, in simple language, a passion of devout feeling ; his style was wonderfully pure and strong ; and he had that faculty of on-sight which is the product of deep insight combined with utter sincerity. Indeed, there were those who said that, had he lived in earlier days, he would have been spoken of as one of the Prophets. Moreover, though he knew little of such special branches of Science as were

then in vogue (Geometry, Astronomy, and a rude kind of Chemistry) he was filled with the true spirit of natural Science ; with the consciousness of a common life pulsating throughout Creation ; of which life the tendency of Poets to write rhythm is as much an expression as is the sequence of the seasons, or the rhythmic beating of the human heart. He was kind to all who were helpless and oppressed ; and, above all, the child loved him. Therefore, the father asked the old Poet to undertake the instruction of his child in the History and Literature of his Race. That the influence of such a man would be of use in promoting the comprehension of secular subjects was perhaps not likely to occur to anyone in those days ; but he could at least be trusted never to interfere with what he could not understand.

When the boy was about eleven years old, several of his teachers spent a Sabbath afternoon in the garden attached to his home. At a pause in the conversation the mathematical master asked the boy of what he had been thinking so intently.

"I was wondering," he replied, "why we use the word radius in the singular ; because there cannot be one radius ; there must be two wherever there is one."

Geometrician : "How do you make that out ?"

Boy : "The other day the drawing-master had been showing me how to adjust the distance between my pins to the length of my thread so as to get the most beautiful species of Ellipse ; and, after he had left me, the fancy took me to try what would come of putting the pins nearer and nearer together till at last they were close together ; and then I saw that I got a Circle. So a Circle is an Ellipse with its two foci got together ; and its radius is a double thread ; and—I am puzzled—I do not see why Geometry lessons and Drawing lessons are so different."

Geometrician : "My boy, you are indulging in foolish speculations. I fear" (added the Geometrician, with a momentary and perhaps involuntary glance at the old Poet) "I sadly fear that you have been under some misguiding influence. The Circle belongs to Geometry lessons ; and should be drawn with a pair of compasses. The Ellipse belongs to Art ; and should be drawn either by your fancy or with two pins. It is indeed possible that you may have drawn an Ellipse which looked like a Circle ; but beware of being misled by apparent likenesses. Boys cannot judge of these things ; they should be careful to study each thing from the point of view prescribed by their teachers. Your masters will guide you safely ; each will show you the proper manner of approaching his special subject. If you study on lines of your own devising you will not make progress nor become a truly learned man. Our conversa-

tion, however, seems tending to disregard of the Sabbath ; let us cease it."

The Poet started, and became confused. He had been, during the greater part of the conversation, gazing at the faint, pale crescent of the moon. Then he had stopped, and, taking up a stick from the ground,* had drawn with it, on the earth, first an Ellipse, then a few lines resembling in miniature those used by children to mark out the ground for a game popular at the period.

When the Geometrician took leave of his host, the Poet rose to accompany him ; and the following conversation took place between them on the way home :

Poet : "We are puzzling that child between us ; and I felt I should like to try to come to some understanding with you."

Geometrician : "If everyone minded his own business there need be no misunderstandings. I have never interfered with your lessons on versification."

Poet : "Nor have I interfered with my pupil's ideas of Geometry. That, indeed, would be still more out of place ; for your literary attainments are considerable, whereas I know very little about Geometry. If I have done any harm, it was in this way. One day that the child was copying a Greek ornament, I could not help saying to him that so much beauty could not be generated by mere skill ; and that I felt as though the threads he was using must represent the lines of some living force ; and the curves he was drawing must picture the track of some mighty event. It was only a feeling, for which I could give no reason ; and doubtless it was injudicious to give vent to it before my pupil. But surely I have heard that the Ellipse has been discovered to be subject to mathematical law ? You seemed to imply that the boy was mistaken in suggesting a connection between Ellipses and the lines with which Geometry deals."

Geometrician : "All the sections of the cone are subject to some sort of mathematical law. But such things should not be suggested to children. The best Greek text-books on elementary Geometry avoid all reference to any curve except the Circle.† The Circle is the perfect form. It is fatal to scientific method to set pupils investigating imperfect and variable forms before they have mastered all that can be taught them of perfect forms. Besides, the knowledge of the Circle is important ; because the heavenly bodies move in circular‡ paths. It is dangerous, and methinks

*According to Jewish regulations, any subject may be talked of on Sabbath provided the conversation be decorous ; but handling a stick and writing or drawing are strictly forbidden.

† Euclid deals with no conic section except the Circle.

‡ This was the Greek idea.

almost impious, to set children trying to find a mathematical reason for the vagaries of Artists instead of studying the facts made by the Creator."

Poet : "Yes, if it be sure that the heavenly bodies move in Circles the Ellipse must needs be the less perfect form. Yet it seemed not so to my feeling. A body that moves in a Circle is always at the same distance from some fixed point ; is any thing in Nature really always at a constant distance from any other thing ? However, the Astronomers know best, and my feeling was, doubtless, quite mistaken. Still, you confess that there is a connection between Ellipses and the curves with which Geometry deals ; and you certainly made the child believe that there is none. Surely it is contrary to Religion to suggest to a child the thing that is not, even for the purpose of fixing his mind upon his studies."

Geometrician : "Religion ! Those who wish to show respect for religion should begin by keeping Sabbath. It has been said that your allegiance to the faith of Israël is less firm than might be desired ; but surely you do not go so far as to deny the duty of Sabbath observance ?"

Poet : "Nay, friend ! The Sabbath is most holy ; and I erred grievously.* But it was in abstraction and forgetfulness, being absorbed in listening to your conversation, and in following up in my mind the thoughts suggested by it. No wonder our pupil is perplexed ; for I confess that your remarks pained me, especially being made on this sacred day of rest. For the Sabbath is dedicated to Him of Whom we say that His first attribute is Unity. Therefore, even the act of tracing a line on the earth may be no more serious a breach of the Sabbath than it is to insist on keeping up, on the day of rest, those artificial barriers which men invent to facilitate secular study and the gaining of worldly ends."

Geometrician : "I do not understand this strange doctrine ; it sounds to me both mystical and irreverent. The religion of our pupil, however, does not concern me ; you are responsible to his parents if you put into his mind the ideas which you seem to have borrowed from some heathen mystic, and so cause him to swerve from the Law revealed to our fathers. My concern is with his intellectual advancement ; I fear that you will ruin his career. Mark my words ; I predict that he will not, henceforth,make such rapid progress as he has hitherto done."

The prediction seemed, at first, only too likely to be realised ; the boy's keen intelligence became mysteriously blunted ; and soon his health also began to fail. The father was in sore distress

* By drawing on Sabbath.

at the threatened failure of his hopes. The gentle Poet, mindful of the Geometrician's warning that his influence over his pupil was a source of distraction, was careful to confine his intercourse with the boy strictly to the hours fixed for lessons and to the subjects which he was engaged to teach. If, in reading Psalms, he was prompted to lay impassioned stress on every passage which declares that the Creator of heaven and earth is the God of Israel, he did so without intention, and almost without consciousness that he was doing it.

But at last, at the child's request, the father arranged that he should spend a day in the country alone with his favourite teacher; and then he poured out to his friend what had been weighing on his mind.

VII

HARD LESSONS MADE EASY

I have more understanding than my teachers, for Thy testimonies are my study.

The boy began : "My lessons puzzle me ; they do not seem real. *Why* is it wrong to speak of a Circle as if it were a sort of Ellipse ? I cannot understand these distinctions ; they puzzle me and make my head ache. Geometry and drawing and music and poetry and flowers seem to me like the same thing seen through differently shaped holes ; at least it is not a *thing ;* it is—I do not know what it is. Sometimes it frightens me ; and yet I feel that, if I could reach it, I should get well, and sleep and not have headaches. What is it that I see through all those holes ?"

Poet : "I think that, if we lived in the days when there were prophets, they would tell you that what you see is what Moses saw on Mount Sinai."

Boy : "But Master ! Moses was *inspired* ; and he saw—is it not said that he saw *the Eternal* ?"

Poet : "Do you mean that Moses was inspired to tell the Beni-Israel* that God has nothing to say to them ?"

Boy : "But surely you cannot mean that God is speaking to me when I see things differently from my teachers."

Poet : "Moses saw a good many things differently from his teachers ; and he wished that every Israelite should be a prophet of the Unity."

Boy : "But Rabbi Ezra says that those who trust to their own inspirations now-a-days, and who talk of God speaking to them,

* Children of Israel.

are heathens and sorcerers and false prophets ; and my father says that they are always ignorant ; and often mere impostors and thieves."

Poet : "I can well believe that those who trust to *their own inspirations* are misled ; and that they mislead others. But the Unity cannot mislead. No good ever came of distrusting Him. Those who trust Him renew their strength like the eagles. Suppose you try that medicine, my child. If you did so you could take your lessons more lightly and they would not distract you so much, because you would not be trying to find a serious reason for distinctions that are mere matters of convenient arrangement. Why should you object to divisions and classifications among curves or any other subject of study ? Treat them as you would the lines which boys draw on the ground in their games. An honourable boy keeps the rules of the game strictly and willingly ; he has no temptation to cross the mock barrier in any manner which contravenes the rule. Why should he ? When the game is over, the restriction will lapse ; and there will be an end of its power to hamper his freedom. Meantime the game has been good exercise and discipline for his limbs—all the better, the more strictly he has kept the rules. Try to acquire the habit of thinking, on Sabbaths and Festivals, about the likenesses between those things which, on week-days, you study by different methods. It pleases the Great Unity to send us out to school on week-days ; obey as a good son should. On the Sabbaths and Festivals come home to Him, like a child to his Father's house."

Boy : "That is like what the Rabbi Ezra says : that there is for each thing an appointed and fitting season ; day for study, night for sleep ; six days for labour, one for rest ; and you mean. . . ."

Poet : "I mean that worldly hours are for specialisation and distinctions, for attention to detail ; and that sacred hours are for the unification of contrasted ideas. Unification of contrasted conceptions is the true preparation for repose in meditation on The Inconceivable Unity ; and therefore the true preparation for Sabbath and the best occupation of the last hour before sleep.

"Stay ; let me give you a Logic lesson, such as used to be given in the old days when there were no Rabbis and no Scriptures ; when the Logic of the Greek Schools had not yet arisen ; and when the Beni-Israel had neither schools nor books of their own.

"Look at this tree. You see that the branches divide as they grow upwards. The fibres which, here, live within the same bark-case, a little further up are enclosed in separate bark-cases. It must be so ; separation is, in all things, a necessary part

of growth. In the tree, the separation, once made, is permanent; what has been divided does not grow together again, unless, indeed, it is helped to do so; I once saw two branches of the same tree which a gardener had grafted together; and accident may sometimes produce the same effect The tree is, in this matter, the mere slave of chance. But man's mind is made in the Image of God, in Whom is re-united all that has been divided. The Law of Separation, which is the master of the tree, is our servant because it is the servant of our Father. Therefore wise men of old, when they wished to teach people to feel themselves sons of the Unity, used to cut from a tree a branch that had divided, *so*, and they turned it upside down, *so*; to show that man,* the child of God, can reverse the Lines of Separation. And the tradition of Passover tells us that when the progress of our fathers towards freedom was hindered by difficulties, a way opened before them as soon as Moses held aloft this symbol of re-union after division."

Boy: "May I have it in my own hands, Master? Ah! now I see! As long as our teachers are keeping things apart in our minds, we are only growing tall and big and fruitful, like trees; we are like trees which the Lord has planted, as Rabbi Ezra says all Jewish children ought to be. But we are something besides trees; and, therefore, we ought not to grow wooden and stiff; because we are not really trees, but the Beni-Israel. And, therefore, we are allowed, on Sabbaths and Festivals, to upset the whole arrangement, *so*; to make a fresh arrangement for ourselves; putting unity where there was division and division where there was unity. I quite understand now, Master. But why are we not shown this at Passover, when our parents tell us how Moses brought the People out of bondage?"

Poet: "Our rulers have for some time past abolished the use of Natural Symbols in public teaching. They wish to encourage learning; and think it better that people should not be distracted from the study of books by playing with what seem to them mere toys. Also, trouble has been caused by Egyptian impostors, who pretend that handling these objects imparts to them magic powers. Moreover, many forked sticks, when stripped of their leaves, present a likeness to the horns of rams or of beetles; or to other portions of animals or men; and, in fact, resemble those carvings which, as you have heard, the heathen hang up in their temples, either to promote idolatry or to provoke unseemly laughter. Therefore, in order to preserve solemnity and decency in public instruction, our rulers long ago forbade the use of any Geometric

* This ceremony is still performed by miners, and is said to be the very one traditionally handed down from very early times.

toys except such as were cut from some tree whose branches divide in a clean even fork.* But it was difficult to get this wise rule observed. Teachers were fascinated by Nature's strange variety of form ; and forgot that what to them were mere suggestions for Science and Art, might be degrading to the masses. Therefore, it was decided to discontinue altogether the use of twig-symbols. We lovers of Nature are being punished for our indifference to the moral welfare of those more ignorant than ourselves ; natural Science is fast being swallowed up :† even as tradition tells that those were swallowed, who made use of public worship to excite the people by burning incense mixed with enervating and intoxicating drugs. The good King Hezekiah was obliged to destroy even the brazen serpent, said to have been made by Moses himself, when it was found to pander to idolatry.

"But alas ! books also can be misused ;‡ and become objects of an idolatry as degrading as the worship of Nature's sacred sticks and stones. The study of books and that of natural Symbols seem to me to contain the proper corrective of each other's dangers ; each, separated from the other, slips downhill towards degradation and narrowness."

Boy : "Master, why do you not tell these things to all our People ?"

Poet : "They would not listen to me, my child ; they would think me dreamy and unacquainted with practical life. There will surely arise, some day, one who, seeing what I see, will possess also much technical information which I lack, and who will speak with the authority given by knowledge. He will be despised and rejected by his own generation, of course ; such is the fate of all who dare to see farther than their fellows. But Truth will prevail in the end. There must come a time, at last, when Israel will look back on the long record of rejected prophets and wasted treasures ; and see that officialism is costing more than it is worth. Then it will be manifest that there is no safety in any form of mere negation, no sure anchor of Hope except the Light that lighteth every man ; that lack of trust in The Unity is a greater danger to society than any special aberration can be ; that official meddlesomeness and the over-caution born of fear are more fatal hindrances to progress even than lawless irreverence. Then the Beni-Israel will

* This is the characteristic of the Hazel, the Ash, the Mistletoe and especially of the Olive, in fact of most "Sacred" trees of the world.

† This was the case in Palestine ; and the Christian movement was, to a large extent, a recoil against the neglect of Nature and the worship of books. In this day Natural Science is having its turn of undue pre-eminence.

‡ So can the microscope and the scalpel ; or any other portion of educational apparatus.

raise once more the standard of Moses, and proclaim the right of every child of man to be a prophet of The Unity, even as Moses was.

"But I am puzzling you, my child; these things are beyond your comprehension at present. When you are older, I hope that you will join the Society of the Free-Geometricians ;* you will find in use among them many symbols of the Unity of Nature which have been discarded from the schools. Meantime, make this Sacred Symbol of mental freedom, so loved by the greatest of Leaders, the companion of your thoughts. Refer to it at each successive stage of your development, and whenever your way seems to you blocked by difficulties. You will understand its lessons better as you grow older. Never forget that, though trees are the mere slaves of Law, you are the Son of the Lawgiver; and may be, if you will, the Heir of His power. God gives to us all things freely both to understand and to enjoy. The only limitation imposed on us is that of Time; we must do each thing at its fitting season; and wait for each order of union, till its appointed time be come."

Boy: "But Master! can it be that God has no care for other creatures than men? I know, for you have often told me, that other nations are as much God's children as the People of our land; there is no difference between us and them, except that Moses told us more about The Unity out of Whom our souls are made than other nations know. But surely it is not only men that He cares for? That young ass that my father gave me; he is my servant and must do as I bid him; and yet I cannot feel that he is nothing but a slave; because I cannot help loving him when he feeds from my hand. And you know that God said that I must not ride him on Sabbath. But you speak as if trees were not children of God at all; only things which He made for us to use. Is it possible that He could make them so beautiful if He did not care for them? When I have drawn a very beautiful curve, I love it even more than I do my ass; I could not make it right if I did not feel that I am caressing it and that it is talking to me. Could God make the lines in this Lily so beautiful unless He put into it some of His Love?"

Poet: "The trees keep no Sabbath; but we keep it for them; we may not pluck their fruits on that Holy Day. Moreover—well, you cannot understand that now; some day, when you know better what fatherhood means, when you have little children of your own to love, watch patiently the golden heart of a Lily and try to find out whether Our Father has given to it any share of His Life of Love."

* Free-Masons?

Boy: "If all things reveal God, why is the Law of Moses specially sacred?"

Poet: "Ah! that was what I was warned of; that I should lead you astray into mystic dreams. It is true that the heavens declare the glory of God and that all beauty showeth His love. All Nature is full of instruction. Every line on every leaf is a word in a love-letter written by The Unseen Father to His children. But that letter is too long for us to read in this life; and we become confused with its wealth of wonders. Beware lest you lose the sense of sequence in your own development. All things were made by Our Father; but not all things reveal Him with equal clearness to man. Whatever else you fail to find time for, learn at least the Law of your own life; the most important of all lessons, for us, is to distinguish truly which attributes of Our Father we should cultivate first in order to grow like Him. God was in the world from the beginning; and the world was made by Him; but the world knew Him not.* Then He came to His own chosen child, the soul of man; but His own received Him not. But as many as received Him, to them gave He power to become the very sons of God; souls that were not moulded by the will of man, but received their life direct from God. No man hath seen God with bodily eyes; but the true sons of God can, nevertheless, declare Him as He is.

"And for you, my dear pupil, may you some day know more of Him than your old master can tell you. Your greatest danger will be the temptation to drift into self-absorbed dreams. May God strengthen you to remember that, whatever Truth He reveals to you, you hold it in trust for mankind. When you have found for yourself the consolation of Israel, forget not to strengthen your brethren."

Had the Geometrician overheard this conversation, he would, indeed, have considered it mystical and dangerous; and certainly quite beyond the mind of a child. Yet the boy's health and intelligence began to revive after it; and with them his interest in every department of his studies; especially in Geometry and Astronomy. He became one of the most original mathematicians of his time; and Greeks came to him for instruction. He was a friend and ally of the Maccabees; and is supposed to have perished in the struggle for the freedom of his People.

*As I believe the first few verses of St. John's Gospel to be a summary of previously existing ideas about the Unity, I have not scrupled to put a portion of their teaching into the mouth of an earlier thinker than John.

VIII

THE CUTTING OF THE MISTLETOE

Scene : Epping Forest.
Persons : Druid, Assistant Druid, Prophetess, Chorus of People.

In the middle of the stage, a tree on which grows the Mistletoe. On one side of the tree a small fire is burning. The two Druids and the Prophetess stand between the tree and the fire. Near them, but further from the tree, stand the rest of the people.

Exhortation by the Druid

Faithful Britons of the true Religion !

You know that the Romans are gaining ground in this, our loved country. Never would our land have fallen into the power of these impure barbarians had all our tribes been faithful to the One true Revelation. But, you know it well, the greater number of our people have fallen away from the faith revealed to our fathers. They have forsaken the Great Father, of whom our blessed Founders told ; and paid worship to stones set up by wise men of old to make observations on the stars. They have profaned the memory of our founders, the healers, the teachers, calling them gods, though they witnessed of the unseen God ; and offering to false images of them sacrifices of torture and blood. They have profaned the solemn ceremony of initiation, the dedication of youth to a life of purity by passing over flame ; pretending that God could be pleased by the actual burning of human flesh. A traveller from the West has told how in his country some wise man ordered that infants should be dedicated to justice, by being laid under the symbol of justice, a stone of even balance ; and now mothers expose their children under the balance-stone to perish of hunger and cold, believing that the birds who feed prophets with wisdom are cruel ravens, and that God wills them to be fed with the flesh of tender babes. We have never seen the balance-stone, nor do we know the ceremony of dedication to justice ; yet we sing of the sacred Logan, because the true worshippers of the Father should everywhere protest against the profanation of any rite which He has anywhere ordained.

Some, we know, have mocked the ceremony of divination, cutting impure branches from forbidden trees whose roots are in

the earth. Others have profaned the very Mistletoe itself, the sacred symbol of Inspiration, making before it senseless supplication and asking it to alter the laws of Nature, though it teaches how man can know and use those laws. They have profaned the symbolic kiss of brotherhood given under the Mistletoe, making it an excuse for impure orgies.

Wherefore we are punished by God. The brutal Romans, who know of no Unity except the visible unity of Roman rule, have been faithful to such truth as they do know. Therefore power has been given to them for a time to oppress and destroy the unfaithful servants of the Invisible Unity. But let us, the servants of the true God, show our fidelity by joining in the most solemn ceremonial of our faith. Attend to the sacred rite, and may it be our guide in life and our support in death.

(*He points to the tree.*)

Separation, division, seem to us evils; but if we could see truly, they would not appear so. Look at this tree; repeated divisions are the means of its growth in beauty. All things are subject to separation in order that all things may grow. All things must obey this law. Therefore the legend tells that even the sun, whom no spirit could injure, turned downwards when he was shot with an arrow made of the forked Mistletoe.

(*He holds up his knife.*)

Man is the son of God, and heir of his power. I hold in my hand the instrument of separation; and can cut a branch from any tree that grows.

Man is lord of all created things; therefore I fear not to cut this branch, though on it grows the sacred Mistletoe.

(*He cuts the branch on which grows the Mistletoe, letting it fall into a cloth held by the assistant.*)

This doctrine grew not on earth; it was brought mysteriously from on high. Wherefore the symbol of our faith is no tree that has roots on earth, but the Mistletoe, whose seeds are brought no man knows whence, and which grows not if sown by man's hand. This doctrine is very sacred and pure; and may not be altered, even by the Arch Druid; in token whereof the bough was cut into a napkin that the berries might not be soiled by the touch of my hands.

This is the only supernatural truth, and must be held in esteem above all truths. Other truths are discovered by our natural faculties, but this was revealed from on high by the direct Will of our Father. All evil magic and sorcery come from confusing natural

truth with that which is supernatural. The only supernatural truths are : That God can reveal the law of continuity, and that man, who is made in the image of God, can master the law of separation. In token of the pre-eminence of supernatural Truth, this branch is raised above the heads of us all.

(*The assistant raises the cloth containing the branch.*)

Now, my brothers and sisters, join your hands, and sing the song of Odin's Birds.

(*The chorus forms a ring round the tree, fire and Druids, join hands and dance round singing. At each refrain they stop dancing, and clap hands.*)

Oh ! the Mistletoe Bough !
The sacred Mistletoe Bough !
Oh ! life is sweet and death is safe
Under the Mistletoe Bough !
Our leader Odin has taught us
Whence comes the Mistletoe-lore ;
Wherefore let us give thanks to Odin,
And praise him for evermore.
(REFRAIN, BIS.)
Oh ! the Mistletoe Bough !

The birds of the air are bringing
The seeds of that knowledge for man ;
Nor land nor toil it costeth :
Let us reach it whenever we can.
The spirit bird is singing
The secret in one ear ;
Oh ! list to its gentle whisper:
Its voice is low, but clear.
Oh ! the Mistletoe Bough !

But who is this that is calling
So loud on the other side,
And telling us wonderful stories
Of the sacred olden tide ?
The Saga-bird is telling
How the Asas through dangers came,
Led by the glorious Odin,
Blessed for ever his name.
Oh ! the Mistletoe Bough !

Ah ! sacred birds ! you confuse us ;
  Your voices will not agree.
Or is it that we are too feeble
  And catch not the harmony ?
You taught your secrets to Odin,
  And to him they seemed all one ;
For his heart was strong and faithful :
  It had bathed in the glow of the sun.
    Oh ! the Mistletoe Bough !

But we can hear but dimly,
  And the birds are singing too fast ;
We will trust to our leader Odin
  To show us the truth at last.
Oh, Odin ! Teacher and Healer !
  Our Shelter and Saviour art thou ;
The tempest of life is arising :
  Guide and deliver us now.
    Oh ! the Mistletoe Bough !

The old Logan-stone is rocking !
  The wild bird sways on it free ;
But, alas ! for the helpless infant
  That cries for its mother's knee !
Many fond ties have been broken,
  Many true hearts have been sore ;
But the Mistletoe Bough is the promise
  Of a love that shall last evermore !
    Oh ! the Mistletoe Bough !

Druid : This doctrine makes all men brothers, and keeps human affection holy and safe. Therefore give each to each the kiss of peace under the standard of our most holy faith.

People (Singing).

Come, brothers and sisters, join hands now ;
  And kisses exchange ere we part ;
For the love that the Mistletoe blesses
  Can sully no innocent heart.
Oh ! we are children of Odin !
  And all things that grow are our own :
Even the sacred Mistletoe
  We cut from her leafy throne.
    Oh ! the Mistletoe Bough !

(*People exchange kisses. The assistant then lowers the branch.*)

People Singing.)

The Mighty One speaketh in thunder,
But we will have no fear ;
The heavens are distant and awful,
But Odin is ever near.
Oh ! the Mistletoe Bough !
The sacred Mistletoe Bough !
Oh ! life is sweet and love is safe
Under the Mistletoe Bough !
Oh ! the Mistletoe Bough !

Druid : Lest any should be tempted to think that the Mistletoe hath magic powers, we now consign it to the flames, that all may see how powerless it is to avert its own dissolution. May God, Who sends the birds to carry the Mistletoe seeds, bless us now and evermore ; and may He deign to accept this offering at our hands.

(*Takes napkin from assistant and throws the branch into the sacred fire.*)

People sing slowly, standing still.

Accept our offering, O Father !
We give Thee back Thine own !
For all that is sacred must shrivel
In the fire that is Thy throne.
Come down ! come down ! O Holy One,
Receive our tribute now !
We bring Thee the fairest of Nature's gifts,
The blessed Mistletoe Bough !
Oh ! the Mistletoe Bough !

Prophetess : The God of the Mistletoe hath shown me a vision.

(*The chorus greet this announcement by dancing round, singing.*)

We *still* are the children of Odin !
He is guiding us now as of yore,
His own two birds still bring us the seeds
Of the blessed Mistletoe-lore.
The past and the future are joining
To quicken our prophetess now,
As the fresh young berry is quickened by sap,
By twin sprays from the Mistletoe Bough !
Oh ! the Mistletoe Bough !

Prophetess : The Leader, Odin, came from the East, bringing lore, the same which was taught to our forefathers with a Mistletoe

Bough. But we have lost some part of the true faith ; and for want of it the rest is decaying. The Mistletoe-lore is holy and true ; and shall be our support till the end. But it is perishing out of our land. We have lifted ourselves too high ; therefore are we brought so low. The Mistletoe has no roots in the earth ; when the branch is cut whereon it happened to grow, it withers utterly away. Man should not trust the birds of the air to sow the seeds of his faith. We say that, because we are children of God, we may cut down all that grows in the wood, even the sacred Mistletoe ; but the symbol of an enduring religion should be something that man not only dares to destroy, but also has power to plant. This was told me by strangers from the East who were seeking metals in our land. I saw these strangers at their worshipping ; they, too, raise aloft a sacred branch, but not such as these that wither in our hands. On that branch is a leaf whereon are written words : not such as Romans read ! The strangers read to me from their leaf, that their forefathers had, like us, a sacred branch of divination, and were taught of old the true Mistletoe-lore. They had also stones whereon were taught the motions of the stars. But when they corrupted the doctrine and paid senseless homage to the stocks and stones, a great leader among them made the imperishable leaf and wrote on it immortal words. This sacred leaf of the East teaches us to keep alive and pure for ever the doctrine of the All Father.

While we were singing, a vision was shown me, as I told you : a Revelation of the Future of our Land.

The people from the East are hated by the Romans, and persecuted even as we are. But they will be faithful unto death to their Leaf that does not wither, and God shall give them an immortal crown of life. And at last Roman tyranny and Roman treachery shall shrivel before their faces as the mists when the sun ariseth in his might. They shall shatter all systems set up to make unity visible, as the lightning shatters the oak ; they shall scatter all minions of tyranny as the tempest scatters dry leaves ; and their Leaf shall deliver this our Britain from all that comes from Rome. And the lore of our Mistletoe shall become immortal, when it is grafted on the teaching of the Tree of peace, that grows in the land of Sunrise, whence came the blessed leader, Odin.

Odin and Baldur and Frey are very near to me now ; and they have taught me a new verse for our hymn. Learn it from me, my people, and let us sing it before we part.

(*Prophetess sola, then chorus repeat.*)
The Olive branch came o'er the waters,
Bringing freedom and peace for man,

Those trees whereon wisdom groweth :
Let us plant them wherever we can.
Oh ! Asia ! the cradle of Odin !
Send us deliverers now !
Help us to render immortal
The lore of the Mistletoe Bough !
Oh ! the Mistletoe Bough !

Druid : Blessed be the Eternal, our Father, and the Father of Odin, Who in every age sends birds to carry the sacred seeds and prophets to declare His Will unto His people. Let us show our thankfulness by fidelity even unto death ; and may Odin receive our souls when we pass into the Unseen Land.

People (Standing).
The souls of the blest have departed
To dwell with Odin on High ;
As the smoke of what was our Mistletoe Plant
Has floated into the sky.
We trust Thee, Father ! Father !
Though Thy ways be hard to read ;
Thou takest ever our Mistletoe Plant,
But Thy birds still bring us the seed !
Oh ! the Mistletoe Bough !

(*Druid goes off slowly, alone, down an open glade, in the full light of the setting sun, towards the Jewish Camp. The Prophetess leads a winding dance, in and out among the tree-trunks. All the people follow her steps as exactly as possible, the Assistant Druid foremost among them. As they dance and sing*)

We still are the children of Odin,
And faithful have ever been.
Come life, come death, we'll still be true
And follow our Prophetess Queen.
Oh ! the Mistletoe Bough !
The sacred Mistletoe Bough !
Oh ! life is sweet and love is blest
Under the Mistletoe Bough !
Oh ! the Mistletoe Bough !
Oh ! the Mistletoe Bough !

Note to Cutting Mistletoe

It may seem anomalous to introduce the names of Odin and Thor in a Druid ceremony. It would be so if the Druid were "orthodox" and superstitious. But my Druid is meant for a typical *Leader of Reform*. Such men usually try to purify their own religion by the introduction of the best elements of some other. The Mistletoe makes a natural link between the two religions in which it took a prominent place.

IX

"GENIUS COMES BY A MINUS"

—Hinton.

An owl was hooting in the Forest in a country where owls were scarce (because farmers killed all the young owlets they could find). A composer heard him ; and wrote down, as best he could, the notes which represented its cry. He wove them into a grand Pastoral Symphony. But he never succeeded in teaching any performer to reproduce perfectly the true Forest tone.

Many years afterwards some members of an orchestra went for an excursion into the Forest. Some unseen person was practising the owl-note of the symphony. "O Marvel !" cried the excursionists ; "here is the greatest performer of our day. This is a wonderful rendering of the great composer's strain."

"Hoo-hoo-hoo-hoo !" sang the invisible 'cello.

"Oh ! marvellous stranger," then said one of the band ; "come back with us to the town. We promise you a cordial welcome."

"Hoo-hoo-hoo-hoo !" said the recluse.

"Oh ! stupid man," said another ; "why do you live away from your kind ? Why can't you be like other people, and compete with our 'cellos ? You might, you probably would, win the prize for the best rendering of the hooting-notes."

"Hoo-hoo-hoo-hoo !" repeated the recluse.

"Don't bully him ; coax and persuade him," said a third. "O, wonderful unseen stranger : see, here is a sample of the accompaniments among which we invite you to sing." Whereupon he touched the button of a portable electric lamp ; and blew a blast on a brass cornopean.

The unseen 'cello gave a frantic shriek. But when the noise and glare had subsided, he once more greeted the night with his former

wonderful note, taking no notice of the inducements held out to him.

"Oh! sublime hero," said a fourth member of the excursion party. "How superior you are to all our vulgar glare and noise."

"Hoo-hoo-hoo-hoo!" sang the recluse once more.

What was the explanation of his genius, of his modesty, of his indifference to men's praise or blame; of his superiority to worldly aspirations? I will whisper it in your ear. The creature was—an Owl.

X

THE RAINBOW AT SEA

OR, THE MAGICIAN'S CONFESSION

Glitter and glow! flitter and flow!
Which way, oh Prophet! does the wind blow?

A storm is rising far in the East!
The waters are curdling and frothing like yeast!
The skies are black with a Nation's doom!
Death rides the storm-wind, wide gapes the tomb.
Oho! glitter and glow!

Tell us, oh Prophet! is hope left, or no?

The war-horse is snorting and pawing the ground;
Witches are dancing in merry-go-round;
Vultures are screaming from far and near:
"We have fasted too long, now the feast is here."
Oh! woe! glitter and glow!

Tell us, oh Prophet! doth God live, or no?

God, the Avenger, on Sinai stands!
Thunder and judgment He holds in His hands!
God of the plague, and famine, and sword;
Dreadful His punishments, sure is His word.
Woe, woe! glitter and glow!

Tell us, oh Prophet! is Love dead, or no?

[A Rainbow begins to sketch itself faintly on a cloud over the sea and gradually grows brighter and more complete.]

Child ! I was dreaming, and drunk with mere sound.
Did you think it was *real*, my merry-go-round ?
We seers, we play with the Word of the Lord
Till we stab our own hearts with His terrible sword.
Is Love dead ? you ask me. Ah ! no, my child, no ;
But the Seers were dazzled with glitter and glow.
We trifle and toy with affection and hate,
We puzzle the people with "doom" and with "fate."
Our own fancies flood us with passion and pain ;
But Love ever reigneth and ever shall reign.
Trust no visions that come amid glitter and glow ;
See ! the Lord on that storm-cloud is painting His Bow.
No struggle with Time ever alters its shades ;
No fashion dictates when it brightens or fades ;
No force has distorted that magical form ;
Noah saw it as we see it, *ending the storm.*
Glitter and glow ! flitter and flow !
All shall pass, like those wavelets, beneath

THE LORD'S BOW.

EAST AND WEST (*Bombay*) 1904-1908

1904

JUNE, JULY — How did Art Originate in the East?
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FEB. — The Purdah.
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HOW DID ART ORIGINATE IN THE EAST?

In a preface to Ram Chandra's Treatise on Maxima and Minima, the late Professor A. de Morgan called attention to the importance and value of certain kinds of mental quality possessed by some natives of India, which gives them direct access to some scientific secrets which Europeans can learn only by laborious and round-about methods of investigation. Before the publication of this preface, a considerable stir had already been made in Europe by the fact that De Morgan and others had found out how to express logical formulæ in algebraic notations. Of several works on that subject, which appeared in the middle of the nineteenth century, one, written by my husband, was spoken of by Herbert Spencer as being the greatest advance in Logic since Aristotle. George Boole himself told me that his supposed "discovery" was much older than the time of Aristotle; that the formula called, in modern Europe, "Boole's Equation," must have been perfectly well understood, in some shape or other, before the five sacred books of the Hebrews, ascribed to Moses Ben Amram, could have been written. "Boole's Equation" is, in fact, only the Hebrew Formula, known as the "Shemang Israel," expressed in an accurate, depolarised notation, and thus freed from the sectarian associations which had grown round it in the course of ages. Since my husband's death in 1864, I have come across indications of the truth both of his assertion and of Professor de Morgan's. It has fallen to my lot

(so experts tell me) to throw light on a point connected with ancient Indian Art. The fact seems to me all the more significant, because I have not been to India, and know very little about Art of any kind ; and at the time when I made the discovery, I was thinking of matters much nearer home than India. My discovery, such as it is, appeals to unscientific persons, especially to women, and may, perhaps, interest such readers of *East and West* as find articles on science, and on political economy, beyond their grasp.

My attention had been attracted to the fact that many women, when broken down in nerve-health, are haunted with a longing to do some kind of "fancy-work" (*i.e.* decorative needlework), but dislike each kind which they take up. In many of these cases the medical adviser has prescribed needlework, but the nurse has failed to find any kind of work which she can persuade the patient to persevere in. Presently my own health gave way, owing to over-strain in connection with writing. I needed some quiet recreation ; I could not divert my mind by reading ; the very sight of black letters on a white page turned me sick ; I longed for a revel of mere colour, and especially for constantly changing colour. Coloured embroidery was the very thing for which my soul craved. I had had, it is true, little practice in the art ; but that did not matter, the object being to amuse myself and recover health ; the very novelty of the occupation would divert me ; and I could learn, I thought, as I went along.

I procured from Liberty's an Indian table-cover, sharply printed with a repeating flower-pattern in blue on a white ground, and a mass of embroidery silks of a great variety of shades, and set to work to embroider the flowers each in a different colour. But alas ! my hope of a useful occupation seemed illusory ; the brain-sickness, the sense of nervous worry, the dazzled condition of the eyes, were brought on almost as quickly by the attempt to embroider over blue lines on a white ground as by the attempt to read black words on a white page.

At first I was painfully disappointed. But two facts conspired to give me courage. One of the patients in the Sanatorium where I was lodging was a lady of Spanish origin, who, when fairly well, would sit with other members of the household, and occupy herself with plain-sewing ; but who, when more ill than usual, found relief in some strange kind of Art Needlework of her own devising. Everyone in the establishment was aware that Miss C, when at her worst, amused herself with some queer kind of work ; but it did not seem to occur to anyone that the fact might be made of use to other sufferers. Surely, thought I, George Boole's pupil and executor ought to be able, in case of need, to correlate facts into a

working whole, so far, at least, as to evolve a hygienic recreation for herself and other invalids! I watched Miss C.'s work, and observed that it involved a great deal of feather-stitching done free-hand and without pattern. I procured a piece of very soft material. The Liberty table-cloth had worried my hand by the resistance of the fabric to the needle; it was very slight and would have been unnoticed had I been in my usual health; but in my then weak condition it was perceptible at each stitch. The piece which I now selected was free from this objection. It was printed all over in shades of a pleasant cloudy neutral tint which passed into each other without any very defined pattern. I set to work to feather-stitch about at random on it, in a lazy, luxurious manner, choosing each needleful of silk to suit the caprice of the eye at the moment; and setting each stitch in the "direction of the least resistance," *i.e.*, at the angle which was most restful to the hand at the moment, without regard either to neatness or artistic effect. I had been struck by the peculiar *lifelikeness* of Miss C.'s impromptu sprays; they were not like any particular sort of moss or seaweed; one could not say that any of them was meant to represent any particular species of known plant; but one felt that each was living and growing. The work was more like little bits of Japanese embroidery, or the touches done by a painter, than like anything ordinarily done with a needle in Europe. I had attributed this quality of Miss C.'s work to her being, as I supposed, a trained embroideress. To my astonishment, I found the same characteristic of lifelikeness appearing under my own unskilled fingers!

Another discovery was growing up under my eyes. I chose each needleful of silk to suit the colour-impulse of the moment. Each day when I left off working, the colour of the whole seemed satisfying and delightful; but sometimes, on taking it out next day, it, so to speak, hit me in the face with a sense of something crude, glaring, utterly wrong. I had read in a book on nursing, that the colour-needs of a patient vary with his state of health; scarlet hangings are good for the nerves in one kind of illness, dull purple in another. If so, there would probably be finer gradations of colour-need than those observed by the writer of the nursing book. I resolved to push the matter through and find out all I could about the relation of colour to health. I resolved never to undo my work, however bad in colour or form; but always to add a corrective and see whether that plan would heal me. Each day, when I got out my work, I looked over it to see which bit struck me most forcibly as crude or unpleasing, gazed at that portion till my eyes were slightly dazzled, then looked into the heap of silks, pulled out the one which seemed most restful to my eyes, threaded my

needle with it, and stitched in among the selected crude spot, fastening down long stitches with shorter ones.

Another point had to be settled—that of form. If I was not to work on a pattern previously drawn, I must somehow get a design of some sort. I procured a skein of the so-called "Japanese gold" (the gilt paper thread of which we see so much on Japanese screens, and which is used in England for outlining), wound it on a reel, and left it for a day or two. It thus lost its skein-kinkles and acquired a general springy curliness. I then shook it off the reel and used it to make trails all over a piece of plain gown-silk (as one decorates a wall or table with long clinging trails of bryony or hops). Having adjusted them with pins according to my fancy, I sewed them down, worked free-hand feather-stitch along and near each of them, and coloured flowers in the axils where they crossed each other, still choosing each needleful of silk to suit the momentary "passion of the eye," setting each stitch at the angle most pleasant to the "passion of the hand," and correcting crude spots by subsequent additions.

Up to this time I had worked alone, simply following out my successive impulses during my illness and the beginning of my recovery. But at this stage of the proceedings, a new element came into the investigation. Experts saw the work I had produced; and, without professing to think it well worked, pronounced that it had the peculiar *colour-glow* which distinguishes real old-fashioned Indian work from modernised (and especially European) imitations.

Here indeed was a revelation ! I had applied what was (so my husband had assured me) an old Asiatic formula of psychologic correlation to the purpose of combining in logical synthesis a mass of hitherto unco-ordinated fact concerning nervous impulse and the sequence of colour-vagaries, and behold ! I had, unwittingly, reproduced the inimitable old Indian colour-glow.

The investigation had grown beyond my power to prosecute alone ; I sought the help of friends. One or two lady doctors, a nurse whose speciality was the charge of nervous patients, two highly skilled embroideresses (one of them a very artistic designer) and others volunteered to join me in a thorough investigation ; and we set to work to experiment. In a future number of *East and West* I hope to give an account of what we discovered, in so far as it throws light on ancient Eastern Art. The main and most important conclusion to which we have been led, I can, however, state here. The quality spoken of by De Morgan is a peculiar sensitiveness to impressions, which exists everywhere, in germ, in children. European culture and life tend to deaden it ; but it often

reappears among us, in certain forms of nervous disease. It is then called Hyperæsthesia, and is usually accompanied by morbid symptoms which make the patient incapable of study and of useful work, till the disease passes away, carrying the extra-sensitiveness away with it. One main object of the great Eastern Religions (such as Judaism was in its origin) was to take up and cultivate the sensitiveness and educate it into a means of perpetual scientific and moral revelation. Those, therefore, are doing grievous harm to both East and West who try to make the religious and domestic culture of Asiatics conform to our own coarser standards. If we do this, we shall root out from the world scientific and artistic potentialities of untold value, besides much increasing the spread of actual nerve-diseases. We ought rather, while opening up to our oriental fellow-subjects access to our Western appliances and methods, to give them every encouragement in conducting the development of children in conformity with the best forms of their own hereditary ideals.

A little earlier I promised to give an account of some results arrived at by myself and a few colleagues in an investigation as to the probable genesis of art faculty in the East, so far at least as this was carried on in the sphere of needlework. I must beg my readers to remember, in reading the following scattered notes, that our investigation had reference, throughout, not to the question of how a skilled embroiderer can best produce certain desired decorative effects, but to that other, and far more important, question, how needlework can best be used as an educative exercise for training, steadying and developing the artistic faculties of a race.

In order to make clear what it is that we think we have found out, I will ask my readers to form for themselves a mental picture of the three kinds of equilibrium known to science. These are: (1) unstable equilibrium, such as that of a thin tall object standing on its end on the floor. It stands while undisturbed; but a touch or even a breath is enough to disturb it; and as soon as that happens, it tends to fall farther and farther out of the perpendicular. It has no tendency to recuperate or recover its former position. This is the condition known as that of unstable equilibrium. If the rod be balanced on the hand of a skilful conjurer, he can keep it poised for a long time, in spite of slight deviations from the perpendicular; but only by incessant attention on his part to the business of assisting it to recover its balance. If left to itself, it falls helplessly.

The second condition is that of a solid table standing evenly on four legs; it is difficult to disturb; and, if slightly tilted up, it

falls back naturally into its former condition. This is what is known as *ordinary* stable equilibrium.

But there is a third condition, that of the Logan Stone, or of the tumbler-doll. The lightest touch, a breath of air, sets it rocking to and fro ; but if left alone, it ultimately settles back to the condition of equipoise. This is the condition of *mobile* stable equilibrium. Now the nerve condition called hysteria is one of unstable equilibrium ; the condition miscalled health in Europe resembles the first kind of stable equilibrium ; it is produced by deadening the sensitiveness to influences and diminishing the tendency to set up symptoms and sensations. Whereas the object of Eastern, and especially old Indian, Art Culture would seem to have been to produce mobile stable equilibrium by cultivating to a maximum degree both the tendency to set up symptoms and sensations, and the power to re-act against all sensations, so as to make of them a means of Artistic Revelation without real injury to true nerve or mind balance.

I will now proceed to details. If we take a healthy plant or branch of a tree and look at it, we see that it is in what is called "good drawing." Now strip away one of the minor branches ; and, at the spot from which it was torn, we find "bad drawing." This suggests a process of training for harmonisation of colour. When we find that a spray of feather stitching, etc., seems "in bad drawing," we treat it as merely incomplete. We do not rip the ugly bit, but look to see what would seem to have been omitted or, as it were, torn out. We then insert the missing portion. This practice assists the study of Nature, and cultivates the power of reproducing with the needle true natural forms.

The material known as Japanese gold (gilt paper coiled round a soft thread) when twisted up in skeins as we commonly see it, loses some of its natural properties as an Art trainer. These can be restored to it by unskeining it and keeping it wound on a reel for a few days. When shaken off the reel, it falls in a confused mass of exquisite curves, resembling, in miniature, those produced by the coiling together of serpents, but in far greater variety. Many persons who have natural geometric instinct, but have had little access to geometric instruction or appliances, will understand what I mean by speaking of the strange fascination of watching serpents passing from one curve to another. A pile of Japanese gold-coils when moved by the fingers, produces an effect more like a Geometer's dream, or an astronomer's mental image of planetary motion, than like anything one expects to see on a prosaic European work-table.

The heap of gold-coils, being in a highly mobile and elastic

condition, produces on the finger tips, and, through them, on the whole nervous system, an effect which is probably analogous to that of the modern "vibratorium" treatment. It tends to refine and sensitise ; it stimulates the sense of form, and even that of colour, increasing the desire for some kind of artistic expression.

When the heap of gold-coils is gently pulled apart and distributed in wreaths and trails, over a piece of cloth, it tends to settle in little bunches of intersecting loops. The gold can then be so manipulated as to form a bunch of loops wherever desired and of any required size. The bunch can be of any degree of complexity, from a single loop to the most intricate mass of intersecting coils. The form of each loop, however, will be determined, not as in ordinary European "Art Needle-work," by the merely passive obedience of the gold to the tyranny of a hand, which is itself usually enslaved to a pattern previously drawn with a pen, but by the combination of the hand's free movement as guided by the worker's will, with the elastic resistance of the gold to the hand's direction.

The frames thus generated are useful as ground-plan for embroidering groups of foliage or flower effects. The shape taken by the loop suggests the shape of the enclosed bit of foliage, and gently controls the form of the spray,without stiffening o mechanicalising it. I have got many very "Japanese" looking bits of moss, etc., by simply working a spray at the pleasure of the wrist (as described in my last article), subject only to the restraint imposed by the shape of a loop of Japanese gold taken as frame-work.

The accidental loops thus introduced into embroidery by the "free" use of Japanese gold remind one of those little interruptions to the general pattern by little frame-works enclosing separate designs, which have been introduced into European designs in imitation of "Japanese" Art. The modern European use of these accidental frame-works is, for the most part, inartistic and unmeaning, because divorced from any natural genesis or *raison d'être*. When they occur spontaneously, as a caprice of the gold which is being used to generate the main design, they have a very different effect.

Some characteristics of Japanese design and drawing suggest that in Japan the use of the brush and pen, as implements of Art, was introduced at a time when art-needleworkers had already attained some skill, and was at first developed in imitation of needle-art. The art-needlework of Western Europe, on the contrary, has always* been the victim of designs traced by the pen or

*If Mrs. Boole had had access to mediæval work such as has been collected and studied during the last twenty years, she would probably have deleted the "always."—ED.

pencil. Two Arts, like two races or nations, may be mutually helpful as allies ; but when one is a mere slave or adjunct to the other, they mutually degrade each other. This principle has been well illustrated by our series of experiments in needle-work. Japanese painting will probably grow stronger in proportion as its details grow more unlike those which occur spontaneously in free-hand needlework.

But it is far more important to national culture and hygiene that India should not allow her art needle-work to entangle itself in such a condition of slavery to the pencil as has so largely prevailed in England. For this there are many reasons.

The hand, when holding a needle, is in a different position from that which it occupies when holding a pen or brush. To work out with the needle details of form which occur spontaneously to a hand holding a drawing-tool, is an exercise which, if practised to any great extent, must exert a bad influence on the nervous system. In a properly sensitised condition of the hand, it soon produces actual suffering. In the condition miscalled, in England, health, the suffering is not present to consciousness as such ; a process of de-sensitising goes on and the nerves become callous. This desensitising, so far as it goes, constitutes destruction of artistic instinct. It is far better for both the artistic and the intellectual development of the worker that she should be guided, from without, as to general outline only, producing minute variations of direction according to the "passion of the hand" itself *while engaged in holding a needle*, than by slavish obedience to the passion of another hand, or even of the same hand, *while engaged in holding an instrument of different shape*, such as a pen, or brush. For this reason, the main outline should either be generated by means of trails of some elastic twist or braid or gold thread, and then followed as a whole, with slight deviations generated by the "passion of the hand" ; or if the design is to be drawn with the coarser implement (pen, etc.), it can be drawn on the back of the cloth and then run through with a thread which can be pulled out when the work is finished. The practice of tracing details of form with the pen, to be followed with the needle, is injurious not only to the instinct of the hand for form, but also to the instinct of the eye for colour. If a pen-drawn pattern is to be accurately followed with the needle, the eye must be, during the time of working, incessantly occupied in attending to the pattern. This unfits it for attending, while working, to the question of colour. This has resulted, in England, in the practice of selecting and arranging the colouring, once for all, before beginning the work. Could anything be more fatal to the education of the colour-sense ? Con-

ceive a country in which it should become a custom for the painter, before beginning a picture, to choose what colours he will put in each spot, and leave himself no freedom for experiment and self-correction ! There may be a pre-arranged scheme of colour just as there may be a pre-arranged general outline of form ; but the details of colour should be constantly selected and corrected by the momentary "passion of the eye," and the details of form by the momentary "passion of the hand." This is one of the secrets by means of which your ancestors developed the wonderful old Indian colour-glow. We venture to say this, not because you do not know it—God forbid that we, in our ignorance, should dogmatise about ancient India—but because you do, you know it much better than we, because it lies deep down in your subliminal consciousness. Ancestral treasures are sometimes lost, because they seem so secure that the inheritors do not see the need of taking pains to keep them safe from thieves. My colleagues and I, who found out one or two of the secrets of your ancestors by long and effortful investigation, send you this friendly warning—that robbers are prowling around, seeking what they may despoil. We send you, with our sincere good wishes, the following as a warning of what official English "Art-Needlework" tends towards as its limit and goal.

A specimen of needlework was sent by the South Kensington Art Needlework School to an Exhibition in America as a sample of what England could produce. It contained about seven square yards of solid needlework. The ground was a uniform blue, across it ran a yellow scroll ornamented with white lilies. The material chosen was *white linen* ; the outlines and veins of the flowers were worked and the linen left for the white portions. The scroll was worked in yellow and all the rest of the linen was covered in blue ! Three women sat eight hours a day for several weeks, each working in one uniform tint in one monotonous stitch. Such work tends to make women machines, not artists. The tints chosen were such as are popularly called "artistic" ; the meaning of which term we will presently explain. The pattern was well drawn ; and the surface produced was as even as woven satin. Our school gave itself a superficial air of "encouraging art" by affording the smallest amount of opportunity for the exercise of any properly artistic faculty, and inflicting the largest possible quantity of injurious and stupefying drudgery. This blue quilt was a type specimen or bad incarnation of all the vices which have been assiduously cultivated in England for the last half-century under the name of "Art Culture."

The Art-teacher who showed this monstrous specimen of cruel

folly was a kindly lady, devoted, we are sure, to the interests of her workers and the development of art faculty as she had been taught to understand them. When remonstrated with about the pernicious effect of such work upon the workers, she said, "Poor things, they are glad to get the money," which, no doubt, was true. The workers were driven by hunger, as other slaves in various times and places have been driven by the lash, to minister to the triumph of a false opinion.

Early Victorian Art dealt in strong colour planned beforehand and, therefore, necessarily inadequately harmonised. When the influence of the East upon England had made us ashamed of our glaring contrasts and bad mixtures, the so-called "æsthetic" movement began, and it became the fashion to use only soft colours. These were called "Art colours," by which was meant such as could be used inartistically and routine-wise without shocking the eye. The true colour-glow is produced by using strong colours freely, so intermixed as to neutralise each other's crudity.

The most artistic effects, we have found, are got when one works up a piece to the utmost of one's power ; and that piece is taken as a ground to work on, either by another person, or by the original worker so long afterwards that she has become, virtually, another person.

Speaking for myself individually, I have tried a further experiment of the same kind. If I work in a mood of anger or vexation about any one, the colouring produced under such circumstances is particularly violent and harsh. When I come to harmonise such crude work, I find the process much assisted by recalling to mind the person with whom I felt angry before, and honestly trying to think out what account she would be likely to give of my conduct. I feel sure that we have here a clue to some of the mysteries of ancient Oriental Art.

We shall be told that many ladies in England are really skilled embroideresses, and despise the stupefying methods against which we are warning you. That is true : embroideresses who possess real genius show it in training themselves in spite of all conventions. But, as we said at the outset of this paper, we wish to show, not how an artist of genius gets special effects, but how a nation can develop or can lose its natural birthright of innocent pleasures. The simple art of expressing one's own form-and-colour-fancies with the needle should not be the monopoly of great genius, but the recreation of the toil-weary, the recuperation of those whose nerves are overstrained.

If art needlework be directed by the old Eastern conception, it enables the poorest woman to amuse her leisure by linking together

cheap material and waste scraps of many kinds, into decorations which are a refreshment to the eyes of her family as well as her own. Art needle-work, in England, tends to become, more and more, a luxury for the rich and a drudgery for the workers ; because, by losing the one priceless quality of inspiration, it tends to depend more and more, for its value, on costliness of material and on the evidence of the enslavement of the workers.

The masses in England, having lost the secret of harmless recuperation, seek recreation in the gin-palace, and relief from nerve-torture in various vices and many sorts of evil drugs. For our sakes, dear Indian friends, as well as your own, preserve the old Indian secrets of Art. While we are teaching you the working sciences by means of which we gain control of the Earth and its material resources, teach us to preserve our national vitality by holding communion with the Eternal Inspirer, Who will, if we will let Him, direct every movement of our fingers and bring perpetual delight to our eyes.

THE PSYCHOLOGY OF INDUCTION

EVERY serious experiment is worth recording for what it may suggest. An enormous quantity of what might be valuable material is lost owing to the present condition of the art of Criticism. If one gives to the public the result of careful experiment carried on through perhaps many years, some one who just knows enough of the subject to be aware that a part is not the whole, denounces one as *generalising from insufficient facts* ; such critics ignore the great distinction between the two kinds of scientific induction—the external, when a law of nature is inferred from a comparison of many instances (and for which very many are necessary), and the so-called "mathematical"—which is really psychological—where a potentiality of human nature is (quite rightly) inferred from the fact that an individual, or a group of individuals, have succeeded in accomplishing a thing once.

Experimenters in psychology let themselves be discouraged too easily by self-assertive critics ; we owe it to the world to help, when we can, those who are willing to be helped.

I have reason to believe that a few Parsi ladies will be helped by a tale which I am going to tell ; and therefore I offer it, to those who can understand.

In 1865 I entered, as Librarian, Queen's College, Harley Street, the first Ladies' College opened in England. At that time Cam

bridge and Oxford gave no degrees either to Jews or to women. Queen's College had no degrees to confer; it was merely educational. The pupils were all women; the professors all men; women were admitted on the teaching staff only as subordinate assistants. The College was managed by the professorial staff, assisted by a committee composed of aristocratic and wealthy ladies, who did not teach, but were supposed to "set the tone" of the place. The Institution was ostensibly undenominational; pupils of all religions were admitted to the classes for secular instruction; and any parents who wished it, could procure exemption from classes in theology and from attendance at prayers. But though the managing bodies were, or tried to be, religiously tolerant, they were by no means superior to racial prejudices; Jewesses were admitted—on sufferance—but had a good deal to endure. From what I have read in *East and West*, supplemented by what I have been told by Parsi ladies visiting London, I gather that Parsi ladies in Bombay will not need to be told what one means by English racial impertinence! Well, the ugly thing was in full force as regards Jewesses, in London, and in Queen's College, in the year 1865, and for some little time after.

The Lady Superintendent had been in office many years. In her youth she had been governess in a cultured Jewish family whom she loved and respected; and she writhed in impotent wrath at what she was compelled to witness; but, single-handed, she felt powerless. Finding that her new Librarian was inclined to take her side, she resolved on a bold experiment. She selected a very clever and well-trained little Jewess, and, to the somewhat disgusted astonishment of the authorities, placed the child on the staff of monitors, whose function it was to assist her in carrying out order and discipline, and then set to work on our propaganda. We did not lecture the Christians about their treatment of Jewesses; we advised the Jewesses themselves. We told them that they differed from us, not only negatively in not having had the spiritual experiences of Christians, but also positively, in *having* had a racial discipline which we lack, that they had no right to come among us, taking what we had to give, competing with our children in the mere matter of learning what we could teach, copying our dress and external manners, and trying to pass, on sufferance, as more or less skilful imitators of us; they owed it to their race, their ancestors, their parents, their great Founder, Moses, and also to us who were giving them a share in our culture, to give *us* the benefit of *theirs*. The Jewish discipline, we told them, trained the race in glad acceptance of Law, as not mere irksome restraint, but as a delight and the object of joyful homage. They had no right to slink

about in corners, obscure, useless, and merely tolerated, leaving us two ladies to wrestle, unhelped, with Christian freakishness and the insubordination generated by religious hysteria and pious sensationalism ; if their religion meant anything real, we ought to find them a help and support to our authority.

The astonishment of the Jewish girls at first was pathetic. But they soon grew accustomed to the new conception of their place in the non-Jew world. In less than five years we had several Jewesses going about the College with a delightful air of calm repose ; the discipline was much improved ; religious vagaries and exaggerated sentiment were at a discount ; and Christian girls who had entered College excitable and unmanageable learned to control themselves, partly because by doing so they earned the honour (of which I have heard some of them boast) of being *allowed to walk out with a Jewish monitor,* and several of the more intelligent Christians attended the synagogue occasionally—not in any spirit of disloyalty to their own faith, but, on the contrary, because, the Founder of Christianity having been born and bred a Jew, they realised that it behoved them, as pious Christians, to understand and respect the religion which He followed.

The psychology of the matter is very intelligible.

People talk, carelessly, of "the influence" of such or such a person ; as if a given individual gave off only one kind of influence. We give off various kinds of influence, according to the nature of the faculties which, at the moment, we are exerting. Life depends on an interplay of many faculties, all necessary but not all of equally compelling power. Imitation and competition are necessary parts of life ; an individual who never exercises those faculties becomes weak, like one who eats insufficiently. But the powers of competition and imitation, like the faculties of eating and digesting, are derived from our animal ancestors ; the exercise of these powers confers no dignity on the individual, and does not make him impressive to others. A Jew who spends too much of his time in imitating us non-Jews, or in competing with them in external acquirements, without entering into our spiritual culture, loses impressiveness and dignity, and sinks towards the lower types. The attitude of *reverence* is that which raises man towards the Divine and makes him affect other men with a sense of awe. Every Jew is a gentleman when he is thinking of what he owes to Moses and the Law. By telling our Jewish girls to think, while in College, of what they owed to their heroic ancestors, we had caused them to show to their school-fellows the refined and dignified side of themselves. It was no longer possible, therefore, to treat them as mere parasitic dependents on us ; because Miss

Parry and I had made them show that they were obviously something else.

Respect for Law happens to be the thing which binds the Jew to his best tradition, the quality which ennobles and quickens him. Other oriental races are bound to their Sacred Past in other ways. We are all familiar now with the value of oriental writings, but reading ancient books does not confer the qualities generated by ancestral discipline. What has the worship of pure Fire, continued for centuries, inbred in the Parsi race ? Something, surely, more distinctive and higher than the capacity to wear Paris frocks, speak English with a Belgravian accent, take Cambridge degrees, and compete in business with European manufacturers and merchants. Something—but what ?

I ask the question ; I do not suggest that I can answer it. But, at all risk of being accused of generalising on insufficient knowledge of Indian affairs, I venture to state that if I were at the head of any school in India to which Asiatic girls were admitted, I would teach them all the Invocation of Psychology to the ancient Religions :

> My kind guardians, my brothers
> Come back to the live world with me.

And to Parsi girls in particular, I would teach the Invocation to Zoroaster :

> Come *bringing Thy Fire,* my brother ;
> And brighten the dull world for me,

THE NAMING OF MOUNT EVEREST

VERY little is known of the English Godfather of that Himalayan mountain. Circumstances, into which I cannot now enter, led to the destruction of nearly all written memorials of his life ; and as he married in late middle age, his own family were too young at the time of his death to remember much that can throw light on his Indian career. Nor do I know much of it ; but I have a vivid recollection of his character and personality ; and perhaps the little that I can tell about him may throw light on the nature of the feeling that prompted those who remembered him to connect his name with an inaccessible snow-peak.

No portrait taken of him reminds me of him as much as does a statue of Moses, the legendary Deliverer of Israel, of whom it was said that "no man knows his sepulchre." As a matter of fact, George Everest was buried at Hove near Brighton. But if I were

writing my impressions of him in metaphor or parable, I could not express them better than by saying of him, as is said of Moses, that after spending his life in leading other people out of bondage to within sight of a Promised Land, he went up a mountain to be alone with God ; and some Unseen Power disposed of him, and left his friends suddenly aware that they had in reality never known much about him. He was always a land-mark, a beacon to others ; always utterly lonely, and always misunderstood.

In the year 1806, he, being then sixteen years old, was sent to India as a cadet. He had received the ordinary unscientific education of a young gentleman of that period, which comprised a certain amount of accurately taught Latin, a very little illogical theology, and a large amount of flogging, fagging, and fisticuffing. He was considered an excessively troublesome boy. Not that he was ever accused, I believe, of any action that could be considered really wrong, deceitful, or unkind. But he was always in danger. And his escapades kept the ladies of the household in a perpetual state of terror. At last he was found in a quarry, firing against the rock, reckless where the bullets might recoil to. His father was spoken of by people who did not like him as a man who loved philosophic calm more than anything else on earth ; he decided to send George away for the peace of the household. Before sailing, George went to take leave of his sister, a pupil in a select boarding school. She took him into the school-room ; whereupon he blew out the candles, and took advantage of the confusion that ensued to kiss the pupils and teachers indiscriminately in the dark. That is all that I can remember being told of his boyhood ; except that he was his mother's favourite child, and her death, which took place soon after his departure, was supposed to have been hastened by grief at losing him. He seems to have been the idol of the whole family, and perhaps his father's decision was not as selfish as it was represented to be. He (the father) was in many respects a wise and far-seeing man. He knew his children better than most fathers do ; and I am inclined to think that he sent the boy off because he felt that such a boy would be safer facing dangers and difficulties for himself than being coddled and spoilt at home.

I have heard from others that George became a brave soldier. He certainly was a brave man, possessed of a remarkable amount of both physical and moral courage. But I have not the least reason to suppose that he ever cared for his profession, or thought with anything but pain of any use of military weapons against natives of India. I have no doubt that he did his duties as a soldier as long as he had any such duties to perform ; but many circumstances conspired to make those duties distasteful to him, and he was, I

know, very thankful when a happy accident diverted his energies from the work of conquering India to that of surveying it.

He had an active and eager mind, athirst for knowledge of all kinds. His first device for procuring mental food and occupation was to get himself taught as many languages as he could, by native teachers. This must have struck, from the first, the keynote of his future career, marking him as different from ordinary English officers, among whom it was not, I believe, at that time, much the fashion to enter into sympathetic relations with conquered countries.

He made the acquaintance of a learned Brahman, who initiated him into that ancient philosophy of the relation of Man to The Unseen Inspirer, to the *As-Yet-Unknown* Truth, which forms the common underlying basis of several Asiatic religions (including the Brahman, Buddhist, Parsi, Jewish and Christian). His devout mind was intensely impressed with the ancient conception of a relation between Man and The Unknown—a relation which is direct, primary and independent of, and prior to, any religious belief, and of which each religious formula is a more or less inadequate expression. The whole idea of any particular religion being the essentially right one, or claiming to be necessarily truer or better than any other, became utterly abhorrent to him. That anyone should attempt to convert anyone else to his special form of worship, or should speak of his own doctrines as essential to salvation, was enough to rouse his contempt and anger to the last years of his life. And I fear he never was on very good terms with Christian Missionaries. Having learned all the languages that he could get anyone to teach him, he next turned his attention to the study of mathematics. And he caught a vision of the Ancient Secret, that mathematical notation is not a mere mechanism for calculating numbers, but the supporting framework of that same organic relation of Man's mind to the As-Yet-Unknown of which religions are various outward expressions.

Now the main difficulty of mathematics consists in the fact that students treat it as a "secular" subject. As soon as the student sees mathematical notation in its true light, as the supporting skeleton of religious thought, what was before obscure becomes easy to understand. This is the explanation of many a phenomenal career in mathematics. George Everest's progress in the study was rapid and sound.

While he was still quite young, the Surveyor-General of India needed an assistant. My uncle's account of what then happened was this. If the authorities could have found another man in India, who knew mathematics enough, they would not have

appointed him, for already they hated him ; but there was no one else competent to do the work ; therefore they were reluctantly obliged to appoint him.

And so he escaped from the duty of coercing and slaughtering natives to the more congenial task of organising and supervising the work of the native surveying staff, and teaching trigonometry to young Parsis and Hindus.

By what particular mode of offence he had made himself thus early hated by the authorities, he did not inform me. One can infer its probable nature by what followed during the survey.

That he loved difficulty and danger for their own sake became evident when, after his return to England, he told us tales of his hairbreadth escapes from peril. Jumping into a live cactus hedge to escape wild cattle was one of his adventures ; leaping from a precipice into the branches of a tree growing from its side in order to avoid being crushed by some heavy vehicle that had broken the traces in going up a hill, was another ; all these episodes were told as pure jokes and with great zest ; but never a word can I recollect of fighting anyone—except the English priests of red tape !

The quarrel that I heard most about was over a signalling instrument. When he took charge of surveying parties, he found that the native surveyors were made to take out-door observations when it was unhealthily hot and to do calculations indoors when it was cooler. He wished to reverse the arrangement ; but the signal could not be seen, from hill to hill, except in the glare of the sun. He invented a more suitable instrument, by means of which signals could be seen in cloudy weather. Having made it a real working possibility, he applied to the authorities for leave to bring it into general use in the survey. There ensued a long and angry correspondence ; red-tape probably could not understand why any implements were needed except those in use ; and George Everest was not the man ever to understand why there need be any delay in carrying out any project which tended towards the emancipation of man, woman, or child, from bondage or unsuitable conditions. His advocacy of his protegés may have been more zealous than judicious. What is certain is that people who were content because they were taking for granted the legitimacy of their own position dreaded his influence, and whoever felt wronged and oppressed loved him—then, and always, and everywhere, to the end of his life.

In one of his letters to the authorities he made the remark that he knew he was making himself obnoxious, but that would not trouble him ; he had taken for his motto : "Serve God and fear no man." Remarks of that kind do not tend to make a subor-

dinate popular at headquarters! But they act as rice-seeds cast at random into swampy ground; after many days some of them are found growing. A young Parsi employé in some Government office had to copy the correspondence. The story was told to my aunt, either by Mr. Dadabhai Naoroji or Mr. Fardunji, when they were in England together; and I think the copying clerk was one or other of them. Whoever he was, he was struck by the phrase, and adopted it as his motto. Later on, this clerk realised that Parsi women were being kept in a degraded condition of ignorance. He and one or two friends organised a movement for procuring English teachers for Parsi girls. They had many difficulties to encounter and some persecution and obloquy from their co-religionists; but they had taken for their motto "Serve God and fear no man."

I do not know whether the quarrel about the signalling preceded or followed my uncle's long visit to England in the eighteen-twenties. During the course of that holiday, he went to Germany, taking with him his youngest brother (my father), then latterly ordained a clergyman of the English Church. They went to a great gathering of scientific men somewhere in Germany, travelling in company with John Herschel and Charles Babbage. Knowing as I do know something of what my uncle's influence was on my father then, and after his final return to England on my own mental development, I can read between the lines of Babbage's and Herschel's writings and gather something of what my uncle's Brahminical view of the meaning of mathematical notation must have done to sow in their minds the seeds of an ideal more spiritual than those current in English universities.

He came home finally in 1844. I was then a child of twelve. From the first, he was always the centre of stir, passion, emancipation. No repressive prohibitions that anyone made could be enforced where he was; he simply laughed to scorn the notion of any one coercing any one else. Children and animals worshipped him. Every one loved him to a degree that was distracting; yet the grown-up members of the family seemed to spend a large part of their existence in wishing that he would not say the things he did say. Perhaps they feared he would spoil us children! If they thought so, it was a great mistake. Loyalty to relationships and to accomplished facts emanated from him like a contagion. I can remember nothing which made me so willing to submit to my parents as uncle's naughty-sounding exhortations to me not to let anyone coerce me. He had a power greater than any one else I ever knew, of calling out the spirit of "Liberté oblige," of making one feel that the claim for Freedom is the outcome, not of dislike to

doing what the authorities wish done, but respect for one's self as a child of God. He made one long for discipline for its own sake ; he called out in one a passionate revolt against all that could come between one's soul and God ; including one's own weakness and selfishness and cowardice. I feel certain that he would sooner have cut his tongue out than have uttered a word calculated to induce any one in India to real rebellion. But probably the home authorities suspected the contrary, for red-tape has the fatal property of strangling in its devotees the power of understanding loyalty. If the home authorities had had the courage to give to such men as George Everest a free hand in India, it might have been, by this time, in a condition of more real self-government than it now is ; better able to reform itself religiously, to educate itself intellectually and to protect itself from internal evils, such as famine and plague ; a more organic unity within itself, and therefore more actively and helpfully loyal to England than is yet the case.

An episode of my uncle's life after his return to England may serve to throw light on the reason of the strange sense of unrest which surrounded him. He took a country house at Ascot, and soon afterwards was visited by a deputation of neighbouring gentlemen who had come to express their desire that he should represent their party in Parliament. He agreed to stand, and asked what steps he was to take. He would have to pay a certain sum into a local Bank. "Very well. But what is to be done with it ?" "It is for election expenses." "Yes ; but how will it be spent?" "Make it payable to the order of your agents, and do not ask for details." My uncle rose and rang the bell ; when the servant entered, he said : "Show these gentlemen out." Such was his account to me of the one attempt of his countrymen to enlist him in the service of his country in the capacity of Member of Parliament. The whole question as to which party won at an election, and who was and who was not in power, would always have seemed to him trivial in comparison with the harm that would certainly be done to the country by the slightest dishonourable action. And it is not difficult to guess why a man who took that kind of tone was obnoxious to men accustomed to treat as "necessary election expenses" a certain amount of bribery done by agents without the sanction of the principals !

He helped and befriended Bishop Colenso, and every one else whom he heard of as trying to reform or broaden the English Church or any other Church ; but he never allowed his name to be publicly connected with any movement of reform, because he would not allow himself to be supposed to belong to any party in particular. "I don't believe in Colenso's view more than any one else's,"

he said; "I back up whoever is attacked, because I can't bear to see a man ill-used."

This religious impartiality gave pious people the impression that he was indifferent to religion. Never was there a greater mistake. On one occasion, during the last year of his life, I was in his company, along with two pious ladies. Beside his couch was a small table on which nothing was to be seen except a red bandana handkerchief. When the door had closed behind the other ladies, he took up the handkerchief; beneath it lay a Bible. The next few minutes were amongst the most awful of my life—awe-ful in the literal sense of the word. I realised then what a struggle his life had been, torn between his childlike and humble devoutness, his passionate love of God the revealer, his longing to be in religious communion with his friends, and his intolerance of any religion which claimed to be superior to all others.

When I undertook to write this sketch, I thought it would be easy to say a great deal about the man whose name, while he lived, was synonymous, wherever he went, with the sense of help for the weak, of hope for the hopeless, of cheer for the sorrowful, of courage for all who were struggling in any good cause; and of bewildered terror to whoever was content to take for granted the rightness of his own claims, rights, religion, opinions, beliefs, or moral codes. But I find there is little I can say. And perhaps, after all, this incapacity of mine to find much to say about him is the true interpretation of the motives of those who named the mountain after him. Perhaps he filled the background of their minds as of ours with the sense of inexplicable inspiration and power, without giving them many intelligible facts to record. They gave his name to the highest thing they knew of, and left it to the Eternal Silence.

THE RELIGIOUS PHILOSOPHER AS A SOCIAL HARMONIZER

I

THIS article is not intended as a learned or metaphysical or in any way exhaustive treatment of a complicated subject, but only as a possibly helpful suggestion for lecturers or writers who are imparting instruction on religion or philosophy to any sort of mixed public. At Queen's College the writer was considered rather successful in teaching philosophy to young girls, in a manner which made each more, not less, interested in and loyal to the religion of

her own parents, while promoting religious harmony and mutual helpfulness between persons of different sects. As I am sure that any power which I may have possessed in this direction is largely due to what my uncle, George Everest, learned from a Brahmin nearly a century ago, it will only be a natural expression of gratitude if I can hand on the help to any native of India, who may now be puzzled owing to the apparent conflict between Eastern and Western ideas.

This article will be in two parts. The first will contain some general suggestions as to the precautions which it is well to take in order to avoid stirring conflict, weakening faith or destroying purity and the sense of the Ideal; the second part will consist of a skeleton or frame-work on which the teacher may conveniently arrange whatever he may have to say on the subject of religious philosophy.

The teacher of religious philosophy may with advantage strike boldly at starting the master-keynote of the whole symphony of religions, the need for religious differentiation. The various parts of the chorus, the various departments of the subject, then fall naturally and easily into their proper places. In a class of philosophy there need be, there should be, no suggestion of a question as to which religion is truer or better than others. Anything of the kind is as out of place as a discussion in a university about the respective degrees of usefulness of the learned professions for which it trains men. They are the expression of different needs of humanity; each attempts to supply some one of those needs. Some group of people must be told off for, and in a certain sense more or less sacrificed to, the supplying of one of these needs. And the best that any of them can do for humanity is to do its own work with conscientious fidelity, and take sympathetic interest in the work that is being done by others. No person can be considered truly educated unless he has intelligent sympathy with all the religions of the world; but he should also have some real knowledge of, and a feeling considerably warmer even than intelligent sympathy for, that of his own ancestors. This point should be strongly emphasized in the first lesson.

Too many teachers treat ancient philosophies and religions entirely from what may be called the anatomical or dissecting-room stand-point, *i.e.*, they think they have given sufficient account of a religion when they have minutely described its construction at some one or more given epochs. Before one can understand an ancient religion one must investigate it biologically, that is, show its life history. It must be pictured as constantly decaying, and being re-formed; as acting on other religions and being acted on

by them. Pupils should have it kept constantly before their minds that every religion tends perpetually to degenerate into superstition, that constant watchfulness is necessary to prevent this degeneration from truth into superstition going on within one's own mind. This general thesis—the perpetual gravitation of religion toward superstition and the need of incessant watchfulness—should be profusely illustrated by examples. But the examples should always be taken from the past, from errors that "are dead and done with"; the teacher should scrupulously avoid making adverse comments on customs which prevail anywhere in his own day. If one neglects this precaution, one can never be sure of not hurting the feelings of some parent, pulling up the precious seedling of racial loyalty in some pupil, or diminishing the likelihood of some member of the class coming to sympathetic comprehension of somebody or other whom he may meet in future. The teacher of religious philosophy is in honour bound to observe this rule. The temptation to break it may seem at times great; but it vanishes as soon as one has a clear perception of one's relations to the whole subject.

But it will be asked, is the teacher of religious philosophy to make no attempt to prepare his pupil for choosing the good and rejecting the evil among the tenets and practices of his own sect? Certainly he must make the attempt; indeed his success in this very object is the proof and the measure of his fitness for his function. But there are far better ways of accomplishing it than by adverse criticism of anything that contemporaries think or do. And here comes in the value of a mixed class; it helps the teacher to resist the temptation of drifting towards an easy but ineffectual method of assisting the choice of the pupils. The correction of the superstitions of any one religion is to be found in the highest ideals of some other. By laying constant stress on that aspect of each religion which presents it as a pure and perfect, though partial, ideal, one gets the class gradually into a habit of reverence, each for the best side of his own religion. Attention is taken off from those elements in which there are superstitions. Nothing is said that would hurt the feelings of his parents or his clergyman if repeated to them. Neither friction, tension, nor need for reticence at home is set up. And all the time, the *tension* of the pupil or such of his hereditary customs as are either degradations of, or unimportant accretions round, its main ideal, fall insensibly into a secondary place in his mind and gradually lose their hold on his imagination. He continues to carry on the customs of his sect thinking less and less of *them*, and seeing more and more clearly the truth behind them, but still practising them reverently as

homage to his ancestors and a tribute of respect to his immediate family till the time comes when they are inconsistent with some higher duty. When that happens he is able to drop them, without scruples of conscience or emotional suffering. As David Marks is fond of saying, religious custom is not the nut, but it is the shell of the nut, and it should remain unbroken till the kernel is ripe and ready to act as living seed. There is a long interval between the first forming of the tiny kernel of true faith and its final ripening. Meantime, it has to be fed in order that it may grow, and the best fertiliser for growing kernels of faith is the habit of reverence for every mode in which any human being tries to express his faith and aspirations.

We come now to a principle which should be explained to all pupils as soon as they are old enough not to be confused about it. The transcendental cannot be *directly* grasped by the human intelect or senses. It appeals to the emotions of man and reveals itself to his spiritual vision ; but the intellect has no direct hold on it. It has therefore been the custom of religious thinkers in all ages to facilitate the process of thinking about their relations to the eternal by reference to something within the scope of intelligible experience. This custom is vaguely described in Europe as "Oriental Metaphor." It might with more appropriateness be described as Inspired Common Sense ; it is no more Oriental than it is Greek or Scandinavian, or Irish or American-Indian ; it is the spontaneous method of all races which have not yet sold their birthright of Genius for a mess of Academic Pottage. It rests on the perception that whatever is in the created must exist potentially in the Creator.

In ancient times the framework of Metaphor, chiefly used by religious thinkers, consisted of allusions to the various relations between human beings. As civilization goes on, this becomes objectionable for ordinary and religious teaching. Relations between human beings involve emotion, passion, tension. It is found better for the health of intellectual and neurotic people that religious *emotion* should be kept pure from all admixture of other feelings, and that the intellectual portion of the religion should be built on a framework of depolarized and unsensational symbolism. An immense amount of interesting work in this direction has been done in Europe within the last hundred years. Some account of this work will be given in the second part of this article. The point to which I wish to call attention at once is that though religions built on a non-emotional framework are most suitable for general public teaching at the present day, yet no study of ancient philosophies or religions can be thorough without a considerable amount of analysis of the emotions connected with personal human ties,

including the question of both normal and abnormal relations between the sexes. I will conclude this portion of my subject with a suggestion or two for the teacher whose duty lies in the direction of preparing Asiatic pupils for entering into sympathetic relations with England without loss of purity, dignity or self-respect.

God forbid that I should suggest that we in England now are on the whole less pious, less earnest, less fervent than our forefathers or than any Asiatic race. Our fervour is as great as ever and so is our power of self-sacrifice. So also, I am sure, is our *latent* potentiality of devotion to an Ideal—if we had an Ideal. But not one man or woman in ten thousand in England now has any definite knowledge of what it is that he is devoted to. When we find that out, there will be a tremendous national renaissance. The British Lion, some fifty years ago, fell asleep, after an over-hearty meal of material prosperity. Just now, he is struggling in a nightmare caused by indigestion, in which scraps of all sorts of Ideals are mixed up into fantastic horrors. But he will wake up presently; the spectres will vanish, and he will regain a clear vision of his own gods. The teacher in India would do well to get himself penetrated with that notion; he will then be all the better able to prepare his pupils for coming into organic relations with the England of the future.

The teacher should take care to avoid a mistake into which he may be led by mere sounds of words. Europe is *supposed* to be Trinitarian. The Christian religion is usually described as a Trinitarian one, and so indeed it used to be in the days when it was organic and strong, and a source of strength to Europe. But the conception of Trinity hardly exists in Europe now. Some of us shout the word Trinity very loud in Church on certain special festivals, but it is safe to say that no man in England has any idea of the meaning of the word unless he is to some extent a student of Oriental thought. The religion of England now is a mosaic of scraps from all the five types, to be described in the next paper, arranged, not in organic union nor even as a good mosaic, but jumbled together anyhow. And whoever wishes to know the meaning of the doctrine of the Trinity had better begin by paying no attention to what is said on "Trinity" Sunday by English clergymen in the present day.

II

The following is, of course, not intended as an exhaustive treatise on a large subject; it might be used either as an initial address

or as the general syllabus of a course of lectures on religious philosophy by any teacher who desires to promote mutual understanding between Asiatics and Europeans. The history of religion is mainly a history of the action of the human mind on two apparently conflicting processes, and the relation between these processes. The one is that known as anthropomorphism, that is to say, the inventing of gods in the likeness of man ; the other is the gradual raising of the mind of man into a possibility of assimilating eternal truth. But in order to form a conception as to how the mind acts on this relation in so serious a matter as religion, we must first be quite clear as to how it acts on a similar relation in more trivial matters. And that must be my excuse for the apparent bathos of commencing a course on religious philosophy by an analysis of something with which everyone is familiar—that known as arithmetical notation.

Man can, if he likes, arrange numbers in any scale of notation that he finds convenient. We "carry" twelve pennies as a shilling, twenty shillings as a sovereign, sixteen ounces as a pound. There is nothing in the nature of number itself to make one of these more right than another. But on the whole, whenever there is nothing external to determine which shall be used, we find that the mind of man gravitates normally towards counting and carrying in tens, or, at more elementary stages, in fives. The reason is obvious in the ten fingers. Suppose that an inhabitant of another planet knew nothing else about man, but had a good opportunity of investigating all the schemes of notation used on earth, he would come to the conclusion that man was a creature who had some sort of natural counters, ten in number, arranged in two groups of five each—and this would be a true conclusion. Elementary man counted on the ten fingers of his two hands. We do not need to go to scales of notation to find out how many fingers our ancestors had ; we can see our own fingers.

But the mind of man is a thing we cannot see, nor can we perceive it by direct cognition. We have to infer its laws partly from a consideration of the nature of the work done by it. We learn something of the laws of the human mind from a study of the works of our forefathers, much in the same way as an inhabitant of Mars might learn a little about our anatomy from a study of the notations invented by earth men of olden time.

We can, to some extent, do this by the inspection of such subjects as the natural sciences. Each science bears the stamp of the condition of mind of its creators; but in physical science this element is mixed up with and obscured by a very large proportion of statements of external fact, revealed to man not by his mind, but by his senses.

The psychology is much more clearly seen when we are dealing with the abstract sciences, logic and mathematics, and with man's presentation to himself of his conceptions about the universe, about God the Great Unity, and about the relations of man to man. Or, in other words, about philosophy, religion and ethics.

Each race can know something of its own nature, and the best way of using its own special faculties, by studying the religion, philosophy and ethics of its own ancestors. And we can all learn something about the faculties which are common to us all, and the best way of using them by a reverent study of the ancient religions, philosophies, and ethics in general.

In ancient times, study was not so much divided as now into water-tight compartments. Books being few, and the persons incapable of reading many, the public service of the God or Gods was practically a school. Most things considered valuable by a nation were publicly taught in its temples. And the study of an ancient religion, therefore, brings us in contact with the main ideas, on cosmogony, philosophy, ethics and even hygiene of the people among whom it prevailed.

We are going to see what light we can gain on the working of the human mind from the study of the structure of ancient religions. For this psychological purpose it will be well to classify religions into five main groups, viz :

Those which lay the main stress on the idea of Unity ;

Those which lay the main stress on the idea of Duality ;

Those which lay the main stress on the idea of Trinity ;

Those which lay the main stress on the ideas of vicarious atonement and voluntary renunciation.

There is another group of religions which are, what is often called by bigots, "heathen," "pagan," "polytheistic" or "idolatrous." In so far as these terms imply any reproach or disrespect, they are totally inappropriate. Polytheism is not necessarily either immoral or false. But it tends rather to give outlet to the emotions and the artistic faculty than to express the working of the intellect or conscience. It is, therefore, in a sense, less serious than the religions of the other groups ; that is to say, it is more attractive and intelligible to simple peoples who feel keenly and do not think overmuch.

Of the five main religious principles, any or all may be taught in the same temple, to the same congregation ; may even be illustrated in the course of the same ritual. But it is somewhat as a movement in music, chiefly in one key, may wander into another key by means of accidentals ; some one key must predominate, or we have, not organic music, but a mere meandering sequence of

more or less agreeable sounds. This is one of many reasons why one should remain in the faith of one's forefathers. One need not be narrow or prejudiced ; one may profitably diverge into the study of other religions ; but life should be dominated by the key of reverence for one's own, or one drifts at the mercy of mere sentimental impressions.

The perversion of any religion is nationally disastrous. The best way of purifying any, of keeping it to its true purpose and preventing it from slipping down into perversions, is to bring its devotees within range of clear vision of the others at their best.

The Religion of Unity in reality lays stress on the contrast between the eternal and the temporal ; between the absolute and the phenomenal ; between the infinite and the finite. It treats all phenomena, all the various happenings of life, as a succession of shadows cast by one eternal substance. From that eternal we came out ; to it we shall return ; what happens in between the coming out and the returning is of comparatively small consequence. Good is Eternal ; evils are transitory. Loss, sorrow, what are they ? The Eternal is always there. If He has taken away some source of joy, it is as a teacher wipes off from a blackboard some noble lesson or some beautiful drawing, as the necessary preliminary, to writing some other. Let us think not of our temporary loss, but of His Eternal Presence. He loves us all and always, because we are His children. If we quarrel and hate and wrong each other, He will reconcile us in His own good time. "I make peace and I create evil," saith the one God.

The Unity-God appears in many forms—as the Holy One of Israel, "without parts or passions," the stern discourager of all abnormal forms of self-indulgence : as the Greek Pan, the authoriser of all freedom and condoner of all licence : as the genial all-Father of Scandinavian mythology.*

The Religion of Duality originates as a recoil from the bad forms of unity religion. It lays stress on the incessant contrast between good and evil. So far as man is concerned, they are equally persistent and are, therefore, practically eternal. After every day there comes a night : Satan, or Ahriman, is always ready to tempt every man : every good that man pursues leads him towards some temptation. The lamp of the watcher must be always alight ; the fire of Tophet must be always burning, to consume impurities which would spread infection ; vigilance must be incessant, unbroken, or man drifts helpless down into some moral abyss.

*The question, on what depends the moralising or demoralising influence of any religion which emphasises the idea of the Divine Unity will be the subject of a separate paper. It need not be entered on here.

The Religion of Trinity has nothing to do, directly, with either ethical direction or spiritual consolation. It attempts to balance and guide the intellect. The contrast which it emphasises is between various departments of study. It exerts a profoundly ethical tendency ; but indirectly, by keeping a check on intellectual conceit and exaggeration.

Man is a creature whose mind, when working on any abstract question, works most normally in threefold classifications. Time is continuous ; but man naturally classifies it as Past, Present and Future. Space is homogeneous and direction indeterminate ; but man finds his way about in space, mentally, by thinking of it as arranged in three dimensions. And, on a similar principle, our intellectual apprehension of the Divine becomes clearer when we classify Divine action as exhibited :

1. In the creation of external Nature ;

2. In the conduct of human life and the organisation of human society.

3. In the voice within man's soul, the Inspirer.

These are presented, not as rivals (like "good" and "evil" in the dual classification), not as separate beings ; but as three "Persons," from *Persona*, a mask ; the outer disguise which the actor on the stage changes according to the character which he is presenting at the moment. The three Persons (or masks) of the Trinity are in reality three main lines of study : That of outer Nature ; that of human History ; and that of Mental, Moral and Psychologic Science. No one whose intellectual faculties are undergoing severe strain can safely afford to despise any of these lines of study. Every man who is pursuing one of them should respectfully seek the aid of brothers who are pursuing the other lines. "In this Trinity none is greater or less than another" ; they are to be treated as co-equal, on penalty of permanent damage to the intellectual and spiritual faculties, if this precaution is neglected. The student must also be careful to remind himself that they are not three separate Gods, but one God seen by man under three masks. The essential action is One. There can be no conflict between various kinds of Truth except in the human imagination ; essentially, the revelations of physical Science, of human Ethics, and of personal Inspiration are the same ; if we do not see them so, it is because our apprehension of the apparently hostile revelations is as yet inadequate ; for in reality they are essentially the same ; their Majesty is equal ; their Truth co-Eternal.

The Trinity Religion takes on many forms as it passes down the ages. The first Person, or mask, the Creator, Elohim, Brahma,

God the Father, is seen in connection with a variety of astronomical or meteorological phenomena.

The Second Person or Mask, Vishnu, God the Son, God as the Organiser of human society, presents Himself to the unphilosophic imagination as the organiser of one's own race in particular or as the patron and model of whatever virtues the teachers of the time are most anxious to cultivate. Thus he gets confounded with all manner of tribal deities, of national heroes and of incarnations.

As for the third Person of the Trinity, there is no end to the disguises under which He appears. And this is not to be wondered at. Personal Inspiration of new Truth is often accompanied by physical sensations or mental emotions, which vary with the individual. There is a tendency to mistake these sensations or emotions for the cause of the inspiration ; and therefore to connect the Inspirer with whatever excites the sensations or emotions. The Inspirer appears as Bacchus, the Wine-God ; or as some God of Love (of more or less pure type). Or, because loss, sorrow and pain open one's eyes to many truths unknown till sorrow comes, the Inspirer is seen as Siva, "the Destroyer," or Moloch, the consumer of children.

The student will be much helped in his way through the tangle of apparently conflicting evidence, if he will bear in mind that in every age and country there have been quiet thinkers mingling with the emotional worshippers and active zealots, and helping to mould their religious ideas ; and that the *thinker* gravitates naturally towards presenting the Divine under three "Persons" or masks ; viz., the Works of Nature ; the History of Man's social organisation ; and the Fact of Inspiration.

But no process of thinking gets rid of the problem of evil. Nor does any kind of ethical discipline enable man to carry out with logical thoroughness his ideal conceptions of justice and benevolence. Whatever arrangement men make with a view to promote justice and mercy, someone's rights will have to be ignored, some race of creatures must be sacrificed to carrying out the arrangement. If we are providing meat dinners, we must have animals killed ; equally so whether the food is for ourselves, for our families, or for the poor ; and if we become vegetarians in order not to kill animals for food, we must kill the wild creatures who would prey on our crops. Agriculture conducted on sentimental principles is necessarily a fiasco. The same terrible truth manifests itself in our relations with our fellowmen. When all has been said that can be said, about Humanity, Charity and the Brotherhood of man, it still remains true that the weaker must go to the wall. A society, like an individual organism, must cast off its effete par-

ticles ; the fit must survive and the unfit must be let go to ruin : or at least to what looks like ruin as seen from our earthly point of view. Social progress, and the moral evolution of man must have their victims ; the only question is—who shall the victims be ? All the sacrificial rituals of antiquity recognised this truth. Whatever elements of superstition, of sensuous passion, or of priestly greed may have got mixed with these rituals, the basis of them all is a public object-lesson in recognition of the principle that no community can conduct its own social, ethical or religious life without sacrificing something or somebody who is treated as outside the pale of the association.

The ordinary reformer, in religion or ethics, tries to shift the burden of the sacrifice, to widen the ethical association, to make it include some class which has hitherto been treated as outside the pale of justice ; or to make it extend mercy to some who have hitherto been treated merely as materials for sacrifice. He assumes that it is good to be inside the pale ; to be treated as a citizen, a fellow-creature, by those within. His reform takes the direction of trying to rescue this or that class from the victim's fate.

But a few times in the world's history there has been born an individual, Buddha or Jesus, whose consciousness is inverse to that of ordinary man. By some process of induction outside of all human logic, he arrives at the belief not only that all which God does must be good, but that, of all good things, the fate of the victim is the best. Gifted with unusual intellectual powers, he refuses to exert them for the direct furtherance even of those objects which in themselves seem to him to be good. He sees that there is something better than success even in the doing of what seems to oneself good. Instead of exerting himself to get some who have hitherto been despised and rejected admitted within the pale of justice and mercy, he insists on putting himself outside of it. He says to the despised outcasts : "Brothers, you have the best in life ; admit me into your ranks." He says to the Eternal : "Father, thou willest that there shall be victims to progress ; let me be the next victim." He says to respectable society : "You must be unjust to somebody ; I will force you to be unjust to me."

Respectable society, startled and perplexed, understands nothing of what is happening, except that its cherished Ideals are being somehow attacked. It feels that its very foundations are being undermined. It takes the anomaly at his word, and sends Him back to the Unknown to which He normally belongs.

And when He has gone back to the Unseen Father, Humanity wakes up to perceive that the Divine passed by while it was asleep and dreaming. It recognises that the lowest place was that which

the Highest chose. The stone which the builders of social order rejected becomes the headstone of the social edifice ; men perceive in bewildered amazement, that the unintelligible, helpless, meaningless, impossible factor in the state, the man without personal ambitions, the voluntary associate of all that is outcast and despised, embodies a force such that whoever and whatever attacks it is sure to be broken in the shock ; and that, should it decide to attack anyone, it would surely grind him to powder. And out of their terrified penitence for a mistake which they could not have avoided making, there grows up a religion in which religious worship is paid to the Incarnation of all which is rejected and despised by mankind.

The teacher of religious philosophy has no right to express any opinion as to the respective merits of different modes of worship. But one prediction he may safely make. Whoever has courage to turn the search-light of psychologic investigation in among the phenomena of inverted consciousness, holds in his hand the key to the intellectual and spiritual future of mankind.

AN EPISODE OF PROGRESS AND REFORM

CERTAIN public workers in Bombay and elsewhere have conceived, and are attempting to carry on, in India, a gigantic enterprise of reform and reconciliation ; so at least I gather from a valuable book which a friend has kindly sent to me. As I read it, I was constantly reminded of an episode which passed in London, with comparatively little notice at the time outside of the Jewish community, though its consequences have been widespread and far-reaching, and which has always seemed to me to present, in a small compass, all the main features of reform at its purest and best—reform in its truest sense ; the re-formation and re-construction of a religious Ideal which has fallen into superstition and degradation.

India is a large country, and some things are most easily done on a small scale at first. It is true that difficulties present themselves when a thing has to be done on a large scale, which did not obstruct the path of those who were successful on the smaller one. Nevertheless, a record of a small experiment, under comparatively simple conditions, is sometimes suggestive to those who are wrestling with the more complicated circumstances ; and possibly, therefore, the following sketch may not be quite without interest.

It will be a great honour for me, if I may be privileged to introduce to the reformers in India such a man as my venerable friend, David Marks, the Leader of Reform in Anglo-Israël.

The father of David Marks, who had at one time been prosperous, died, in or about the year 1820, having been unfortunate in business and leaving hardly any provision for his young family. The widow, who is spoken of by her son as an excellent mother, had a struggle to maintain her children. She sent the boy to the Jews' Free School. He had been already well taught at home. He had read Hebrew and English before the age of four ; and soon after entering the school, at nine, he was found useful in teaching other boys. At fourteen he left school and found employment, first as teacher in a family ; then as reader in a synagogue and teacher of languages and of the Jewish religion and literature in Liverpool.

At fourteen David Marks had got into his hands a copy of the New Testament, and began to attend the English Church on Sundays, without, however, leaving off his attendance at Synagogue on Saturdays (the Jewish Sabbath). The Jewish religion was at that time entangled in a mass of ignorant superstitions, and its condition much resembled the descriptions which I have heard of the Parsi religion as it existed in the early days of the last century. David Marks was fascinated by the New Testament, and by some aspects of the Christian religion as it existed in England. For some time he meditated "turning Christian" (as it is called) ; *i.e.*, renouncing Judaism, and joining some one or other of the many sects professing Christianity. As he told me long afterwards, if he had decided after only three years of study of the question, he would have taken the step across, but he waited to study further ; and, after six years, he decided that he would rather see what could be made of Judaism. It had occurred to him to observe that Jesus Christ, the object of worship to Christians, had never attempted to found any new church ; being born a Jew, he had remained so to the end, and not left the Church of Israel, but done his best to reform it and bring it back to consciousness of the essentials of Mosaism. At the age of twenty David Marks perceived that the best "Christianity" for a Jew is to follow the example of Jesus Christ by doing his best to purify the Church of Israël, to bring it back from a tangle of idle ceremonial to the ethical conception of faith in God, the Eternal *Unity*. When he was thirty, some wealthy London Jews, seeing no spiritual or other use in the mass of minute observances which at that time made so large a part of the routine life of Jews, built a synagogue for themselves, and commissioned the Reformer to draw up some rational form of ritual, which, while Jewish in its essence, should be compatible with the life of cultured citizens of a country such as England.

Here was his opportunity ; and nobly did he avail himself of it.

Among the doctrines which he set before his congregation were the following :

Man is, by nature and inalienably, the child of God, the Unity, prior to, and independently of, any Church, creed, or religious opinion.

Races are selected by Divine Providence to bear witness to, and preserve from oblivion, special Truths. Each race has its special mission, to which it had better remain faithful.

The mission of Israël is to preserve and teach the doctrine of the *Unity* of God. Until all the world is, in some form or other, monotheist, Israël should preserve its Church and ritual distinct from those of other races, as a perpetual witness of that special element of Truth—the Divine Unity.

But other races have other truths entrusted to them ; and each race, while preserving the ritual which fits it for its special mission, should, for the sake of its spiritual development, study the sacred books and the best literature of other races.

The ceremonial of a Church is the framework of discipline by which the race to which it belongs is prepared and fortified to be a witness for the special Truth entrusted to it.

Ceremonial lawfully may, and necessarily must, change with the progress of the ages. The reformers of each succeeding age should aim to select for preservation such elements of existing ceremonial as are suitable for keeping the people in touch with the most vital portions of their ancestral past, and most likely to brace them up to the truth for which their race is a chosen witness.

The distinction between religion and the knowledge called "secular" is an artificial one. The whole conception of such a thing as ignorant piety is essentially heathen and idolatrous ; he who truly loves the true God, in no matter what church, will desire to know as much as he can of the works of God and of the history of man.

It is unwise to become a convert from any church to any other ; because the doing so implies that one is safer in one church than another. Whereas man is safe in any church, God being the Father of all churches, and each one the vehicle of some special truth and the shelter of some race. Therefore, it is wise to remain in the church of one's fathers and endeavour to purify and reform it as opportunity offers.

Besides the above openly avowed doctrines, David Marks cherished certain aspirations, which, though not exactly expressed in words, could easily be inferred from his sermons by any one observant enough to listen for Harmonic Undertones and to

"read between lines." Among these cherished aspirations were the following :

He hoped to destroy the prejudice against the New Testament and all connected with it, which had grown up in the Jewish mind by age-long association with persecution of Jews by so-called Christians.

He hoped to make of his synagogue a place where Jesus Christ (if he could come back to earth) would find himself at home and love to worship.

He hoped that some of his congregation would, at some future day, render signal service to England, as a thank-offering for the shelter extended to Jews by the English Government when they were persecuted in other parts of Europe.

And he hoped, especially, that some of his congregation would render service to the cause of national education in England.

The new synagogue was opened in January, 1842. The ritual is wonderfully beautiful and some of Mr. Marks' published sermons constitute a masterly summary of the duty of the pious Jew in a non-Jewish land—a priceless commentary on that utterance of Jesus, "Render to Cæsar the things that are Cæsar's, and to God the things that are God's." The first proceeding of the orthodox Jewish authorities was to pronounce on the reformer the sentence of excommunication. All the curses which the Hebrew language contains were written out, and then read aloud in the principal synagogue of London, as due to fall on the head of the reforming preacher, his congregation, and everyone else who should be guilty of holding intercourse with him or giving him food, shelter, or countenance.

Then awoke in the young apostle of peace that fighting spirit which is a necessary underlying element in the composition of every effective reformer, no matter how charitable may be the Ideals present to his consciousness. Two new aims added themselves to those previously entertained by David Marks : He aspired to convince his congregation that "curses hurt no one except the utterers" ; and he hoped to prove to the people of Israël that "no excommunication is worth the paper it is written on." (About this last utterance of my revered teacher, I shall have a word to say in sequel. For the present I am giving an account of David Marks, and need not express any views of my own.)

A few years after the opening of the Reform Synagogue, the undenominational College (London University College) needed a Professor of Hebrew and Syriac. David Marks secured the appointment ; and this opened up to him the acquaintance, which in some cases soon ripened into warm friendship, of several of the

foremost non-Jew teachers of his own generation and the next. Charles Babbage, Augustus de Morgan and Kingdon Clifford were successively his colleagues and friends, and it would be difficult to say which of the two has profited most, English science or Jewish culture, by the consequent interchange of ideas and ideals between the Semitic Reformer in Religion and the Saxon Reformers in Logic, who were trying to revive, in England, the old Asiatic Science of the use of accurate notations as implements and vehicles for accurate thought. David Marks is what is called "a scholar," *i.e.*, one learned in ancient languages and literature ; he has had little opportunity for understanding physical sciences or the details of mathematical procedure. His interest in Hebrew "religion" is attached to the religious and ethical side of that religion. No one could be more puzzled than he seems to be when he is told that the Hebrew ritual is a storehouse of mementoes of ancient methods of teaching science and logic ; and that, by clearing it of accretions gathered in the dark ages of Mediæval Europe and presenting it to English thinkers in something like its pristine simplicity, he has opened up to us a long vista among many secrets of ancient science and art, the value of which he himself could only very dimly appreciate.

The Jewish authorities, I believe, had a genuine and cordial dread of the influence of the reformer. But they were not long in finding out that they had made a social mistake in attracting the notice of Christians to the fact that simple piety and true philosophic insight into the essentials of religion were *not compatible with Judaism as understood by orthodox Jews*. They wished to retrieve that mistake. By Jewish law, the curse, once laid on, could not be cancelled except on the penitent application of the accursed man. An intimation was conveyed to David Marks that if he would only make the necessary application, he would be received back into communion with orthodox Israël, without much in the way of concession on his part. But the reformer had his own project to prove that curses do not hurt ; he therefore refused to say or do anything which could be interpreted as implying that he considered excommunication an evil, or that he had taken any notice whatever of the curses which had been hurled at him. His motive for this refusal was not understood ; and it increased the bitterness of his opponents. But they were "fighting against God" (to use the old religious formula). They were fighting against an unconquerable combination of forces, all enlisted on the side of the reformers.

David Marks is an extremly benevolent man ; it is intolerable to him that any creature should suffer pain, if he can by any means relieve the suffering. To help the poor and sick was, as long as he

was able for the exertion, his greatest pleasure. He was appointed almoner to some wealthy members of his congregation, and was indefatigable in using the means thus placed at his disposal for the benefit of sufferers of all nationalities and all creeds. His wealthy co-religionists, however, naturally required him to give special attention to poor Jews. He became a well-known and welcome figure in the poor Jewish quarters. There were streets, where, at the age of seventy, he could hardly pass along, so obstructed was his path by men and women anxious to kiss his hands or touch his coat; a member of his family informed me that, in those very same streets, he had, at and soon after his excommunication, been spat at and pelted with mud.

Then, again, he had a fine voice, and a manner of speech highly cultivated, yet entirely free from affectations; and a delivery charged with that restrained passion which, more than any other quality, makes preaching impressive. A trained musician collected many beautiful old Hebrew chants, laments, and hymns, and wove them into a musical arrangement of great beauty. The whole service of worship at the reform synagogue is wonderfully attractive to the cultured and thoughtful. It is, however, unsuited and uninteresting to the mass of uncultured Jews. We may be thankful that the authorities have had the wisdom not to attempt to model the worship at other synagogues on Mr. Marks' pattern, although the orthodox synagogues have taken courage from the example set by the reform synagogue to omit certain customs which fostered heathenish and barbarous ideas.

The reform synagogue, from the first, attracted a certain number of cultured non-Jews; and David Marks occasionally addressed some portion of his sermons especially to these visitors from other religious persuasions, interpreting Jesus Christ to them, in the light of a typical Jew prophet and reformer. Not a few of these outside members of his congregation have applied to be received into the Jewish Chruch as converts. He has given me an amusing account of his answer to these applicants. He used to say to them: "You wish to join our Church formally? Why? What benefit to you expect to get by such a step? You wish to join us in prayer? Very well; you will always be welcome among us whenever the synagogue is open for worship. You wish to read our Scriptures? No one hinders you. You wish to keep the ethical commandments of Moses? I am glad to hear it; you will be all the better citizens. You wish to conform to our religious and domestic ceremonial? It is the discipline of a Race; for you it would be burdensome, unmeaning and useless. You wish to be descended from Abraham? Ah! I am sorry, it is not in my power

to grant you that. Then, what is it that you seek from me?" Sometimes the visitor would begin to talk about the value of Mr. Marks' instruction and the superiority of his sermons to those in Christian Churches. Then his tone would change. "If I have taught you anything good, go away and practise it, and teach it in your own Church; and do not come here flattering me."

Flattering him about his sermons was the shortest and surest way out of his favour and into his contempt. I have sometimes been tempted to think that he held it as the one unpardonable offence! The synagogue was, for him, the House of God; to make of anything that went on there an occasion for glorifying man was utterly abhorrent to every instinct of his soul and every feeling of his loyal heart.

Being such a man as he was (and is), and situated as he was, the ultimate victory was, as I have said, inevitable. The anniversary of his birth is now held in Israël as a sort of Jewish Christmas, a Festival of Reconciliation for Israël. All parties in the Jewish community unite in demonstrations of affection to the Leader. On his ninetieth birthday he sat, from ten o'clock in the morning till after dusk, receiving telegrams of congratulation from pious Jews all over Europe, and deputations of ministers from every synagogue in London. A letter from the Hebrew College of Cincinnati, America, appeared in the *Jewish Chronicle* of that morning, thanking him for having pioneered the Jews of the world into line with culture and progress.

And all the curses in the Hebrew language are still resting, unrepealed but harmless, on his venerable head! He has grandly carried out his intention of robbing of its terrors the terrible formula of cursing, before which intending reformers had so often quailed!

Various members of the reform synagogue have rendered good service to the cause of National Education for Christian England. One of their most valuable contributions has been Mr. Claude Montefiore's "Bible for Home Reading," which has taken the literature of ancient Palestine out of the category of sacred fetiches, and made it an available storehouse of knowledge of ancient Semitic religion, philosophy and literature. The book is held a household treasure in many a Christian home. We hope that Mr. Montefiore will, at some not too distant date, give us his impressions—those of a pious but liberal Jew—about the life-work of Jesus Christ, the martyred reformer of Israël.

Having said so much I feel that I should not be doing justice either to truth or to the Church of Israël if I did not express my sense of the profound wisdom of the custom of excommunicating

(excommunication, *i.e.*, officially putting out of communion) those who attempt to modify a time-honoured ritual. The curses which used to accompany the ceremony are, of course, absurd remnants of some dark and savage age. But the ceremony itself is only a public recognition of the truth that a certain principle which everyone acknowledges with regard to attempts at material progress is valid also when intellectual and spiritual progress is in question, *viz.*, that *pioneers must accept loneliness for a time.* Explorers who are going to open up a new country must for a time forego the society of the weak, the timid, the sick, the maimed, the very young and the very old. Those who wish to experiment on chemicals the properties of which are as yet unknown, must begin by shutting the doors on ignorant, untrained, inquisitive and meddlesome children. Weaklings need the shelter of accustomed surroundings, and ought not to be encouraged in following a reformer who is trying new methods till these methods have been tested by the brave and the strong. When we rightly understand the ethics of reform, excommunication will precede, not follow, the attempt at change. It will not be inflicted as a penalty, but applied for by the intending reformer as a protection from the responsibility of being followed against his will by those unfit to face doubt, perplexity and danger. It will be accompanied, not with curses, but with blessings, thank-offerings, and songs of praise. When brave men are starting out on an expedition of research, they hope to come back laden with good news which they will then be able to share with the weaker brethren whom Providence has marked out for some function less adventurous than that of the pioneer. Those who are to profit by their exceptional courage invite them to a farewell banquet at which the blessing of unseen powers is invoked to prosper their undertaking. The same idea, surely, should underlie the excommunication of a religious reformer.

THE PURDAH: A WESTERN VIEW

To the Editor, EAST & WEST

SIR,—I have been reading over again the article on "Purdah" in October *East and West.* It is wonderul in its masterly grasp of one very large set of facts, and its clear logical arrangement of those facts. But like all work of the kind, it is one-sided. May I put the other side as I see it? Mr. Apte feels (as every good man feels) the need which the youth has of the influence of a mother,

He seems to have overlooked the fact that the girl has the corresponding need for the personal influence of a father.

I am going to put, shortly and crudely, the result of a great deal of experience which has come to some of us in England since the movement of "the higher education of women" began here.

At very low levels of culture, where the education is simple and occupations almost entirely of a physical kind, the young of each sex can safely be left to be educated by older persons of the same sex. The boys learn to hunt, to ride, to wrestle, to fight and to manage boats; the girls learn to cook, spin and sew. In all this kind of thing there is comparatively little brain stimulus, and there is little need of intercourse between the sexes except for the physical purpose of propagating the species. But in proportion as there is more intellectual and nervous stimulus, there comes an ever-increasing need of, and craving for, what may be called the *magnetism* of the other sex. Now this can be given by intellectual contact, even better than by physical. But it must be had somehow. The craving is imperious, and the need imperative. The "higher education" of boys by men, and of girls by women, leads to an enormous amount and an endless variety of nervous diseases, including many forms of moral aberration. I cannot enter on this subject; I only wish to call attention to the broad facts of the case. We in England have succeeded fairly well in tracing many of these evils to their true source, but we need the help of Indian thought, as represented by Mr. Apte and some of your other contributors, in solving the practical problem of how to avoid them in future.

Yours faithfully,
AN ENGLISHWOMAN.

London.

THE MYSTIC SNOWFIELDS OF SCIENCE

IT is a matter of general knowledge that the act of worship has a great effect on the intellectual and physical condition. In phrenological language, the organ of veneration is one of the three principal nerve-centres. Any powerful and systematic action of this nerve-centre may be described as a mystic act.

So far, we can all agree.

But at this point humanity forks into several divisions. We have to do, on the present occasion, with two main divisions. The difference between them is not one of opinion, but of nervous organisation. There are people who can best live the mystic life

by thinking of some human Ideal; there are others to whom thinking of any human Ideal during the mystic act is dangerous to health and sanity. If I, for instance, attempt to engage in any seriously mystic contemplation, in a Christian Church, where I am being constantly reminded of "Christ," that is to say, a certain type of Humanity, I am attacked with a peculiar kind of brain-nausea, which I can only describe by saying that it is like a compound of several physical sensations, of which sea-sickness is one, and *not* the most unpleasant. All my real mystic life is spent either alone, or in Synagogue, where no Ideal is ever mentioned.

People say that the nature of the mystic life depends on early habit. That is, to some extent, true. One can sometimes divert a child from its normal mystic path, whichever that may be, to some other, if one begins early enough. I would add that there is probably no vicious habit more fatal to health, intellect, sanity, and purity, than that of getting into the mystic life on what is, for that individual, the wrong line.

All this has nothing to do with the question of Christian philanthropy. There are homes in which the Christ Ideal is the accepted standard of the human life; and in which the mystic life itself is held as necessary as food or sleep: but where the attempt to *mix the two* is held in utter horror as a vice.

The two kinds of mystic life may be described thus: The Christian mystic takes for his motto "Look in the face of Jesus"; the mystic on our side says to his child—"Look where I'm pointing, child; *don't look at me*," and teaches his children to study the words of Jesus as the guide to practical conduct; but shelters them carefully from any suggestion that either personal love of Christ, or the desire to be like, or with Jesus, is to be the *motive* of conduct.

The relation between the different sets of mystics has been conducted for at least 4,000 years on a basis of mutual mis-representation and recrimination. Our side call the other side "Idolaters," and the other side call us Atheists, Materialists, and a variety of other names. Hard names break no bones, it is true; but a habit of reckless false statement does break human charity. When speaking in public about the use which modern Europeans have made of knowledge stored up in old Asiatic books, I have several times been contradicted about the contents—not the truth or value, but the contents and sources—of books which I had written, or helped to write, or studied with the authors, by persons who had not even read the modern books in question. I think we have had enough of this kind of Polemics.

Much stress has been laid upon the spiritual experience of the

Christian Mystic ; I propose to give here a slight sketch of some experiences of the scientific mystic.

The so-called Christian mystics have had the experience of finding themselves alone in space with God and give us descriptions of that experience. But when one comes to read what they say, one finds that what they really mean is that they have been alone in space *with Christ.*

A man who has seen information come to him down the scientific Jacob's ladder has been alone in space *without Christ.* The Christian mystic seems to have had all along the companionship of an ideal of human goodness ; but the scientific mystic has had the experience of being without any such companionship.

He has felt alone on the top of a snow-range without any indication of any difference between good and evil ; not only without present companionship, but without the trace of a footstep of anyone who has gone before ; alone among a waste of boundless, trackless snow. It is not altogether pleasant to be there, but it is very very good to have been there. When once it is over, one feels that it is, of all the experiences of one's life, the one we would not have missed.

The human being who has passed through the experience is never the same again. The change from Saul, the Persecutor, to Paul, the Apostle, is not at all greater than the change from the condition of one who has hitherto only used scientific notations and methods revealed to other people, to the condition of him to whom has been revealed, at first hand, any new impartial or non-moral scientific method or notation.

Reading the great old records of the past, one knows that such men as Moses the Liberator and the Electrician Elijah had passed through this experience ; and afterwards they wrote that they had seen God. The great Hebrew Geometrician, known in Europe as "Jesus," went through it and said that he had seen the devil. Everyone who has gone through it knows that both are true. God and devil are two faces of One Power. "I make peace and I create evil," says The One ; it depends on the state of the human Seer whether he sees *The One* as God or as devil.

A scientific man once said to me that there are some things that the world can never know unless some men will consent to be ill for the sake of knowing them.

The condition which he called being "ill," I call being up in the scientific snowfields, "whether in the body or out of the body I cannot tell." Those words just describe that condition. But there, I fear, ends its likeness to anything that St. Paul ever experienced,

or wished to experience, or could understand anything about. It is at this point that the history of the mystic consciousness divides.

The man of whom I spoke just now used to say to me that to hold any opinion as to whether there is or is not a future life is presumption. To feel that one can trust God in either case is faith. On nearly the last day of his life he told me that the whole universe seemed spread out before him like a great black ocean, where there was nothing to see; and nothing to hear, except at intervals a silver trumpet sounding the words, "For ever, O Lord, Thy word is settled in Heaven." After he had become speechless, I asked him whether he now believed in a future life. He shook his head and pushed my hand away. I asked, "Are you still willing to trust God for the future as well as the present." He nodded and smiled.

That is the state of mind which the religious world has been for a century or more calling Atheism, Pantheism, Materialism and Infidelity.

I myself, I may say, am fairly familiar with the scientific snowfields. I was taken up there several times as quite a little child, sometimes by one scientific man, sometimes by another. I was taken once by a French National Schoolmaster, in order that I might get a lesson, straight from the Unseen, about arithmetic. The particular Jacob's ladder that was let down for me was a rule of three sum; and a very solid affair it has proved. Scientific truths have come down it for me many a time since then.

Speaking figuratively, I might say that I have been up there in all states of the weather, and at all hours of the day and night. I have been up there when the sky seemed hollowed out of a glittering solid sapphire; I have been up there when everything was as black as pitch; I have been up there when everything was grey fog; and I have been up there when the whole atmosphere was a chaos of storm-spirals and flashes of lightning, against a background of lurid black clouds. But I have never come down without being very thankful that I was privileged to go up. One cannot always get up there at will. But when I am bodily ill, a visit to the snowfields, if I can get there, acts like magic on the bodily ailment, whatever it may be.

Whoever goes up to the snowfields finds that whatever meaning the ordinary language of religion and ethics had for him before he went up has disappeared. He sheds his ethical shell; but presently grows a fresh one.

And here we come to the great danger and temptation of scientific mysticism. It is so difficult to explain ourselves to those who have not shared our experience that we too often give up the attempt

as hopeless. We do not care how outsiders judge us. The scientific mystic fears only two kinds of misconception or misrepresentation, *viz.*, credit given to him which is due to his teachers, or homage mistakenly paid him by persons who would shrink from him if they understood what he really means. Any other sort of misunderstanding than those we welcome, for we know it is the necessary preliminary, and sure presage, of ultimate success. The meek, not the noisy, ultimately control the world. The silenced dead rule posterity from their graves.

We have learned from Euclid that those who are in the right need never contradict opponents ; it is simpler to give them free scope to bring themselves to a *reductio ad absurdam.* And I fear we are tempted to indulge in the devil's darling vice, "the pride which apes humility."

Christian mystics have their own sacred mountain and are probably much the better for climbing it. Most likely it is as high as ours. All I know is that it must be a very different place. And what they say about it conveys to most of us no meaning whatsoever. When I am hearing or reading what they have to say, I feel, much as I suppose a winged ant might feel when looking through the peep-hole of a beehive. Here is a grand culture going on, conducted by creatures not of my species, and whose language does not reach my ears. I have every possible respect for their activity in their own region ; but the two things I am sure about are that if they attempted to mix up with anything I want to do, they would spoil the work ; and that, if I tried to live in their town, I should get my wings clogged with the honey.

Of our own snowfields I would say that it is a region where it is possible to feel utterly alone without feeling in the least lonely : and to be conscious of an absolute cessation of all vital warmth without the slightest sense of cold.

It has always been a great puzzle to me what is the relation between St. Paul's ideas of Christian piety and the example of Jesus of Nazareth. There seems to be no immediately discoverable connection. But perhaps I might express the difference thus :

Christians such as St. Paul seem to be always looking for the foot-prints of Jesus on the sands of time. I have known one or two scientific mystics who took great pleasure in tracing his footsteps on the snow. But if they do that, they only prove themselves so far not his truest disciples. There does not appear the smallest evidence that Jesus Himself followed constantly in the tracks of any particular teacher. At the beginning, He seems to have followed the leading of Gamaliel, the great Teacher of Universal Brotherhood and Kindness. But later on He appears to have

started to steer Himself ; to find His own way and follow no man. And what He has given to science is not footsteps on the snow, but the compass by means of which he succeeded in finding His own way, across a trackless and virgin waste, to wherever God wished Him to go. And yet He was not alone, because the Father was with him.

The compass that Jesus gave to Nicodemus was the storm spiral with calm at its centre. The tree of life for science is the tree of knowledge of good *and evil.* Its first commandment is a stern prohibition to acknowledge any God except the Deliverer from bondage to any one fixed Eidolon ; the second is the caution never to put any Ideal on the Altar of the Unknown. The world of science provides periodically the harmless scapegoat, who is banished into isolation, after the sins committed by ignorance and rapacity, by self-assertion and self-glorification, have been laid on its helpless head. Its own ritual is the perpetual "giving up of *our best,** in order that God may give us His better." The ritual always concludes in the same way—by some blessing coming to the persecutors from the Misunderstood Ones.

Its ultimate outlook was summed up by Ernest Renan, who in his life-time was called, by all sections of the Christian world, "atheist" and "flippant scoffer."

This is the "atheist's" conclusion of the whole matter.

"God is always on the side of the persecuted, even when they are mistaken in their opinions." "And, in the Eternal World, the persecuted thanks the persecutor for helping him to his crown."

*J. Hinton.

OTHER INDIAN PAPERS

The Indian Spectator (Bombay).

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MARCH 24—INDIANS AND ANGLO-INDIANS.
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(1) The Theory of the Samplers.
(2) Hints to the Beginner.
(This appeared also in "The Parsi," Bombay.)

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OCT. 9—RACE PREJUDICE IN INDIA.

The New Reformer (Madras).

1908

AUGUST—THE TYPICAL REFORMER.
(This appeared also in "The Bharata," August 7th, 1908, Rajahmundry.)

INDIANS AND ANGLO-INDIANS

TO THE EDITOR OF THE "INDIAN SPECTATOR."

SIR,—I have read "Bharatatmiya's" letter in your issue of December 23rd last, regarding the strained relations between the rulers and the ruled in India. The first step towards solving the problem would be to understand its genesis. It is due to an inverted partial application of a profound truth—which is, that premature social intercourse, of a wrong kind, is morally disastrous, and especially so to the more sensitive, the more spiritual, race. Dr. Ray Lankester has shown how horrible diseases (bodily diseases) may result from too close contact between two healthy organisms. For instance, the Phylloxera disease was unknown on both sides the Atlantic, till American vines were brought to France; then, French vines were swept off by a new disease. Pasteur traced

this to microbes which swarmed on American vines and did not hurt them, because a habit of immunity had grown with the slow development of the microbe. When the fully developed microbe came on a French vine, the latter became a hideous, leprous thing. Possibly, the American vines which had brought the microbes despised their refined and sensitive French cousins—for having the disease !

I am sure this has been the case with our Jewish population. I was asked by a friend long ago to study anti-Semitism and ascertain to what causes I traced it. I asked friends everywhere, and found that it had its main origin in loathing of the gentilized Jew—who is, indeed, a very loathsome entity often. The refined, cultured, pious Jew, full of reverence for his own Law, scrupulous as to cleanliness in diet, bred in a horror of "sport" and accustomed to associate religious reverence with every slaying of an animal for food, is adorable. But his son who (unprepared and with none of *our* traditions of gentlemanhood which grew up along with our sporting customs and neutralized their bad effect) gives himself the airs of knowing all about fox-hunting, and asks loud in restaurants for pork in order to show that he has no respect for his old father's religion, is a *horror*. In every age that sort of Jew has forced himself to the front, while the true Jew gentleman kept in retirement ; till, at last, it got ingrained into our people's *unconscious* mind that Jews are not fit to associate with.

Then, again, there is the question of marriage. Young people *will* fall in love. Now Eurasians are occasionally remarkably fine people ; but often the reverse. They are a difficult factor to deal with. We are given to understand that Asiatics find them as difficult to deal with as we do. It is believed that the problem would be more complicated if the father were Asiatic than the other way.

Well, these are the facts made by God, not man. God set them as a difficult algebra problem, meaning man to face it, study it laboriously, and solve it scientifically. The average Englishman *hates* study and is impatient of problems. He finds it easier to dispose of the whole, by bringing up his daughters to despise Asiatics. It is a stupid, wicked, irreverent way of treating God's problems. But it is exactly the way in which the majority of English people treat everything that they find difficult to understand. The sooner intelligent Asiatics understand how deliberately and *conscientiously* the English cultivate the faculty of *stupidity*, the better. I have said, at more than one meeting for the discussion of Indian affairs : "The English official goes to work with a stock of the best intentions, an exhaustive knowledge of blue-books, and a carefully

cultured ignorance of the psychology of the people he is going to deal with." In fact, when you hear an Englishman talk of "justice" or "righteousness," you find, in 99 cases out of 100, that what he means by "justice" is—ignorance of psychology.

Then, again, if our English girls were taught psychology, they would understand that the tremendous psychic attraction which many of them feel for any man who opens up to them Asiatic Thought and the Sacred Past, has no real relation to proper, wholesome "falling in love" in a suitable way for marriage. The thrill which they experience is that of dawning spiritual enlightenment, not of normal human affection. Its very strangeness and intensity prove that there is too much spiritual novelty for any strong personal tie to be safe for the nerves and brains. If our girls were taught any rational psychology, they would be saved from many dangers, besides that of mistaking the lightning flash of sudden spiritual insight for the fire on the domestic hearth! But the average British paterfamilias being, as I said, the most intellectually lazy creature on earth, safeguards his daughter from at least one of the many dangers to which that laziness might expose her, by encouraging her to think of all Asiatics on the "d—d nigger" theory.

That is one of the many reasons why a Himalayan university taught by Asiatics, is so desirable. If youths who are to be high English officials in India were to be taught mathematics, psychology and philosophy by Indians, they would know how to teach their daughters their true relations to the East, and, besides that, Asiatic thought would no longer be such a revelation as to drive our girls mad of its intoxication.

But what can one think of an Empire which, possessing the Himalayas as a series of triangulating stations, has its main surveying schools in a flat little Island; and which, claiming Dr. Bose as a subject, omits to lay upon him the task of directing its *principal* laboratories? I am, moreover, credibly informed that Indian boys enter a laboratory, at fifteen years, with their *fingers* in about as high a state of efficiency for manipulation as those of a great English scientist in his prime. Why then are not some of our future scientists sent to India to be taught manipulation by Hindus? The answer to all these questions is the same: it is easier to say a few contemptuous words than to face a multitude of important facts.

The average Englishman will face any amount of labour, suffering and danger in the execution of what he conceives to be his duty; that is why he was able to conquer India. But he seldom

conceives to be his duty to understand a complicated situation: that is why he cannot manage her harmoniously.

But I do think English people might be got to understand what enormous advantages *for England* are being wasted for lack of an Imperial University of Science, Philosophy and Art in India. And if we had such a university, your countrymen could teach some of the future rulers the duty of understanding.

Yours faithfully,

MARY EVEREST BOOLE.

London, 15th February, 1906.

AN INVITATION

TO THE EDITOR OF THE "INDIAN SPECTATOR."

Sir,—In a letter dated April 8, "A Constant Reader" severely criticizes my suggestion of the need of caution in the attempt to bring about closer social relations between Indians and Anglo-Indians. He says: "Let us not be afraid of falling in love with anybody or anything." So far I agree entirely with him; love is the supreme revealer. I am very much in love myself, with several things; in particular with the idea of entire social and political equality between Asiatics and Europeans. But it does not follow, because one is very much in love, that one is to rush too hastily into premature union.

There are two ways of getting across a difficult and unfamiliar country. One is to rush hastily in the direction in which one supposes one's goal to lie; stumble over obstacles, tear oneself on briars, and fall into a bog. The other way is to take a little time, before starting, to study indications and records left by previous explorers. "He that believeth shall not make haste," as a wise writer of old remarked. I have too much faith in the future harmony between us and you to be in any feverish hurry! Or I should rather say, I know too well the power of the force exerted by the existing harmony not to trust to it to guide us in the task of peace-making, if we are humble and patient.

"Constant Reader" says that "God does not set us puzzles." Is that so? Then why does the sun *appear* to go round the earth? James Hinton called that "a riddle set by the Great Father for his children to solve." Most things come to man in a way which involves either patient study or else illusion.

In conclusion, may I venture to add that I should be very glad

if "Constant Reader" would kindly communicate with me privately as I should like to hear more of what he (or she) has to say than we have any right to take up your valuable space with.

Yours sincerely,

MARY EVEREST BOOLE,

16 Ladbroke Road, London, W.
14th June, 1906.

A QUOTATION

THE following remarks of an English friend, suggested by a perusal of Sir Gooroo Dass Banerjee's recent book on "A Few Thoughts on Education," will be read with interest. Our friend has made a close study of the educational problem as it affects the young, and can speak with some authority on the subject. She writes:

"There are some interesting suggestions in this book. I think the most imperative need in education just now is to set free the constructive genius of the actual educators—to set teachers free to do their own business. For this purpose it is imperatively necessary that some central authority should put before teachers a clear picture of a few requirements, such as, for instance, the following:

"(1) We must have all citizens able to read and write the language of their own special ancestors and be acquainted with its classic literature.

"(2) We must have all citizens able to read and write the English language and be acquainted with its classic literature.

"(3) We must have all citizens acquainted with some slight outline of the best points of all the great classic religions, ancient and modern.

"(4) We must have all citizens able to use arms in defensive warfare and drilled so as to be able to act in concert in case of invasion.

"(5) We must have all citizens able to manage current coin, keep simple accounts, and weigh and measure goods.

"(6) We must have all citizens in the Empire able to sing in concert the local traditional folk-songs and hymns of the district in which they reside.

"If a few desiderata of this kind were put before teachers all over the Empire, the teachers would find out how to carry them out."

ANOTHER QUOTATION

An English friend, who keeps herself in close touch with the discussion of Indian affairs at home, and who is an ardent supporter of all our legitimate aspirations, writes to us on the subject as follows:

A Hindu gentleman was pouring forth a stream of angry denunciations against the British Government and saying India would be better off under Russian rule. When he had quite done, I reminded him that he had talked all the treason he liked without taking the trouble to look to see if one of my servants was acting as police spy behind the curtain. I recommended him to go to St. Petersburg and try the analogous experiment. He would come back—if he was allowed to come back—a wiser man. Few of us British subjects of any race realize how much for good is involved in the fact that we are free to abuse the Government as much as we like. People stand up in Hyde Park, quite publicly, and pour forth torrents of abuse against the police, and the police stand by smiling, and occasionally exclaiming cheerfully "Hear, hear!" No harm is done to the orators. The Government under which that happens may be a stupid one; it cannot be said to be a very bad one.

AN ASPECT OF THE MOVEMENT IN SCIENTIFIC INSTRUCTION

In the early days of the recent agitation about Education Bills, there were letters in the newspapers calling upon educational authorities to explain what they were about in language intelligible to the average pious Englishman and freed from mysterious allusions to things with which the ordinary Englishman was not already acquainted. Now the two main facts in the case were that the persons who in 1901 were convened to discuss the improvement of scientific instruction in England, had considerable experience of that region in which ordinary human language has all meaning shrivelled out of it. There exists no language which non-scientific people know, in which it would be possible to express what those men were aiming at. The other fact is that one important object of the Educational reform was that a certain fair proportion of British boys and girls (enough, that is to say, to supply the future electricians and engineers) should be introduced to the mental and spiritual experience of the original discoverer in science before

attaining the age of fifteen years ; and, if possible, before attaining the age of nine.

The task which the scientific authorities in 1901 invited experts to undertake was to make a pathway accessible to little children up to the region where science meets her invisible teachers. And that task is being quietly and steadily carried on.

The task which the Educational authorities were challenged to perform was to make methods of original research in science available as a subject for mechanics' institute debates, by translating it into language intelligible to the average rate-payer. No one has attempted to execute that commission, and I see no prospect at present that anybody will. The Engineer's movement has fairly started ; and it would be difficult to frame an Act of Parliament, or invent a mode of opposition that could stop us now. The difficulty was to find an opportunity for starting it.

The agitation about religious and ethical instruction, though very disastrous in itself in its immediate effect on all children, has had one good result. It has so diverted public attention from the real thing that was being done, that no one had time to interfere with us, and now I am thankful to say it is far too late for interference. So many children have been initiated within the last five years, while their elders were talking for and against doctrinal instruction, that we have at our service a small army of pupils under twelve years old able and eager to show the way to their baby brothers and sisters.

These juvenile teachers seem to be by far the safest. They wield no authority and are themselves under none. They come into no temptation from the desire either to make money, to make political capital, or to save souls. The baby pupil declines to be led up any path but the one which suits him : or to climb any higher than he feels inclined. The whole lesson is carried on, on both sides, for the immediate joy and delight of nerve currents flowing in pure harmony with the Laws of the Cosmos.

It is interesting to note that the promoters of the movement consulted neither the country nor Parliament. What is more strange still, they did not even ask the advice of the experts whom they summoned to assist them. We were invited to tell all we knew as to how the thing could best be done ; we were not asked our opinion as to whether it should be done. We were not even asked to tell what we knew about the religious or moral effect of its being done, for which I may say I, for one, am thankful. It was easy enough for those acquainted with ancient Semitic methods of teaching to show how to do it, but to pronounce one way or the

other on the advisability of doing it would have been a terrible responsibility.

Before 1901 we had only a very limited experience of the effect, on the general development of childen, of early introduction to that high scientific region where the ordinary terminology of religion and ethics shrivels as hot-house flowers would do if taken to the top of a snowpeak.

Since 1902 we have seen a good deal more. The results seem to be everywhere the same. Ethical ideas conveyed in language lose their meaning. But ethical ideas of quite different order from any that can be expressed in language seem to come down each child's Jacob's ladder, and express themselves in the appropriate Notation of Ethics—Conduct.

HAND-LOOM WEAVING

It is to be hoped that Mr. Havell's article on "Art, Ethics and Economics in Hand-loom Weaving" in the August number of *East and West* will attract the attention which it deserves. It would probably be impossible to overstate the importance, to a country in the present condition of India, of a return to the practice of hand-loom weaving. Even supposing the return to be only temporary, supposing that the power-loom is destined ultimately to supersede all hand-loom industry, still one of the most important things to do for India just now is to induce as many people as possible between the ages of twelve and thirty to go through the actual process of hand-loom weaving.

But in order that the regenerative effect should be real and substantial, it is of primary importance that the looms, and especially the shuttles, should be of native design and manufacture. Those who are providing the natives of India with European models are no doubt doing exceedingly good work in helping natives to suggestions of possible improvement ; but the regenerative effect on the population depends on putting the muscles of the hands and feet through series of movements *similar to those practised by their own ancestors*. Hand-looms and shuttles of European patterns might easily be made the instrument of a de-gradation far worse than could be effected by any amount of machinery. The best hand-looms, and especially the best shuttles, for India would be those devised by specially intelligent members of the same tribe, caste and class as the workers who are to use them.

A good deal of experimentation has been going on quietly in late years with regard to the effect of national dances and old

ancestral songs ; and also with wrist movements in embroidery. No doubt the result of the investigations will be sent to Indian journals in good time. For the present, all I am able to do is to call the attention of the promoters of the Indian revival to the importance of the point.

I have had much trouble in attempting to revive the genuine Art of Embroidery. People will insist on looking at, and trying to imitate, what they are pleased to call "artistic effects," or "old Indian designs." I have to remind them constantly of the great underlying principle : "Take care to get the minute muscular movement to suit *exactly* the psychologic condition of the worker at the time ; and leave the artistic faculties to develop at their natural pace." That, I believe, is the true secret of the best old Asiatic work.

In the course of our experiments in embroidery, we have ascertained a principle which may be stated thus : It does not follow, because the working of a particular pattern or stitch has a reviving recuperative effect on the brain, nerves, and artistic faculties, that the working of one which looks like an almost exact replica of the former will have a similar effect. On the contrary, the second may produce exactly opposite results. The broad effect to the eye of the finished work depends on muscular movements of the hand visible to the eye of the teacher. But the effect of the work on the worker depends on very minute movements of the muscles and nerves, which go on out of sight. These fine movements cannot be taught except by the experience of the worker herself. The first duty, therefore, of the teacher who wishes the workers to be raised by the work in the scale of being is to encourage each pupil to find out for herself what way of holding the needle suits best her special nerve condition. This is often difficult to do in the case of women whose instincts have been deadened by a long course of conventional imitation.

The token by which we know when we have succeeded in breaking the bonds of bad habit in the finer muscular movements is not this or that kind of pattern, but that the work takes on that indefinable *cachet* which experts cannot describe, but which causes them to say : "This looks like real old oriental, not any modern imitation."

One of the best ways of setting the fingers and wrist free is to get the pupil to work, for a time, on waste material, with her eyes bandaged, so that she cannot attempt to guide her fingers by any visible result, and is thus driven to find out what sequence of stitches is pleasant to the hand itself.

EMBROIDERY

I

THE THEORY OF THE SAMPLERS

IT must be distinctly understood that the samplers I am sending you herewith* are intended neither as specimens of decorative Art, nor to teach particular stitches, nor, above all, to assist those engaged in training specialists for embroidery or any other Art. They are related to Art as nursery babble or village club-gossip is to Literature. Their function is to *set free* dormant faculties of *self*-expression, by preliminary practice. They aim to show how any stitches with which the individual is already familiar, and almost any materials which may be at hand, can be used to express and register a succession of momentary caprices. By registering and preserving expressions of caprice the worker is enabled to combine them ; and thus gains the clue to *Revelation*, as a result of the right combination of successive impulses of Inspiration.

For National Reform in Art-culture the important thing is, not that a few persons possessed of leisure or special talent should become very skilful and able to do specially good pieces of embroidery, but that latent skill should be set free all over the Empire. For this purpose it is necessary that the power of Convention and fashion, the tyranny of the professional pattern-makers, should be broken for the whole mass of the population.

I am therefore giving *not* elaborate embroideries to exhibit the skill attained by a few of our best workers ; but samples of simple decoration.

The point is to get as many persons as possible accustomed both to see and to wear free-hand decorations. Accustom the eyes and minds of your children and servants and friends to realize the obvious truth that convention and monotonous labour should be devoted to direct use ; whereas ornament should have for its sole object pure pleasure—the pleasure of the worker first and most. Pleasure, and of course also artistic culture, but the artistic culture does not come from any decoration which lacks the power to give pleasure. Decoration which has involved either a toilsome use of machinery or a laborious imitation of the work of a machine, fails to have a culturing effect.

The habit of seeing and wearing decorations, however simple, which have been worked spontaneously and which cannot be

*[These samplers may be seen at our office.—ED.—*I.S.*]

copied, has a powerful effect in giving both mental freedom and in directing the love of Liberty into harmless and profitable channels. It is therefore well to decorate a little girl's frocks and apartment with very simple embroidery worked by her own relatives for the pure pleasure of their eyes and wrist. Even boys, as long as they are young enough to wear blouses and cotton tunics, are the better for having them decorated by lady friends. The more simple and effortless the decoration, and the less it conveys the impression of any fantastic effort to be original or peculiar, the more powerful the effect.

No one can enter into the spirit of ancient Asiatic culture without learning to realize that the habit of using up small scraps of material left over from regular work—the *perpetual utilization of waste*—was an important feature in intellectual development. Our modern European habit of buying cheap material and using it recklessly panders to impatience and is destructive of mental and moral staying power.

People talk as though the insisting on the utilization of waste scraps were a proof of a sordid turn of mind; or as though the importance of it depended on the money value of the material saved. This is not so. The using up of waste refuse is one of Nature's great processes; and no one can be truly educated to understand Nature or Art unless his mind is kept in frequent touch with practical activity in this direction.

We denounce, and quite rightly, the penny-wise-and-pound-foolish economy of spending, in saving pennies, time which might have been occupied in earning pounds. But during the process of training, the object is, not indeed immediate economy of material for its own sake, but that perfection of skill, in the acquiring of which the practice of severe economy in the use of small quantities of material is one necessary element. No one can enter far into the spirit of ancient Asiatic culture without finding out that it involved an alternation of the two conflicting elements—at one time the lavish use of costly material and at another the most scrupulous exactness in avoiding the waste of the smallest and most worthless scraps.

I was never, at any time of my life, a good embroideress.

These samplers are worked with the failing sight, shaking hands, and tired brain of an old woman, no longer able to do properly even ordinary needlework. They represent, not skill, but unskilled inspiration; not exertion, but* Sabbatical repose after exertion. But though my eyes are dim, my thoughts are fixed, while

*The Sabbath is not mere repose but also renewal. Boulanger. *See* "Logic Taught by Love," Chap. 2.

working, on leaping waters, dancing children and branches swaying in the wind. The work, therefore, is the outcome not of mere fatigue, but also of true repose.

It represents not mere quiescence, but also that vibrating condition which is the initial potentiality of all action; not mere decay, but also renewal; not only the twilight of old age, but also the forecast of new light. Therefore I venture to think that it does, in some measure, truly represent the hopeful activity of what we now call "Ancient Asia"—by which we in reality mean the Asia that was young.

II

HINTS TO THE BEGINNER

BEWARE of buying materials made to be sold cheap; the dyes and textures are for the most part, radically bad, and the use of them is uneducative. But buy up *good* materials that are shop worn, and sold off cheap, whenever you can; wash soiled ribbons of good quality; collect embroidery materials left over from more formal work.

Make it a practice to watch trees, etc., not only when still, but as they *move* in the wind; and water-weeds as swayed by the water. As you work, think of all this natural movement; wish (or rather pray) that your hand may be a tool in the Hand of the Creator. Think also, constantly, of Nature as the "Regenerator," the Redeemer of what is worn out and going to decay. As you sit before a heap of scraps, of torn, faded, or ravelled material, say to yourself: "I hope to do with these scraps what Nature will do with my body when I have worn it out; what I hope God will do with my thoughts when I no longer have a brain to think with."

Such meditations as these affect the eyes and hand, and exert an educative influence such as no lessons from a professional teacher of embroidery could exert.

The influence also reacts back from the hand to the soul, and does much to strengthen religious faith. The *habit* of seeing worn out, faded and soiled things grow into beauty under one's own hands makes it easy to hold converse with the "Redeemer of corruption." The consolations of religious faith become merged in pure joy of communion between brother Artists.

RACE PREJUDICE IN INDIA

TO THE EDITOR OF THE "INDIAN SPECTATOR."

Dear Sir,—An Anglo-Indian Official told me lately something which seems to throw much light on some of your problems and also on some of ours at home. He said that he went to India thinking race prejudices foolish and wrong. He thinks so still. He has met many Indians who are perfect gentlemen in feeling and culture ; whose companionship is a privilege ; and whose friendship would be an honour if it were possible to obtain it. But he finds it impossible to make friends of Native gentlemen, and unwise to attempt it, for one quite specific reason, viz., the Asiatic views and traditions about the relation between friendship and propriety are different from the European. One cannot say which is higher or lower than the other ; they are so radically different that as soon as an Asiatic feels to a European *as a friend*, he either wishes to do, or shows that he expects the European to do, something contrary to an English gentleman's ideas of *honour*.

Now this seems to me to be the sort of fungus which thrives in the *dark*. The remedy, surely, is to state it and let the best (adult) minds face it frankly ; then it will disperse.

We have the same difficulty with our Jewish fellow-citizens. Some people said : "Educate Jews and non-Jews together ; and that will round off the angles." The result has been a marked deterioration in the feeling of honour of both races. In consequence there has been a strong recoil. Some of our most advanced and liberal school-masters take care never to have a vacancy, when Jews wish to send a son to their school. Many parents who highly appreciate the work of Jews in literature, science, art, and religion, refuse to send their children to schools where Jews are received. But this seems to me a lazy, stupid and cowardly way of evading a problem instead of facing it. Some intelligent parents encourage the freest intercourse between their children and good young Jews, in study and in long walks (without supervision), but avoid any such relations as would entail any interchange of either *gifts* or *hospitalities*, until the young people are of mature age. The children thus grow up free from prejudices and learn to appreciate each other's good qualities and to respect each other's religion ; without the moral jar caused by being tempted to do or accept what, in their own family circle, would be considered dishonourable or ungentlemanly. They are thus prepared to thresh out the problem and come to a common understanding later on.

The effect on the character and intelligence of both parties has been, where I have seen the plan tried, excellent.

Yours truly,

MARY EVEREST BOOLE.

THE TYPICAL REFORMER

THE typical central Reformer of any age necessarily appears, to a large majority of his contemporaries, as a retrograde ; for several reasons ; which, however, are probably one, seen under several aspects.

The essential principles of Reform are the same in every age ; the key-note of true Reform is always : "Seek ye the old paths." The true Reformer is not the man who has sufficient originality to invent something new, to meet some accidental need of the moment ; but he who goes back to the work of ancient Reformers, carrying to the study of their work sufficient genius to select out, among their data, those of perennial value and importance. He is the one among ten thousands re-verts who has the true instinct of progressive motion ; the one among ten million progressives who has reverence enough to learn from the Past.

The tree of knowledge puts out side shoots in all directions. Each bundle of fibres thinks its own direction is the main line ; mistakes its own bundle for the main shoot. Therefore, when the forester lops off side shoots in order to bring light and air below and foster the growth of the main shoot, the side shoot fibres imagine that his action attacks the main shoot of progress.

The workmen who have been pulling up the weight of the pile-driver think, when they see that weight unhitched and falling, that he who unhitches it is making useless all their good work. Moreover, as they were paid good wages for pulling the weight up, they think they have good reason to be sure that the master wished it to be up, that he wishes it to go up still, and that he will pay no wages (*i.e.*, confer no benefits) in return for the mere wanton mischievous perverseness of the unhitcher.

The true Reformer has always the instinct to economize force. He reduces tangential motion to the strict minimum necessary for generating momentum ; and very soon recalls it towards the centre. We find the path to the centre by seeking the brothers who are going in the direction opposite to our own ; each group of wanderers thinks that its own tangent (the line in which it is blown) is the direction of progress, therefore the man who gives the signal, summoning them all to return to the centre, seems to all (except the few who understand the Law of the thought Storm) to be arbitrarily and tyranically arresting progress.

LETTERS TO A REFORMER'S CHILDREN

(*Written about* 1905)

I. WHAT IS CLEVERNESS? II. CHILDREN OF THE LAW-GIVER. III. THE PROPHET. IV. REFORMERS' CHILDREN. V. THE CLIFF. VI. MISTAKES. VII. THE GAME. VIII. NELSON. IX. NAPOLEON. X. THE ARTIST AND THE CHARLATAN. XI. THE ART OF REFORM. XII. WOMEN'S RIGHTS. XIII. THE ATHANASIAN CREED. XIV. THE FAULTS OF THE CHILDREN. XV. THE REFORMER'S FRIENDS. XVI. THE REFORMER'S EXECUTORS.

I

(*To Ronald and Hubert.*)

WHAT IS CLEVERNESS?

[The children had been producing curves by means of making straight stitches on cardboard.]

One of you two, I forget which, asked me on Sunday: "Aren't I clever?" I did not answer, because I had not had time to think about the question. Now that I have thought a great deal about it, I see that I do not know whether you are clever or not. I do not think it matters much. If you are not clever, God is clever enough for you and Him both; and I do not think it matters much how much of the cleverness is still His, and how much is yours because He gave it to you.

But now I want to ask you a question or two. Do you think the Harmonograph is clever? It makes much prettier curves than you can make. But the cleverness of it is all God's. Perhaps a little of it was Daddy's to think that you would like to have a Harmonograph; but even that I am not sure of; you can ask Daddy what he thinks about that. But I feel quite sure the Harmonograph itself is not clever at all; it is just made of wood, such as the fires are lit with, and metal, such as pokers and nails and guns are made of. It is quite a stupid thing. But God draws curves with it. Prettier ones than He draws with you, as yet.

Now for another question. Do you think God would draw such pretty curves as He does with the Harmonograph, if the Harmonograph, instead of being quite gentle and quiet and sweet, and

letting God draw with it, went sticking itself out to show itself off and to show people it was clever ?

Now there is a riddle for you to answer some day. When you get home, you can ask the Harmonograph and tell me what it says.

II

(*To Kitty*)

CHILDREN OF THE LAW GIVER

YOUR mother wishes you to know something about the lives and deaths of the creatures whose flesh goes to build up your bodies ; the fruits and beasts and fishes by whose deaths you live, as well as the bees whose labour gives you honey, and I think perhaps it would also be well if you knew something of the creatures—who are mostly human creatures—by whose toil and lives, by whose sorrows and suffering and deaths, your minds are built up.

It happens, by no fault or merit of your own, that you four children (who are not different from all other children, except in the way that everybody is different from everybody else) have drifted into the middle of a whirlwind. If it is anybody's fault, it is partly mine, I suppose ; but such things are no one's fault ; they happen by what some people call "chance" and others call "the Providence of God." (The *name* does not matter.) If you look at a dust-whirl in the street, you will see that some scraps of dust get somehow into the middle of the whirl and others fly round outside ; not because there is any particular difference between the inside and outside ones ; but because they got differently placed by "chance," that is to say, by some Law which we do not yet quite understand.

But in all these so-called "analogies," these parables which we draw from Nature (as for instance when I liken children to the various scraps of dust in a whirlwind) there is one thing we must never forget. *Things* of all kinds (dust included) are the slaves of Law ; we are the children of the Law-giver. We may not yet understand the Law : that is, we may not understand yet how it acts or why it was made. But we must never just let the Law drive us like dust before a wind ; we can at least know *what* the Law is. We have not got to "take our chance," as the dust does, blindly ; we can at least know what our place is in the big whirl. We can know ; we ought to know ; and we have a *right* to know. If we do not know, we have a right to say : "Father, I do not choose to

be shoved into my place as if I were a stick or a piece of furniture ; tell me where you want me to go, and I will go there, and stand there until you tell me to move." That is the great big difference between you and the dust or straws, or leaves, that the wind drives. Otherwise, we are all just leaves in a whirlwind ; and, somehow or other, it has come about that you four children have been blown into the middle of the particular little wind storm which is blowing English children about just now.

And so I think it will be rather nice if I tell you tales about other wind-storms ; some that have long blown over, and some that are still blowing in other parts of the world ; and about the special relation of the leaves that have got into the middle to those that are whirling around them outside ; for all the force of the past acts on the life of now ; and all the experience of past reforms goes to enlighten you children now.

III

(To Antonia)

THE PROPHET

If you have read "Mistletoe and Olive," you have perhaps guessed that the same man sat to me for the model of two of the sketches. In No. II I dressed him up as a savage Medicine Man ; and in Nos. VII and VIII as an old Hebrew Poet ; but the face and the character are just the same ; and he has seen the pictures and accepts them as portraits of himself. His name is David Marks. He is a real Reformer : that is to say, a Re-former, not a maker of quack systems. I think he has done more than anyone else I ever knew to make me understand the essential difference between a true Reformer and a quack ; to make me see what, in other would-be Reformers, went to help the Reforms and what went to hinder or spoil them ; how one can help true Reforms in one's own day, and how one might put the wrong touch on them, and mar (for the time) the beauty and grace of any Reform-Curve which might be growing under one's hands.

I think the great thing he has taught me is to spell the word Re-form, in my mind, with a hyphen. I do it sometimes on paper, in order to remind myself and other people to do it in our minds.

A true Reformer always remembers that he is not the Author of Law, but only one of the Editors of it ; that his business is not making new systems, but re-shaping old thoughts to suit the time he is

living in. He knows he ought to go patiently round a similar curve to what previous reformers did, though on a higher rung of the spiral. Quackery implies more or less of beginning life by thinking "all that was done before me is valueless compared to what I am going to do"; and ending by thinking: "What I have done is fixed for all time; no one ought to alter it." The grand old man of whom I am telling you began his reform by writing a very modest book on "The Essentials of Mosaism," telling what Moses had done and had tried to do; and now, at nearly ninety-four, sits in his arm-chair, blind and almost helpless; but always willing to listen to anything fresh; and always ready to give his fervent blessing to any of us whom he knows to be sincerely trying to do right, and who have gone a little ahead of where he has got to; who are, as it sometimes seems to him, wasting our time, by spending it on things that he himself can see no need of or use in. He always supposes that any sincere person probably knows things that he does not know. I once heard him preach a glorious sermon about Numbers xi. Joshua came and complained to Moses that other people were prophesying in the camp; that is, professing to have received a fresh inspiration from God, over and above what Moses had told the people. Moses said "Are you jealous on my account? Would to God that all the Lord's people were prophets." The ring of David Marks' voice as he read those words has got into my very muscles and nerves; I seem to hear them over again when you children are doing curves that your mother and I never thought of and cannot, just at first, even understand. Elsie did one that we could not understand at all till we read her explanation and we were very glad.

Some foolish teachers try to stop children doing things which they (the teachers) cannot understand. To me it is always a joy when my pupils do things beyond me; it brings back the ring of my dear old teacher's voice, saying, "Would to God that all the Lord's people were Prophets."

The key-note of all true Reform is: "Seek ye the old paths"; "Sing the old songs," "Tell us the old, old story."

Some one wrote to my husband to say that, in reading an old treatise by Leibnitz (who lived at the same time as Newton) he had come upon the same formula which the Cambridge people call "Boole's Equation." My husband looked up Leibnitz and found his equation there, and was perfectly delighted; he felt as if Leibnitz had come and shaken hands with him across the centuries. Afterwards one of my husband's admirers and would-be "followers" tried to persuade me that Leibnitz did not understand as much, or mean as much, as Boole had done. But then,

the person who talked in that way was not a real Reformer ; my husband was a real Reformer.

IV

(*To whomsoever they may concern*)

REFORMERS' CHILDREN

FEW things are as unlike vital action as the imitation of that action. The superficial results may look alike but the action itself is utterly unlike.

How can that be ? Several causes go to make up the unlikeness. Here is one of them.

The higher we climb up the spiral, the more unpleasant are the consequences if we slip off. It does not follow, because we have to go round the same curve as our predecessors, that we need make all the same jerky steps as they did. We shall make some mistakes of our own, no doubt ; but we may avoid some, by studying theirs.

If you read the Books of Samuel, you will find an account of a dear old Reformer named Eli. He lived in a time when "The Word of the Lord was scarce" (which does not mean that the Word itself was scarce, but that very few people listened to it or noticed what it said) and he tried to call the people's attention away from silly superstitions to the essentials of Mosaism. His sons are spoken of as very bad men. As far as I can make out, they did not wish to do anything worse than most priests' sons did at that time. But one feels somehow that they ought to have been better. Their being bad was a disgrace and sorrow to their father. Just fancy what "the dearest Daddy in the world" would feel like, if he heard you, at a party, singing loud, flashy, trashy, vulgar songs that happened to be in fashion ! It would sound worse, and be worse, if you did it than if the daughter of any common-place music-hall pianist did it. Well, that is how Eli felt ; his sons made him miserable, because they wished to be "like other priests' sons" ; and they did not happen to be "other priests' sons"; they were Eli's sons.

It is something like this kind of thing. A man goes to live, with his little son, on top of a high cliff. They look down and see some boys jumping, harmlessly enough, off a big boulder on to the sand, and picking up things. "Father, I want to jump off on to that sand and pick up things." "Well, you must not." "Why may not

I ?" "Because." The real reason is, he must not do like the other boys because he *cannot* do like them. If he jumped down to them, he would probably soon find himself, not picking up things like them, but being picked up at the bottom, with a broken back. "Noblesse oblige." If you are a Reformer's child, you are *obliged* to be different, in some ways, from other people's children ; so you may as well make up your minds, at once, to settle whether you mean to behave better than other people or worse.

When a Reformer's children "go back on" the Reform and want to be as free as "other people," they do wrong in a more aggressive, blatant way than other people, just because, whatever they may *say*, they know in their hearts that they know better and ought to do better.

It seems very sad, does it not, that while Eli could train Samuel, a stranger's child, into a great Prophet and statesman and Reformer, he could only make his own sons into extra-vulgar scamps ?

So far in the world's history, the majority of Reformer's sons have deserted their father's real principles as well as his special ideas and hobbies. Not by any means all Reformers' children ; but, I fear, a majority. Many people think there is some reason in the nature of things why it must be so ; and that it always will be so. I do not think that ; I think it happens because we do not understand how or why it happens. If we did, it would not happen any more. At least I think not. So I have been trying to find out why Reformers' sons so often do not either carry on their father's Reform or start Reforms of their own, or lead ordinary decent commonplace good lives like other people. And in future letters I will try to tell you what I think I have found out about the matter.

V

THE CLIFF

There are some things that it is of no use to take into a house, till one has arranged convenient shelves or hooks to stow them away on. And there are some things which it is useless to put into a mind till one has arranged convenient mind-pictures to stow them away on. It would be of no use for me to try to explain to you what I mean about Reformers' children going wrong, till you have a good strong mind-picture, well fixed up, to hang the information on. So I am going now to direct you how to make a suitable mind-picture.

Next time you go up to rest, when you have your limbs all

nicely slack and your eyes shut, and are breathing slowly, think of this picture :

Some children are playing among low rocks by the sea. They climb the rocks and jump off on to the sand. Sometimes they tumble off and hurt themselves, but not very seriously, and it all goes to make them healthy and hardy and brave. They dig in the sand. They find pretty shells in the sand ; and star-fish lying on it. They hunt in rock-pools ; and find corallines and lovely seaweeds and many interesting creatures. They get wet and dirty in a harmless sort of way ; but it is good for their health ; and they are very happy and merry.

On a high cliff a little way back from the beach, there are a few houses. Children from those houses are playing on a granite moor still further back. They climb on the rocky boulders and jump off on to the grass. They dig up wild flowers to put in their gardens. They find pretty snail-shells and fossils. There is a shallow fresh-water stream, where they find forget-me-nots and water-veronicas and marsh king-cups ; and also several sorts of caddis-worms, and some wigglers and hydras, which they take home and keep in a fresh-water aquarium. They get a little muddy in a harmless sort of way ; but it is good for their health ; and they are happy and merry.

A fence runs all along the top of the cliff ; and the children are strictly forbidden to attempt to climb over it. Sometimes the children living above are taken carefully down to the shore through a gate in the fence and along a path under care of grown-ups ; but they are never allowed to climb the fence.

One child takes it into his head that he has a right to be with, and do like, the *majority*. Why should not he dig sand, when other children dig sand ? Why may not he pick up star-fish when other children do it ? Father and mother have no *right* to deprive him of the pleasures and advantages which other children enjoy.

So he climbs over the fence.

He knows he does not particularly want the star-fish ; they would not live in his aquarium ; and he does want harebells and milkwort to put in his garden, and his mother asked him to dig up some tormentilla roots for her rockery. And the cliff looks steep and he does not quite like the notion of the climb down. He feels shaky and queer, and a little nervous. But he is not going to be beaten ; he has made up his mind that it is manly to do what the majority do, and he is not going to be stopped by silly rules.

So he begins to scramble down the cliff.

Then he remembers that his little sister, who is ill in bed, had a longing for some heather, and he had promised to fetch her some.

That settles the matter. He can see at once that it is of more consequence to keep one's promises, especially promises to the sick and helpless, than even to be grown-up-ish and manly and like the majority. He will fetch the heather to-day, and go down the cliff to-morrow. So he scrambles back over the fence and goes up to the moor.

In the evening he tells his mother all about it. She explains to him that she is very glad that he is brave, but if the courage is genuine he will have the courage also to accept discipline as well as danger, and to let himself realize to the full what a fall down that cliff might mean before he risks incurring it.

It was fortunate for him that his sister had a bad cold that week, for if he had gone down the cliff, he would almost certainly have fallen and probably been a cripple for life.

Many, many do, my dears; but we are not going to make mind-pictures of them. It is enough to know, of mere knowledge, that such things happen; we do not wish to register them in our imaginations so that they shall haunt us in our dreams—our sleeping dreams or our waking ones.

Know all things; test all things; but *hold fast* only those that are good; which chiefly means, I think, that we should not give the power to hold us fast, except to things which we ourselves honestly feel to be good.

We *must* look at "the ugly side"; but we must put the shortest stitch we can on the side which looks to us ugly.

Probably God can see some beauty in being a cripple for life; or else no such thing could exist. But, until something happens to make you have some association with it which seems to you beautiful, all you have to do with crippled-ness is, to register it in your minds as a thing to avoid if possible, and not let it get hold of your imaginations at all.

So, please, when you go up to rest, make a mind-picture of the two groups of children as I described above, and of the wise little boy climbing back to go and pick heather.

Fix it firmly in your minds so that as long as you live you will always be able to recall it easily.

When it has become part of your minds, then I will try to tell you a few things that I have found out about the children of Reformers.

VI

MISTAKES

THERE are some other words besides Reform which it is well to spell sometimes with a hyphen, so as to remind oneself what they really mean.

One of these is the word mis-take. When we feel angry, or sorry, or annoyed, we are prone to begin talking about "faults." "Whose fault was it?" "It was your fault." "It was not my fault." We should spare ourselves a great deal of trouble if we stopped ourselves from talking about "faults"—a word which seems to have no very precise meaning—and asked, instead, "What mis-take has been made?" We should usually find that two or three persons or sets of persons have been mis-taking different things; and the mistakes have become entangled together and so there has come about a mis-under-standing; that is to say, a standing of ideas in the mind in wrong relations to each other, the one which should be uppermost shoved to the bottom; the heavy ones on top of the fragile ones; like what happens to a trunk when everyone has been snatching at whatever he happened to want at the moment, and taking no notice of anything else. Everything gets into a muddle and mess and some beautiful things get broken and spoiled. So directly you begin to see that there is "fault" anywhere, it is best to un-pack the whole trunk-ful of mis-takes and begin to put things tidy.

We are going to unpack the muddle about Eli's sons; and see if we cannot straighten things out a little ready for the next set of Reformers' children to start fresh with: you four to begin with, then, perhaps, other children situated as you are.

In the great mis-under-standing about Reform, there are at least five sets of mistakes, all tangled up together. There are:

The mistakes of the Reformers themselves.

The mistakes of their admirers and followers.

The mistakes of their opponents.

The mistakes of persons who are neither followers nor opponents, who, because they happen not to take any part or interest in the Reform, think they have a right to ignore its existence.

All these four sets of mistakes get muddled up in the children's heads, and puzzle them out of their senses; so it is no wonder that they do not see what is happening or where they are going, and make mistakes of their own—the fifth set—and make "confusion worse confounded."

I do not wish to throw blame on anybody ; I have been as much to blame myself as one else could be. It is not my business to blame other people, but it is my business to help you, and so, my dears, if in these letters I say very little about other people's "faults," and a good deal about those of Reformers' children, it is not because I think they are any worse than the rest of the world, but because you are, at present, children, and because the mistakes of Reformers' children are the ones you are most likely to make, and the ones you had better take care to guard against.

VII

(To Hubert)

THE GAME

ONE of you asked : "How long is God going to play 'dis game with us ? 'dis game that the God inside us is playing with all of us ?"

How long ? For ever, I hope. It would be a bad day for any of us when He left off !

Only, dear, what do you mean by "*this*" game ? Which game ? He is playing a different game with each of us.

What keeps us all in a muddle is that we each think God must be playing the same game with other people that he is playing with us ; and so, when we see another person doing what would be against the rules of our game, we think the person is cheating ; and when we see God doing to someone else what he does not do to us, we think He is unfair ! That is stupid. Judge not other people by the rules of your game that you may not set other people a bad example of judging you by the rules of their game. No one can tell whether another person is playing fair, unless he knows what game God is playing with that other person. And that we can only know if that person tells us. And sometimes the person himself doesn't know.

What we can do sometimes is to see that the other person is playing some game which will cause him to spoil ours if he comes near enough ; then we have a right to say : "He shall not play his game on my ground if I can help it."

But perhaps the most important thing for each of us is to make sure that he himself is playing honestly. Find out, if you can, *what* game God is playing with you and learn its rules, and mind

you keep them, and do not cheat or be careless. Go on playing honestly till you are tired of that game and wish to change to another ; when you do so tell God honestly.

Those are some of the rules of the great game which He is playing with all of us, which includes as parts of itself all the separate games. How long will He go on playing it ? For ever and ever, I suppose, in some part of the Universe.

VIII

(To Kitty)

NELSON

So you have been doing honour to the memory of Nelson, like nearly all the rest of England. And some Sunday you are going to do honour to the memory of Napoleon ? Well, that is good logic and true English fair play. If you did the one and were not ready to do the other, it would not be English, it would be idolatrous and slavish.

I, personally, should not do either. Neither comes within the rules of the game that God is playing with me. In my game one may have to *do* some things that hurt other people, but one never takes pleasure in the thought of its having to be done. I cannot say that I do not sometimes find pleasure in it ; but I always know that I have broken the rule of my game if I do. My game—the puzzle God sets me—is to find, if one can, the thing to do that will please both parties in a dispute. And to do that honestly is difficult. But then I am a good deal older than the majority of the people in England.

That is not your game at present. Play your own game honestly; that is the best way to get soon sent up to a higher class which plays more difficult games.

But you must not suppose that Nelson and Napoleon were playing the *same* game, and that England beat Napoleon in that game. Nelson was playing the game of "The nation expects each man to do his duty" ; Napoleon was playing the game, at least so he says, of "We are admired by Gods and men."* By all the rules of the big game, Nelson was bound to win in the end. If England ever takes to theatrical vanity instead of business-like devotion to duty, it will probably be England's turn to be beaten.

*"Du haut des Pyramides quarante siècles nous contemplent."

X

(*To Ronald*)

NAPOLEON

NEAR the end of my last letter I made a mistake. By the time you are old enough to read this letter, you will, I hope, be wise enough to see for yourself what my mistake was. But still, I should like to tell you myself.

I said that Nelson was bound to win *in the end*. But in truth none of us knows what is, or will be, the end. Certainly Trafalgar was not the end of the war between England and France. Nor was Waterloo.

Forty years after the battle of Waterloo, my Uncle was going to tell his London address to a landlady in Paris. When he came to the words "Waterloo Place," she flung down her pen, crying out "Monsieur, I cannot write that name."

When I was a child, we lived for two years at Poissy. My father engaged, as servant, a remarkably bright and nice boy; we all became much attached to him, and he, I am sure, was sincerely attached to us. When we were leaving Poissy, and Father offered to get him a post in some printing works, where he was likely to rise rapidly, he refused. His mother would have bought him a remplaçant if he was drawn for the conscription, but he said, No, he preferred being a soldier. My father asked him why he wished to sacrifice his good prospects for the sake of being a soldier.

He said, not "I want to be a soldier," nor "I want glory," but "I should like to kill an Englishman." All considerations of his own advantage were subordinated in his mind not to the good of France but to the one hope of avenging Napoleon. The form which love of soldiering took in French boys' minds of that time was a desire to avenge Napoleon. In France, to avenge Napoleon seemed to be the first object of life for many people.

The house we lived in belonged to a poor shabby old man who had been one of Napoleon's officers. Once he came a long way to see my father on some business and of course was offered refreshment, which he refused to partake of. "I never take food more than once a day," he said. I asked him why. "We could not get it when we were with *him* in Russia," he said.

By sending Napoleon to St. Helena, the English had given to a vain and rather selfish charlatan a power over men's hearts of a kind that has never been won by any man while he was successful.

When his body was brought home from St. Helena, the ship which carried it up the Seine anchored on Saturday evening opposite Poissy ; and Mass was celebrated next morning beside the coffin. Our old landlord was standing close to me on the bank. I looked at his face ; and then I knew. I was only about nine years old, but I *knew* or at least the seeds of the knowledge were sown for all my life. Those who once know it, may hurt or kill or destroy, ruthlessly sometimes, from a sense of duty, or from selfishness or ill-temper, but if they take part in any *exultation* about a victory, either martial or political, they very soon afterwards feel that they have soiled and degraded themselves. To do so is against their conscience. They know that it is no part of the game that God is playing with them.

X

(*To Antonia*)

THE ARTIST AND THE CHARLATAN

ONE of you asked what your Father is doing for England. My version of what he is doing would be that he is doing something towards making everyone in England think, feel, write, speak and behave, a little more like an artist and less like a charlatan.

Maurice was true prophet, poet (in the real Greek sense of a Creator) and genuine artist in thought. His "followers" were, many of them, genial and kindly, but mostly of the commonplace order, and this will not surprise you when I tell you that it was the fashion among the followers to set Maurice up as 'a little tin god upon wheels' ; his view of things was bound to be the right one. The whole group were profoundly ignorant of certain important things as to which you children cannot remember the time when you were not familiar with them, and would find it difficult to realise that there ever was a time when everybody did not know them. But you owe it largely to Maurice that you do know the things of which he was ignorant. Maurice's ignorance on the points to which I refer was, if possible, even more profound and dense than that of his followers. Maurice was far ahead of most of his followers in the matter of acting wisely when suddenly confronted with the necessity for dealing with facts of whose existence he had just become aware and the nature of which he did not understand. I want you to make a study of his writings from the point of view of the distinction between artist and charlatan and I am now going to tell you what I mean by charlatanism in art.

James Hinton wrote much about the Art of Thinking, which he illustrated by reference to painting. He once took me to see a little landscape by David Cox, a green upland on the slope of which a dog is hunting something. Seen from a proper distance, the action of the dog is wonderfully true to nature. When you go close to the picture, the dog disappears. All you can see is about three tiny white strokes ; one does duty for the head, one for the tail and one for all four legs.

James Hinton described the historic evolution of that non-existent dog in its progress down the ages. First, a savage scratched a sketchy imitation of a dog on the wall of his cave. Then, as skill in painting increased, the painted dog grew more and more like the live dog, more and more detailed, was copied with more and more conscientious accuracy, until one felt as if every hair was accurately reproduced. Then suddenly the genuine artist gets rid of the Thing-al dog altogether, but gives us an Act-ual dog ; the movement, the action of the dog, without any dog and with the minimum of paint necessary for putting the action on to the canvas. But one feels that Cox must have had the Thing-al dog well worked into his sub-conscious mind. Not only had he learned from teachers who could if necessary have reproduced faithfully from memory every muscle of its anatomy, one feels that he himself must have lived years in the companionship of that dog and entered into all its hopes, aspirations and disappointments. His magnificent unconscientiousness was that of knowledge, not of carelessness. He had obeyed the precept "KNOW : and then do as you like." The charlatan declines to take the trouble to know anything about a dog, except as much as he thinks will be effective in his picture.

One notices the same difference in students who are preparing for examination, say, in science or history. Some students forget all about the examination (till the time comes for a final revision of their knowledge). They throw themselves into their subject, learn all they can as if knowing it were the one thing worth doing on earth. (Only just at the last do they shake out of their minds—provisionally—everything about it except what is likely to be "telling" at examination.) The examination paper of such a student is a real work of art. Other students will check a teacher who is explaining something important, saying "Shall I be asked that at examination ? If not, I don't want to hear anything about it." The papers of such a student are exhibitions of quackery.

I once knew a young woman who considered herself so great a literary genius that she felt absolved from the duty of helping her over-worked sister in the management of the household, on the

ground that she must not be distracted from her literary career. While waiting for the opportunity to write something very sublime she preferred reeling off cheap pot-boiler little stories, to becoming acquainted with the realities of life, labour, suffering and duty. She was with me one evening when Julia Wedgwood came in for an hour's work with me at revising one of the chapters of her great book on the Moral Ideal, which afterwards became a standard classic. More than once in the course of the evening we cut out several pages of really fine writing to substitute one or two sentences which contained the quintessence of them. When Miss Wedgwood had gone away, the girl said, "Some of those pages that you cut out must have taken hours to write." "More likely days," said I. "But if I had done work like that I should want to publish it ; I could not bear to sacrifice it." All I could say in reply was, "That is exactly why you will never be Miss Wedgwood, my dear." She wrote little sentimental pot-boilers for a few years, then abandoned literature and devoted herself to "domestic duties" in the shape of keeping her own house and garden trim and nice for her own pleasure. She has never taken any appreciable share in either the literature of her country or the struggles of her family. Some day I hope you will read "The Moral Ideal" and realize that artistic genius is made very largely of endless, reverent patience.

And your father is doing something to infuse the quality of reverent patience into all the children of England, by teaching them to sing reverently the old, old songs that evolved themselves among lives of patient toil.

XI

(*To Kitty*)

THE ART OF REFORM

You have tried a little experiment that I set you : a teeny, tiny, little experiment which concerns no one except our two selves.

Small as it was, you and I know now that you understand how to conduct an experiment in an orderly and scientific way. Now I am going to set you one on a bigger scale.

From the time when you are old enough to read this letter, make it a rule to think of Reform as an *Art*. Every kind of Reform: political, religious, social, ethical, philanthropic and educational. When people are talking round you of their schemes and

plans and opinions, and what ought or ought not to be done, before you come to a conclusion about what is true or what is mistaken pause and ask yourself the question, "Are these arguments compatible with the idea of treating Reform as an Art? Do they square with the great Master Keys of all Art work?" You know what the Master Keys are: "Wait till you have abundant and luxuriant growth to dispose of; when once you begin pruning, prune boldly (and, if need be, mercilessly); never touch the pruning-knife till you have taken the time and trouble—it may be also the agony—of realizing the full value of what you are about to eliminate."

Never let yourself be led astray by any delusion about Art requiring only the sacrifice of that which is valueless or that which is ugly or that which is evil; all true Art involves the sacrifice of what is in some respects good, for the sake of that which is good on a higher level. True Art implies courage to sacrifice what one values; not cowardly shrinking from knowing its value.

Maurice made the initial mistake of starting his Reform too young; before he had time to know very much about the other thought currents of his day. Or perhaps it was better to start while he was young and strong and energetic; but he badly needed, what every energetic Reformer needs, some one to be to him what the man on outlook duty is to the steersman of a ship; some one not engaged in active service and who is at leisure to watch the horizon. Maurice did not have the faintest conception that any such thing as the Pulsation doctrine (*i.e.*, the Science of Rhythm) had risen on the horizon of European thought, till he suddenly came into collision with it while he was progressing on his own lines at full speed. He did not understand it and his followers were hostile to it.

You and I must take care not to be charlatans ourselves if we can help it. We, too, must face all facts, especially those that tell against our theories. A man is not a tree, that has to "stay put" in the shape it has grown to; he is not the *slave* of any law, whether of heredity, or experience, or evolution, or anything else; he is the son of the Law Giver and he can to some extent overcome mere mechanical momentum. "His seed remaineth" in the man; the seed of the Divine; the still, small voice, heard in the intervals when the storm-winds of passion and self-will are lulled, whispering: "Turn ye, turn ye; why will you die?" Always there remains the blessed possibility of returning by "conversion" to the centre of Silence and of Force; of renewing one's youth and innocence by a plunge in the Fountain of Inspiration.

When you have realized the frequent vulgarity and charlatanism

of Maurice's followers, read again some of the work of that school, such, for instance, as the novels of Charles Kingsley and the poems of Edward Plumtre : 'go slack,' 'give yourself up' to them and *feel* their real, breezy geniality.

Read some of the biographies of that time and see how some of those men were loved. Some of those who loved them were not a high order of people ; they were ignorant people and mostly rather coarse-grained. Still, the ignorant and coarse-grained need something to look up to and love.

Great masters of the art of thinking stood awe-struck before Maurice, perceiving that he had risen above the region of Thought and of Art : that he was looking straight into the very face of God.

XII

(*To Antonia and Kitty*)

WOMEN'S RIGHTS

ONE more story about Maurice, and then, my dears, I shall be able to tell you how I think a woman might throw up on to the dome of her own spiritual firmament a clear reflection of Hinton's lesson about the Art of David Cox.

After Mr. Maurice's death, I called at his house and was shown into the library, where I waited some time alone and took the opportunity of examining some of the books. There were rows of folio works on Theology. Several were on the Eucharist ; others, on general theology, opened, of their own accord, at a chapter on that subject.

To know all that anyone had to say on the Sacrament of the Lord's Supper was Maurice's speciality as a student. There were endless specifications in the books about who was and who was not fit to receive the Sacrament ; who might and who might not be admitted to it. When his son at last came to me, he told me that his father had, at intervals through Easter Sunday night, repeated scraps of the Communion Service. Early next morning he had suddenly sat up in bed and cried out "The Sacrament is not for individuals but for *Nations*. The Peace of God be with you all ; with us all." And then he fell back and never spoke again. In his biography you will find the statement that in the course of that night he had said something about the part that women would take in universalizing the right to Communion in the National Church for all who wished it.

James Hinton once said àpropos of the "Women's Rights" movement: "Women will always love the man who says 'Lay down your life' better than the one who says 'Take up your rights.' " And I am sure that is true. But, if we are to be true artists and not charlatans, we must not dismiss the Women's Rights movement as unworthy of serious study. Every utterance of the clumsy and seemingly misguided platform women is the outcome of some personal suffering; or of revolt against some injustice; or of sympathy with some one else's wrongs.

"Never a cry of passion or of pity;
Never a wail for weakness or for wrong;
Finds not its archive in the angel's city,
Has not its echo in the endless song."

Every detail of the woman's movement has its place in the construction of the great preliminary Ideal of woman's emancipation.

But when we know that Thing-al Ideal as a conscientious painter knows his model, then we shall have acquired the right to waive away from our canvas all claims and assertions of those re-al rights which men have withheld from us; and to take, instead, the Act-ual Right, which no man dare dispute, the right to a share in carrying out Frederick Maurice's dying commission.

XIII

(*To Hubert*)

THE ATHANASIAN CREED

So you think you are tired of being God's child; and you want to be Father's or Mother's child. That really means that you are tired of the game you have been playing with God, and wish to change it. Very well, then; you have played it honestly, and played it out; and now God is giving you leave to change it.

The game you have been playing is: making a toy idol of the Third Person (*i.e.*, Mask) of the Holy Trinity; and neglecting the other two. You have tired out that part of your mind by which we hold intercourse with the Third Person; and let the parts with which we hold intercourse with the other two grow flabby and weak for lack of exercise.

The remedy is obvious: Let the over-worked part go slack and rest; and begin to exercise the others.

The part of you which should converse with God the Son (*i.e.*, Incarnate Humanity) has grown so flabby that there are very few people you like to be with ; the rest of the people tire you, and make you feel sick and worried and ajar ; they are "too much for" your flabby powers of human response. Very well ; thank God for the few who do not tire you. Meanwhile, the way to get back into strong and healthy touch with Incarnate Humanity is very simple. "*Others' needs*" is the way back. You will not find other people jarring or sickening as long as there is anything which they need done, and which you can do. Whatever you do for any, even the least, human being, you do for Incarnate Humanity. You can serve people while in town. God the Father, God revealed in Nature, is more easily got at in the country than in town.

Next time you go to the country I would advise you to notice plants and butterflies and birds more than you did last summer. And when you are grown up and think over all these things, I hope you will not forget to say to God the Holy Ghost that you understand He is one Person of a Holy Trinity and not a toy idol ; and that you are much obliged to Him for giving you a good lesson on sound Catholic Theology while you were still young enough to have a Daddy and a Mummy to go back to, to be rested when you were tired and sick of trying heretical experiments.

XIV

THE FAULTS OF THE CHILDREN

AFTER all, we have said very little as yet about the faults of Reformers' children. And perhaps it is just as well, for though we need to know enough about the existence of sin and folly to guard ourselves, as much as possible, from falling into them, it is not wise to make abiding, haunting mind-pictures of other people's errors and wrong-doing. It will be better to give you a clear picture, once for all, of the main cause which brings so many Reformers' children to grief ; and there is a picture of the chief means by which that cause of mischief itself can be neutralized at its origin.

In the philosophical world we know of three kinds of equilibrium.* One, that known as unstable equilibrium ; that of a rickety little table, or any object so standing that it is liable to fall ; it will stay as it is as long as no one disturbs it, but is liable to fall at a slight jolt or knock. One form of unstable equilibrium is that of a stick balanced on one end on the finger of a skilful mani-

* See *The Forging of Passion into Power.*

pulator. By incessant attention and constantly shifting the basis he can keep it upright for a long time ; but, the moment his attention wanders, it goes over, helplessly and hopelessly.

The second kind is that ordinarily known as stable equilibrium, that of a solid table settled steadily on its four legs and made difficult to move by its very weight itself, that weight being so adjusted as to conduce to stability, not to fall. I should call this fixed-stable equilibrium.

The third condition is that of mobile-stable equilibrium ; that of the tumbler-doll or the Logan Stone : a touch, a breath of air suffices to disturb the equilibrium ; but, instead of falling over, the thing rocks easily in all directions, till, left to itself, it rocks slowly back into the former condition of equipoise.

The same three conditions prevail in the intellectual and the moral world. Both the sanity and the morality of ordinary people may be said to be in a condition of ordinary fixed-stable equilibrium. They depend on solid habits ; these fixed habits are difficult to overcome ; but, if you do succeed in overcoming them, the whole basis of the stability is undermined and gone.

Now it is part of the essence of the Reformer's work that he undermines the basis of fixed habits and conventions. The air around him is full of the idea that things are not to go on in their ordinary grooves. This sets his children thinking : If one set of things is to be altered, why not any other set ? If one set of conventions and fixed assumptions is being proved absurd, may not others be absurd too ? Why worry oneself with restrictions sanctioned by mere custom and popular opinion when one's daily thought is of the wrongness of popular opinion and the superstitiousness of custom ?

You see, the Reformer's children have no chance of ever settling their lives on a basis of kitchen-table stability. For good or for ill, that possibility is, from their very cradles, non-existent in their case.

No loss, in my opinion ; because they might have something much better in its place ! But then, they must *have* the something better ; and usually they have not.

The kitchen-table equilibrium being impossible in their case, they have only the choice between the other two alternatives ; unstable equilibrium (which, alas ! is the lot of most of them, till they fall hopelessly over with small chance of rising any more) or the glorious condition of freely mobile stable equilibrium, the sacred symbol of which is the Logan Stone. To establish himself in this blessed condition should be the aim of every Reformer's child.

The condition of ordinary stable equilibrium can be attained

without any scientific comprehension of the conditions by mere patient accuracy and heavy loading. The condition of mobile stable equilibrium, on the contrary, is an affair of accurate scientific balance. You must learn as you go along. But here are the main precautions to be observed.

Keep your intellect well balanced between the three Persons (Masks) of the Divine, as I told Hubert in a former letter.

When you have demonstrated that a certain consequence flows logically from certain premises, do not jump to the conclusion that that consequence is true. Examine well to see if it squares with actual facts. You will usually find that what you have really demonstrated is the existence of some flaw in your premises. This perpetual correction of the premises is the main work of the higher logic.

Remember that your life is carried on at incessant cost of the labour of mankind and the lives of creatures other than man. Therefore, by way of keeping the balance even, welcome every opportunity of ministering to others' needs in ways in which you are capable of so doing. Give freely, asking for no reward, as willing payment for what you incessantly and involuntarily accept.

No truly scientific man begins to think over a subject, much less lay down the law about it, until after he has ascertained all the facts ascertainable at the time which can throw light on the subject. Therefore if thy brother offend thee (i.e., cause thee to stumble, seem to thee wrong) take the first opportunity of telling him privately what in his conduct is perplexing ; and do not try to form, much less express, a judgment as to his rightness or wrongness until you have heard his own version. You may not agree with his view of his conduct, but what his view is, is one of the facts to be ascertained before formulating any hypothesis.

If you are preparing to make any contribution to the nation's treasury of knowledge or opinion, and remember that there has been something in your own conduct which seems to someone else unjust, postpone the attempt to enlighten others till after you have cleared up your own vision by repairing the injustice.

These precepts are, for those who depend on kitchen-table stable equilibrium, mere counsels of perfection, ornamental appendages to the essentials of ethical and orderly life. But for you they are primary essentials of sanity and moral order. Understand this clearly, my dears, and lay the matter to heart. For you, the stolidly illogical virtues of your forefathers are as unattainable as it would be to grow an elephant's hide or tusks. You have to be logical somehow, whether you like it or not. For you there is only the choice between the fatal logic of decom-

position and downward gravitation: 'Let us eat and drink, for to-morrow we die' (the modern fashionable variant of which is 'Let us gamble, cheat and flirt and let posterity suffer the consequences') and the Higher Logic of the Logan and the Foucault Pendulum—in the world but not of it, attached to Mother earth by normal gravitation but swinging free from her empiric control, set free to sway according to your own nature by the habit of rhythmic motion guided by accurately adjusted equations of balance.

XV

(To Antonia and Kitty)

THE REFORMER'S FRIENDS

"We stood back to back, my son; so that, whence soever came the blows of fate, they struck upon a shield." So spoke the dying warrior, in Frithiof's saga, of his brother-in-arms. It would be well for a Reformer if he could say, of some trusted friend: "We stood back to back; so that at whatever point of the horizon a truth appeared, important for us to know, we confronted it with eyes ready to perceive and arms ready to embrace; but his heart was as mine in its dealings with Truth."

Usually, however, the Reformer's chief friend is one who looks out towards the same quarter of the horizon as himself; ready to perceive the same truths; but with a different intention at heart as to how they should be dealt with. The Reformer is before all things an *inspired* man; he clings to a special truth because he believes it is the one he is appointed to live and die for; his friend too often clings to the same truth because he believes that it is the one which is going to lead, in his day, to worldly success. He means that it shall succeed; by fair means if possible; if not, then by unfair ones.

Yet it is good, necessary, for the success of a Reform that the quixotic Reformer should be supported by someone who has an eye to success and worldly wisdom to see how to secure it.

Therefore, it seems to me, the friendship should be a triangular one. There should be two, side by side, looking towards the same quarter of the heavens; one in the attitude of devotion, the other in that of resolve to succeed; and there should be a third, back to back with them both; calmly impartial; not anxious that this or that aspect of Truth should succeed, because he has faith that whatever is true must prevail over falsehood in the

end; and resolved only to be ready to supply the Leader with whatever useful information he is most likely to miss acquiring for himself. He should be one who loves Truth dispassionately, not because he feels that this or that particular truth is specially committed to him or to his Leader; but because God is the Unity of all Truth; he is, therefore, far less likely than the specially inspired Leader to be blinded to any insincerity on the part of the politic comrade by the latter's apparent devotion to the truths which are specially dear to the Leader.

In short, the Reformer too often has no friends or comrades; he has only followers, weaker than himself, who follow where he goes; and one or two associates who go with him as long as they think he is going towards success; and desert or betray him when he seems to be turning his back on her; and are sometimes only too glad of an excuse for setting up as leaders instead of him. He needs at least one unbiased and staunch ally. When he gets such an one, it is almost always a woman.

XVI

THE REFORMER'S EXECUTORS

THE Spiral of Progress* has been in all ages a sacred symbol. The verbal formula which corresponds to it is this: O Eternal Unity, our Father, may Thy Kingdom come, may Thy will be done, on Earth, as it is in the heavens, by incessant, orderly revolution.

Those who wish to learn how they may both remain fresh, escaping the conservatism that is born of fatigue and disappointment, and also remain sane, avoiding the maëlström of useless fads, should study the symbol early in life.

If you ever have to carry on, by only the light of reason and conscience and without the visible presence of the original leader, a work which was begun under the impulse and with the force given by a great inspiration, you may find your task easier if you remember the spiral of progress.

Remember also that your consciousness of any set of facts is always in lower dimensions than the facts themselves. Consciousness omits now one portion of the facts, now another; it never, at any one time, grasps them all.

At first sight it would seem as though this omission of some facts might make the problem as it appears to consciousness look

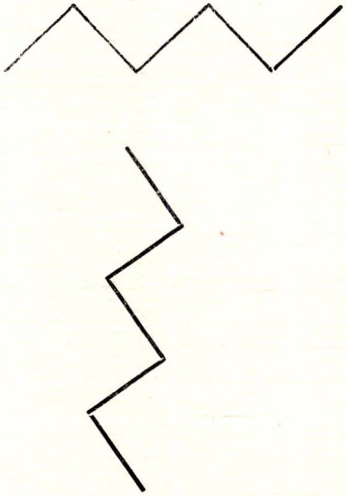
**See* "Some Master-Keys of the Science of Notation."

simpler than it would if you could see it as it really exists. But, on the contrary, the whole apparent complexity of a case is often due to the omission from consciousness of some of its essential features.

To make this clear, let us think of the spiral wire, which is in three dimensions while its shadow on any plane is in two. Let us call the main direction of the coil as a whole Z ; and the two main horizontal diameters X and Y.

If consciousness is in XY, progress will seem to be non-existent ; the path of the ascending creatures will seem to be a monotonous round of movement leading no-whither.

But if the plane of consciousness is in XZ or YZ, the path—which is really one of uniform orderly progress—will seem to be a series of cusps ; i.e., sudden and startling changes of direction.



I think, dears, there is no need to say much more. A few minutes' steady investigation of the spiral and its shadows will tell you more than I could tell you in a volume. If ever you feel either discouraged or frightened at the way your course seems going,

think of the work itself as progress up the spiral and of your consciousness as being sometimes in XY, sometimes in XZ and sometimes in YZ. You will feel both encouraged and calmed.

Possibly the crisis which we call death is the passing of consciousness from changing shadows to abiding facts. Possibly the soul, as it passes into the actual, is able to leave some blessing behind for those who are still seeing the shadows.

PASSIVE RESISTERS AND THE NATIONAL CHURCH

I. Assent. II. The New Basis. III. What is Ritual? IV. Religious Doctrines. V. Are we Berserks or Christians?

These papers appeared in "The Crank" of July, August, September, October and November, 1904, *and were published as a booklet in* 1905.

I

ASSENT

If one tries to formulate what one supposes to be an opponent's position, one is liable to be led into caricature and exaggeration. It is better that each side should state for itself the data which it assumes as basis. If this is done, it clears up confusion and helps discussion to "get forrarder." By way of setting a good example, I propose, in the present article, not to discuss Education Bills, but to state certain data, the knowledge of which seems to me essential to any rational treatment of the subject. If some critic can be induced to make a similar statement on his side, perhaps it may then be possible to compare notes about what is really wrong in the present arrangements, without feeling as if one had got out of the realm of sane discussion into that of nightmare or delirium.

No person in the Established Church of England has any right, legal, ecclesiastical or moral, to require from any lay member of the Church assent to any doctrine whatsoever, or to inquire what any lay member believes. This point was brought to an issue, and thoroughly thrashed out on several occasions, forty years ago. All communicants in the English Church are held to be members of the Church; and there is nothing to prevent any person holding Nonconformist, Unitarian or Agnostic views from receiving Holy Communion in the National Church as a commemoration of the death of a martyred Reformer. The invitation in the Church Service is to those who are sorry for what they have done wrong, and intend to mend their ways. Dean Stanley invited to Holy Communion all the translators of the revised edition of the Bible; and when some fanatic objected to the Unitarian preacher, who was one of them, being admitted to Communion, the Dean replied that it

was for the gentleman himself to decide on his fitness for Communion in the National Church.

I have been a Communicant of the Established Church for over half-a-century ; and have held several posts which were open only to communicants, some salaried, some honorary. I have never held, or supposed myself to hold, or professed to hold, any views about the Creator except that He must contain all possible pairs of contradictory-seeming opposites. I have, from first to last, refused to commit myself to any verbal statements about "Incarnation," "Resurrection" or "Divinity," as applied to Jesus Christ ; for the double reason that I have no means of knowing the facts, and that the words in which the statements are made have not been precisely defined, so that I do not even know what the statements are supposed to amount to. I have never been refused Communion. Only once, forty years ago, did a clergyman even suggest to me that I had no place at the national altar ; and on that one occasion it did not take me long to make the reverend gentleman withdraw his objections, and acknowledge that he had been speaking inadvisedly under a misapprehension as to the nature of his own functions.

The clerical authorities of Queen's College, Harley Street (the first college opened in England for girls), put the question formally to the Bishop of London : What line were they to take with girls who wished to be communicants but who preferred not to express any religious opinions. The Bishop replied that, if the authorities had reason to think a girl honest in the intention to lead a serious and good life, they were to admit her to Communion and ask no question as to her beliefs or opinions.

All this was well over and done with before the year 1870 ; and since then there is no valid reason for anyone asserting that membership in the Established Church involves "assent" to any doctrine whatever.

The perception that, whatever doctrine may be uttered in Church, whether in ritual or sermon, the layman who *disbelieves* it has a right to Communion at the national altar and to full membership in the national Church, was the great boon left to us from Frederick Maurice's Life ; he spoke with his dying breath of the share which women must take in getting the principle understood. And we are not going, please God, to let it slip out of our grasp now. England as a whole has hardly yet begun to realize its importance ; but the party of Agnostic Conformists is as serious, as thoughtful, and as quietly influential as any Non-Conformist body ever was at the time when some older-established body saw fit to despise it or to ignore its existence.

One of the results to be hoped for from the new Education Acts is that numbers of intelligent young persons, women especially, will be reminded of the unwisdom of leaving all the influence of a National Church in the hands of the feeble and superstitious. The latter too often allow themselves to be dominated by inquisitive and dictatorial priests. Those who know better should stand up for a right to a place at the National Altar, prior to, and independently of, any question of doctrine or opinion. If they neglect to do this they are neglecting their duties to the state, and ought not to be surprised if they are judged unfit to train young citizens. People talk about "women's rights" in the matter of elections ; and reproach, for neglect of citizenhood, those who omit to vote. But voting, one way or the other, at an election does involve the expression of some opinion ; it commits one to some kind of "assent" to the superiority of one side or the other. Whereas membership in the National Church involves assent to no statement whatever, except that the communicant considers herself a shareholder in, and custodian of, the nation's treasures, that no opinion held by others can deprive her of her rights, and that no opinion of her own can absolve her from her duties.

The foregoing applies, of course, only to lay members of the Church. What it may be right for the clergy to profess, or assent to, or sign, belongs to a different branch of psychology. I may have a word to say on that at some future day. For the present we are dealing with the one question of what is involved in lay membership.

II

THE NEW BASIS

"THEOLOGY means the knowledge of God. The knowledge of the works of God (of which man's mind is one) is not theology, it is science. The character of our Inspirer Himself is a theological question. It is for science to show us how we may become most receptive of His inspiration ; and the conditions, physical, mental and moral, upon which that inspiration is most health-giving and least disturbing, both to our bodies and our minds."

The above is an extract from a set of lectures written and delivered in or about the year 1866. A publisher wished to issue the whole, but Frederick Maurice "could not understand" the point of view ; and his friends advised the publisher to withdraw the volume because the idea suggested was then too new and strange to be safely put forward. Time has moved on since then,

The principle laid down in the above passage is now accepted as a good working-basis by some official Church of England workers among hysterical and unsatisfactory girls. It is recognised that the Infinite of "God-force," which has not yet impinged on a nervous system is the subject of Theology, while any finite portion of God-force which has come in contact with a girl's brain is thenceforth the business of the lady in charge, and is to be dealt with by her under the direction of medical experience.

The same principle holds good in regard to the education of children. A method for "secular instruction" has been devised, founded on profound study of all the sacred literatures and the principal Religious Rituals of the world. This method is in use, in slightly varied forms, in some private families, and in at least one large experimental school attended by the children of wealthy parents. It is found to be there working with satisfactory results. It is understood that so much Inspirer-Force as has not yet got inside of a schoolroom is the subject of "Religion" ; but so much Inspirer-Force as comes into a classroom is the business of the *secular* teacher ; it is his duty to cultivate the receptivity of the pupils for Inspiration ; to increase it to the highest degree consistent with health and safety ; and to train them in habits of orderly and wise use of the Inspirer-force for all life purposes. He does this on purely scientific principles ; by setting up the proper rhythmic beat of alternation between the instruction which he (or the books in use) can give, and that which the pupils are to seek by listening in silence for the inner voice of the "Formless and Unseen Teacher."

The Formless and Unseen Teacher is called by some preachers "God," by others Allah, or Jehovah ; by atheist lecturers the Inspirer is considered to be "only" Force. Science has nothing to say about the question which of these names is most appropriate. The parents have a right to direct what shall be told to their children about it ; and it is understood to be the duty of the Science Teacher to be silent in his classroom about that of which (in his official capacity) he is supposed to know nothing. But the rhythmic beat between instruction from visible teachers and inspiration from the Invisible is as much the business of science as is the swing of a pendulum or the "behaviour" of electricity in a dynamo ; its laws have an algebra of their own, analogous to the algebras of other forces, though fortunately much simpler. The clear understanding of them makes comparatively easy the understanding of the other Algebras, Notations and Formulas. The religious teacher, as such, has officially nothing to do with the Laws of Inspiration-Force. He has no official right to speak of them at all (unless he happens to have learned the algebra of them ; and

if he has done so, he will speak of them, not as a religious teacher, but as a scientific expert). The division of labour and duty is, so far, settled ; and there is no difficulty in the matter at all.

The School Board system of 1870 was framed, and for the most part carried out, by persons ignorant of the very existence of any such thing as a Science of Inspiration. It effected good in some respects ; but the deterioration in the nerve-fibre of the nation which followed from mental exertion imposed on children by persons ignorant of the laws of mental sequence, and of the effect of Inspirer-Force on brain, caused medical authorities to raise an alarm. The Government is now taking steps with a view to remedy the evil. The persons entrusted with the drawing up of the new Code commenced their work by consulting every expert on the subject whom they could hear of. They hope to utilise on behalf of the children attending primary schools that science of the use of the Inspiration-receiving faculty, which has proved so wonderfully beneficial to the children of certain wealthy parents. If the scheme is to be carried out at all, it will have to be recognised that so much "Holy Ghost" as gets inside of any Primary School in England, is the business of the Education Board, and not of any religious teachers whatever.

But there has come down from some dark age a traditional convention of supposing that the action of the Holy Ghost on human brains, *in Palestine long ago*, is to be treated as a branch of "Religion." By what chance the seed of this strange convention was originally sown we need not discuss here ; we have it now in the condition of a full-grown tree. It gives to our life a certain picturesqueness and shade ; and few of us wish to destroy it, or to disturb unnecessarily the birds who have built nests in it. But any branches that keep light and air from the school-house windows, or endanger the safety of its roof, will have to be lopped off. It would tend to simplify matters all round, if the opponents of the Education Bills would kindly remember two things : that all which could be learned from the Bible and the Creeds by the life-study of some of the profoundest brains in the world, about the action of the Holy Ghost on man, has been incorporated into a scheme of *secular* instruction ; and that any restrictions which the Education Board may see fit to impose on the right of secular teachers in primary schools to use the Bible and Creeds, freely, to interpret them as classics of *secular* instruction and store-houses of information about the *science* of Inspiration, will constitute *an interference with secular instruction*, on behalf of "religious ideas which Agnostic Conformists do not believe in." Now Agnostic Conformists pay rates like other people ; and moreover they have

done nearly all the work of evolving the modern science and algebra of inspiration. No Agnostic Conformist wishes to cut down millennial trees without necessity; that would be contrary to our religion; but, as I said, if the tree keeps out too much light and air from the schoolroom, or the birds make so much noise as to distract the scholars, something will have to be done to remedy the mischief.

Many people have a hazy idea that children are safer, if the supervising of their secular instruction is entrusted to persons holding this or that view about the essential nature of Inspirer-Force, and about the History of Palestine. Some groups felt this so keenly that they went the length of building, at their own expense, voluntary schools, in which the secular education was carried on under the influence of "religious" bodies. If the Government had only had courage to be coldly brutal, to seize the voluntary schools by force, and fling back in the face of those who had built them the money which they had cost, crying: "Now we are quits," much trouble would have been spared to the Education Board! But someone in authority (probably Mr. Balfour) took it into his head to imagine that devotion and sacrifice had their rights; that the very existence of a voluntary school in any district, constituted proof of the existence in that district of some feeling which deserved respect. While resolving to impose the new Code on all the Primary Schools, the Government arranged to hand over the carrying out of the code, in each existing Voluntary School, to those who had shown their interest in the moral well-being of the children, by paying for the building of it.

Hinc illæ Lachrymæ!

The moral of the story would seem to be, that no one who has any instinct of chivalry has a right to any share in the Government of England.

III

WHAT IS RITUAL?

In ancient days, when few people read, part of the day, on holidays, was spent in teaching the people the elements of sanitary and other science. There would have been no use in talking Laws of Nature; the appeal was to the Will of God. If the Camp was dirty, God would smell a bad smell, and go away and leave the field clear for demons who bring fever. God disliked pigs; so the faithful must not eat pork, and so on.

Part of the instruction consisted in a Veni Creator invocation ; an object lesson on the right way to draw down Inspirer force, or new-Creator Force. Modern prudery has created confusion in this whole subject by inventing a sharp line of division between the Laws of physical generation and those of intellectual regeneration ; perhaps the stupidest and most essentially indecent product of our prurient Western civilization. No such idea seems ever to have occurred to the ancient arrangers of ritual. They seem to have supposed that whatever power gives man new babies, the same, or a similar one, gives him new thoughts, and they showed in "ritual" what experience had taught them about the conditions under which this power acted most beneficially for man.

Ritual is, primarily, an object lesson as to how to get Creative Force to act on man.

The information was general. When you knew how to become inspired, you used your knowledge, at home, to get "inspired" about whatever you wished to know ; politics, or the best way of growing your crops ; or the best way of defeating your enemies. But the public Object Lesson had to be about something ; some episode was chosen which the founders of the Ritual thought important in itself. In Palestine, the escape from Egypt, the giving of the Law and the Founding of the Hebrew People, was chosen as the group of incidents to be inspired about on public occasions. In the Christian Church the Crucifixion of Jesus was the subject of the Object-Lesson-rehearsal. Priests were appointed, and taught the order in which the inspiring ritual should be conducted.

"Priests were appointed to lead men into Truth ; but in all ages they have feared lest he should find the right road and walk in it." The message entrusted to the Priests for the People, was : "If you don't conduct your thought-life according to the order of sequence which we show you, you will be damaged in this world" (either by remaining ignorant and therefore slavish ; or by exerting the mind under conditions disastrous to its elasticity and strength). This degenerated into : "If you will not attend to (and pay for) *our particular object lessons* on the order of sequence, you will be damned in the next world." All manner of superstitions grew round the ritual of the Mass. There had to be some revolt against the tyranny of these superstitions ; hence what we call the Protestant Reformation. Further development of the same determination to revolt against the tyranny of priests gave rise to the various Non-conformist bodies. In answer to the statement : "Only by means of our Mass can you escape hell," the rebels replied : "God is our Father ; we will take our chance of all the hell He will

send us to for not listening to you ; in proof of our trust in Him, we will abstain from attending Mass so long as we live."

So far, so good. The protest was magnificent and the results admirable.

But when the protest has been made, and well made, there are two ways of carrying on the campaign in future. The Protestant way is to abjure what priests have misused—a plan which it is impossible to carry out with logical thoroughness ; for what would be left to us to do ?

What have not priests misused at some time or other ? They have misused food, drink and perfume ; love, sleep and money; learning, labour and recreation. We should rescue good things from them, not give them the monopoly of ritual or any other means of health.

Agnostic Conformists go on using God's good gifts, including ritual ; and when a priest shows a disposition to interfere with their ideas as to why the things are valuable, they good-humouredly remind him that his function is to carry on the ritual as he was taught ; to learn its meaning they have access to original sources : i.e., the ancient records and the living Inspirer. From the Nonconformist point of view, what has been exploded as theology is to be banished from Education. From the Agnostic Conformist point of view whatever was once theology is now the property of science ; and a necessary part of educational material.

When St. Peter discovered that God has no prejudices against pigs, the Christian Nonconformist-consciousness of that day discarded the Sanitary Code of Palestine. But probably the arising of the modern bacteriologic science was to some extent fostered by curiosity as to the meaning of that old code. It is certain that the modern psychologic canon about the value of "unconscious constants" and "crystallizing threads" arose in the inquiry : "If the Creeds are not true as theology, how came men to attach so much importance to them ?" And we owe the easy, vitalizing method of inducing by inspiration, the comprehension of Numeration, Proportion, greatest Common Measure, Quadratic Equations, the 47th Prop. of Euclid, and the Differential Calculus, to a comparison of the Jewish Ritual of Passover with the Catholic Mass ; the question was posed : "If Ritual is not necessary for propitiating God, how came it that men have thought it necessary ?" The answer of Nonconformity is : Because men are superstitious and believe falsely." The answer of Agnostic Conformity is : "Because ritual induces a certain kind of force ; and it is natural to man to receive each great truth *in an inverted form* at first." The Nonconformist abstains from what he

supposes to be *false*; the Agnostic Conformist tries the experiment of reversing the position of what he guesses to be probably *a Truth seen upside down*. So far, results have always justified this kind of guess. Where Nonconformity has landed its adherent it is not for me to say. Agnostic Conformity has brought us to vital mathematics, to the Art of Thinking along Spirals and by the use of Parallax and to an Algebra of Inspiration.

The ritualistic method in secular study has been in use among adults, sporadically, ever since 1755 (probably much longer) and as a recognized working method ever since 1855. It has been gradually infiltrating elementary education, abroad, and in private circles in England. It was kept out of the Board School arrangements, partly owing to the influence of Huxley and other "anti-priest" persons at the time of the framing of the Education Acts of 1870. It has taken complete shape in the working of a large experimental secondary school in England. The results of the method are found satisfactory, in enabling pupils to assimilate large quantities of knowledge at an early age, without "cramming" or "swotting." The whole secret of the method was, some years ago, made a present to certain Trustees on behalf of the Nation. Professor Reich has since then been asking large and fashionable audiences in London how it comes to pass that methods of inducing Mathematical Inspiration formulated in England, and used abroad, are known to comparatively few in the country where they originated. Books explaining these methods have lately been published by the Clarendon Press of Oxford; and an application has been made for permission to translate these books into Hindustani.

The question now is, not whether vitalizing (ritual) method in secular instruction *shall be used*; but whether the children attending Primary Schools in England shall get the benefit of methods found useful in promoting brain power, by a few wealthy people in England, and by all classes in certain countries abroad.

A friend of mine whose daughter attends a higher grade Primary School, on seeing some work done at the experimental school above referred to (results of the ritual method) said: "But this is *my* business. I pay rates; and school fees as well; and I want for my little girl the best I can get for my money. But I am only one man; what can I do?" "You can talk to other men," said I. "Ah! that is very true," said he. And I think he will.

IV

RELIGIOUS DOCTRINES

"UNITY is the property of The Infinite, The Absolute, The Eternal. Dividedness is the property of the finite, the transitory, the phenomenal. Every attempt to eternalize phenomenal divisions avenges the Majesty of the Eternal Unity by injuring the brain of Man."

The above is an extract from a formula which has received assent from representatives of theology, both Jewish and Christian; and of science both material and psychological. No one disputes the truth of it—in the abstract. Yet, whenever one tries to apply it to the concrete, one is met by furious opposition. The present educational struggle is a case in point. The whole grievance of the resisters turns round some question about people having to pay rates for the teaching of "religious doctrines which they do not believe in." It is implied that some doctrines are religious and others not so ; otherwise the phrase could have no meaning.

The word "doctrine" means "teaching" ; any thing taught is, so far, a doctrine. It is clear that, if teaching is to be paid for out of rates, we must accept the principle of compelling people to pay for the teaching of doctrines which they "do not believe in" ; it would be impossible to find doctrines of Geography, Grammar, Spelling or Pronunciation, which all the rate-payers "believe in." Many a rate-payer has, in his heart, cursed "that there dratted school board" for doctrines about cleanliness, manners, sanitation, the dangers of alcoholism, and the right treatment of animals, which he (the rate-payer) did not "believe in," and the teaching of which to his own children has wrecked his family harmony. For the workman is not only forced to pay for teaching to other people's children doctrines which he does not believe in ; he is also forced to allow his own children to be taught them. We do not find that the Resisters pity him for the infliction. I have been paying rates thirty years, for the teaching, to the children of my poor neighbours, of doctrines (about arithmetical method) which revolt my conscience and sicken my soul ; I do not find that Dr. Clifford has much sympathy with my lamentations on this topic ! The injustice of making people pay for the teaching of "doctrines which they do not believe in" begins, it seems, when those doctrines are *labelled* "religious."

But the placing of any such label depends on the labeller. What constitutes the distinction between religious and secular learning ?

No such distinction existed in ancient Asia ; the pious man was the learned one ; whoever loved God wished to study the Laws according to which He governed the world ; the brutish callous man was an impious one. All knowledge of Nature, of Literature, and of History, as well as all manner of Sanitation and Hygiene, were taught under "religious" sanction. In Christian Europe, some sorts of learning, being supposed to be more important than others, were put more specifically under sanction of the Church. This classification may have been temporarily useful for certain purposes. But it is essentially transitory and shifting ; it is sound only on condition of being held lightly and let go at the first indication that the time for a change has come. Many things once supposed to be religious doctrine are now understood to be secular science. At one time the History and Geography of Palestine were supposed to be religious. Theories about politics, social science, marriage and the origin of species, have been, in turn, taught as religion ; each of these topics has now been relegated to the domain of science. At the present time, half-educated people label as "religious" certain branches of psychology ; (e.g., that which teaches the effect of ritual in promoting inspiration). Many highly educated people, however, now have a general reverence for all science ; and no superstitious ideas about any one in particular. For them, reading Algebra is as much a religious exercise as reading the Bible ; and kneeling before a crucifix is as much a matter of science as taking a bath. On the other hand, there are persons who could not be induced to take a weekly rest unless they were provided with superstitious reasons for it.

The re-union of religious and secular learning must come sooner or later ; the only question is : Is the present a suitable time ? That question, indeed, needs to be fairly faced, and should have been faced calmly and sanely. But the animus of the discussion now going on, the attitude both of the Resisters and of many supporters of the Education Act proves a condition of feeling in the country very like that of the people spoken of by Isaiah, who, having selected one bit of wood to carve an ornament for their temple, and burned the rest to cook their food, then set up this distinction (made by themselves for their own convenience) as sacred and taboo ; imputed to it some characteristic of being essential and eternal, and would have resented as sacrilegious the attempt to treat the two portions of timber as chips from the same block.

The words "religious doctrine" are properly a slang term, a bit of loose phraseology conveying no definite meaning.

If the opponents of the present Education Acts had claimed that *no person should teach, in any rate-supported school, any doctrine*

whatsoever, until the teacher had given proof of knowing some reason for its being taught, founded on science or on human experience ; some reason independent of mere unthinking prejudice or slavery to tradition, such a claim would have won the adhesion of scientific persons in every department, and of all the more cultured portion of the Church of England, including the Agnostic Conformists. Now, as always, the use of accurately defined terminology would facilitate the union of all intelligent and honest persons in a common object ; (in this case the object is to give to the future workers such a vital comprehension of the meaning of what they learn as would protect them all their lives from being misled by those interested in enslaving them). Now, as always, the use of slip-shod phrases has facilitated the other kind of association : the agglomeration of men in groups, each bound together, not by a common aim, but by a common catch-word, and the flinging of these groups against each other in mutual antagonism.

But storms, however wasteful, clear the air from noxious vapours. Let us hope that the present storm may do something to clear the atmosphere of English education from misty and poisonous slang.

NOTE.—I should like to take this opportunity of referring readers to a book called *Tatty*, by Peter Fraser, in the preface to which this subject (the scientific value of certain psychologic doctrines commonly taught as "religious") is dealt with. The preface might be read with advantage by any thoughtful person. The combined candour and purity with which a difficult subject is handled in the course of the story itself should specially commend itself to readers of *The Crank*.

V

ARE WE BERSERKS OR CHRISTIANS?

SOME years ago, before the present Education Acts had been heard of, much discussion went on in groups of persons concerned with scientific education, as to why it is difficult to introduce into England certain modes of instruction found useful abroad. In an article in the *Essex Standard* (28th December, 1901), on "England's Antagonism to True Science," I hazarded the suggestion that the main cause of difficulty lies in certain intellectual (or rather, anti-intellectual) qualities fostered by the peculiar nature of English religions. The Passive Resister movement constitutes an Object Lesson, by the aid of which I shall be able to state more clearly

than was then possible, in what way, as it seems to me, our English attitude towards religion is obstructing intellectual development.

English thought is strangled in the coils of an octopus, which adheres to its victim by innumerable suckers, and incessantly drains away its life-blood. Its true name is *Negation*, but it has many aliases. The claims which it makes for itself combine those of an infallible Pope, of an irresponsible Kaiser, of a hysterical invalid, and of a spoiled child. Its ethical code contains, among other canons, that of our Berserk ancestors : "Never try to understand a stranger until after you have done him all the harm you can" ; and that of the domestic cat : "Jump on whatever you see moving." It is subject to attacks of maniacal delusion, in which it mistakes for a dangerous giant some windmill which is harmlessly grinding corn. The dialect in which this anomalous negative entity delivers its mandates has no discoverable connection with either rationally constructed language or organic notation. It refuses to translate its terminology into either ; assuming that every Englishman is in duty bound to understand its sacred jargon. The history of this jargon appears to have been briefly as follows :

Every essential principle which distinguishes living from dead science has, at some time or other, been placed under the sanction of the religious emotions, and taught by object lessons in public worship. The Roman Church embodied many of these essential doctrines in a Ritual called the Mass, which was intended to be a universal, world-wide Object Lesson, and the function of which was to transcend, overshadow and bless all local and partial methods of teaching. Priests having perverted the Mass, a protest arose. The protest was evoked and necessitated by the priestly abuses ; but was afterwards turned against the Ideal which had been abused, Lutheranism substituted for Catholicity a North-European consensus ; and replaced the ritual object lessons by a set of verbal statements about man's relation to the Inspirer. But our insular English kings never became true Lutherans ; they preferred to set up a national ritual embodying a national ideal intended to protect England from the domination of foreigners, and to mould the people of the nation into some kind of mental uniformity by the pressure of a purely national ritual. This National Ideal, in its turn, became subject to abuses ; and fresh protests were made. A new ideal arose : the Sectarian ; which embodies a truth probably at least as valuable as either of the others ; the doctrine of spiritual division of labour ; viz., that man is guided towards Truth, not by any organised body or consensus of doctrine, but by separation into groups. Each group dedicates itself to the task of witnessing for some special aspect of Truth, which, owing to the limitation of

individual human faculty, is necessarily being ignored by the other groups. All the groups trust to the common Inspirer to guide the nation as a whole, without any particular section being conscious in what direction the whole is being guided. This is the Sectarian Ideal.

But this magnificently scientific and profoundly humble conception of organic intellectual differentiation was in its turn abused; sectarian differentiation became an excuse for wrangling and for mutual contempt. A protest then arose against the claim of any one sect to decree itself holier than any other. Among the names of the protestors against this *misuse* of sectarian freedom none is better known or more deservedly honoured than that of the Rev. Dr. John Clifford.

But now comes the dark side of the picture. When "secular" teachers try to teach important truths of psychology simply, on a *rational* basis, pious people raise a storm about "undermining faith," making use of state-schools to meddle in "religious" matters; and "interfering with the business of the clergy." And now that the government are trying to get important psychologic doctrines taught, as of old, under sanction of the clergy, pious people are protesting against having to pay for the teaching of "*religious*" doctrines which they do not believe in. Thus, no important doctrine of psychology may be taught, either with or without religious sanction; and psychology, as taught in England is, for the most part, trivial and superficial. Some years ago, a teacher of Method to the Board School kindergarten teachers of a large London suburb was present at a drawing-room lecture which I gave on an analysis by Gratry (a Catholic priest) of the process of Mathematical Induction, which he (rightly) describes as an Invocation of the Inspirer. The instructor under the London School Board said that she had never before heard of psychology having any really scientific basis; she always thought it was empirically built up on mere outside observation. Yet she had studied all the text books in repute in England, and passed all the examinations recognized by the Board! English Protestantism *will not tolerate* the mention, in training colleges for teachers, of the fact that Psychology has a cardinal central doctrine; because the core and centre of human psychology is the cardinal doctrine of the Mass and of most other great Rituals; the doctrine of the Real Presence of an unseen Creator-Inspirer, Teacher of teachers, King of kings, and Lord of lords, for Whose instructions the human teacher should pause in reverent silence at certain points of every lesson in science; and this is a "Popish" doctrine, which many English ratepayers "do not believe in."

So potent in England is the tyranny of Negation that a convention has grown up of giving a bad meaning to adjectives describing any positive fact or quality. The words *Romish, Ritualistic, Anglican, Sectarian,* which describe positive Catholic ideals, are assumed to mean something bad; while those which imply *negation* or the denial of something such as non-Phallic, Protestant, Non-conformist, Un-sectarian, are assumed to mean something good.

I hope we have now convinced our critic in Brotherhood that we Cranks have at least *tried* to find out what the Passive Resisters are asking for. We may have missed seeing some of their aims; but I think we may safely state three things they are aiming to secure.

1. A Board of Education which ignores the dangers and difficulties involved in the attempt to teach science effectively to the children of an unprepared population, and which therefore neglects to study the means whereby those dangers may be minimised.

2. An educational code which shall please ignorant adults by a pretence of being effective and up-to-date; but which shall not in reality admit anything that cannot be described by negative adjectives, nor anything important enough to have ever been placed under the sanction of the religious emotions; nor anything which the majority of English ratepayers do not already think they understand, and feel inclined to endorse.

3. Writers on Psychology able and willing to point out the harm done by ignorantly pious clamour in former times, but who will abstain from pointing out that similar mischief may be done by ignorantly pious clamour at the present day.

I hope also that critics will be convinced of the truth of at least one of our views: *i.e.*, that whatever may be the case in physical warfare, the conduct of political and financial squabbles should be left in the hands of men young enough and worldly enough to be in touch with the conditions under which they are living. The Prince of Peace, Whose kingdom was not of this world, advised his followers to pay taxes quietly unto Cæsar (who was sure to spend some of the money in honour of idols). "The snow of years" should occupy itself in cooling the hot passions of men. When a venerable saint emerges from a dream of a kingdom of Righteousness, and plunges into party affairs in which burning questions about money are mixed up with old-world disputes about religion, he is likely to use arguments which prove too much.

And I am sure that our critics will join us in a prayer, addressed by each to whatever Good Powers he "believes in": that to none of us may be granted more of what we desire than is good for ourselves and the nation.

THE CRANK

1904

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TWO REASONS FOR NOT CALLING ONESELF A PROGRESSIVE

I

BECAUSE party-labels so commonly go by contraries. An epithet taken as the label of a party seems to act in the direction of destroying the quality indicated by that epithet. Whoever is protesting most loudly : "Is thy servant a dog that he should do this thing ?" is usually the most likely person to do it. In the days when the so-called Catholic (*i.e.*, universal) Church held sway in Europe, it showed its Catholicity by exterminating all whose minds were not so constituted as to be able to fit their thinking into the framework of certain special creeds. The party which called itself "Evangelical" (from "Evangel," which means "Good News") taught, as its special doctrine, the news that the enormous majority of mankind were hopelessly doomed to everlasting torment. The party which called itself "Radical" set the fashion of a very super-

ficial mode of thinking which judged of everything by its immediate results, and which had no roots in history or experience. The Sophists of ancient Greece (so called from the word "Sophia," Wisdom) occupied themselves in teaching people how to "make the worst appear the better reason." There are persons in London now, I am credibly informed, devoted heart and soul to the formal doctrine that The Eternal hath neither body nor parts, who occupy time on weekdays in teaching how many hairs there are in God Almighty's beard. Party cries and party names so often go by contraries, that one hopes to find sanity among people who call themselves "Cranks"; and one expects *a priori* to find the chief obstructors of Progress among the party which calls itself "Progressive."

II

BECAUSE Progressives, so far as one can judge by the conversation of vehement members of the body, and by the tone of the articles in the "Progressive" journals, have not the remotest conception of the nature or meaning of the "Spiral of Progress."

A SUGGESTION TOWARDS THE SOLUTION OF SOME EDUCATIONAL PROBLEMS

AMONG all the controversy which has been raging round the Education Bills, one little suggestion has been overlooked; probably because it could not, if carried out, hurt anyone's feelings, or injure anyone's interests. In times of public excitement, measures of reform which would evidently be harmless and useful, are often neglected.

It would be highly desirable, now, to introduce into Training Colleges for Teachers, and into Technical Schools and Engineering Colleges, that valuable old Formula or Modulus for the synthesis of various sciences, the Spiral of the Hurricane or Dust Whirl, with its system of tangents and normals. In 1864, my husband (who might be supposed to know something of the matter, for he had done some effective synthesizing in his day), told me that it would be well worth my while to give up all other lines of study, and devote myself to investigation by means of this Spiral. Each year which has elapsed since then has deepened my sense of its simplicity, efficiency and charm, as a piece of intellectual and educational apparatus.

As an example of its use, I will give an instance of its applica-

tion to my subject, the Cultivation of the Mathematical Imagination. Having drawn the Spiral, with tangents running off in various directions, I tell the pupil that the Spiral itself represents the methods of the mathematical Ecclesia, of the constituted mathematical authorities, of the recognized teachers of Universities. The tangents represent various paths taken by eccentrics, nonconformists, men who have received the *first* personal inspiration, the first birth into a new world ; who have cared, and dared, to go off on lines of their own, each investigating as he is impelled by his own genius.

That is very well for a time ; the youth of genius should find out for himself what is the direction in which he is impelled to go. But before he offers his gift on the National Altar, before he can really contribute to the general store of knowledge, he must pull himself into line with general progress. How shall he do this ?

The advice usually given is, to conform to the general custom, submit to the Academic Ecclesia. But there is a better way.

The normal to any tangent leads towards the centre of equipoise, of balance, of calm progress ; the spot where is concentrated the maximum of force with the minimum expenditure of force in mere useless motion.

But how can any man find certainly the true normal to his own tangential direction, the path which will guide his own peculiar genius towards the centre of progress and of power ?

The direction given by the diagram is emphatic and unmistakable. He should look out for the brother eccentric who most especially "offends" him, who is going on what seems to him to be most obviously and certainly the wrong road, because it leads in the opposite direction to what he is sure is for him the path of inspiration. Let him unify with that brother, call out to that brother to meet him and join hands. When these two meet, they will be in the centre of calm force. This conversion into the Normal is the second birth of Genius, the Regeneration which converts mere inspiration into Revelation ; for inspiration is at best partial ; Revelation comes at the moment of the combination of opposites.

As the diagram shows, all inspirations are inadequate ; and nearly all are, in themselves, actually misleading.

The above is given as a mere example of the application of the formula to one department of study. Its uses are manifold. I find it, however, difficult to induce teachers to adopt it, because it is mentioned in the New Testament, in a report (evidently fragmentary), of a conversation between Jesus of Nazareth and a learned teacher, Nicodemus.

It seems to be supposed that because the formula was used by

Jesus, the use of it in secular teaching would stir up controversy about what is commonly called "religion." But this is surely unreasonable. Many scientific men besides Jesus have come into collision with the ecclesiastical authorities of their time ; but we do not give that as a reason for leaving their *scientific* work to theologians to interpret. Galileo was a heretic according to the Papal authorities of his age ; but that does not give to "religious" persons a monopoly of the construction or use of Orrerys. Where would Geometry be at the present day if teachers had postponed introducing pupils to the Square of the Hypotenuse till ministers of different religions could agree among themselves about Euclid's views of Theology ? He may have had views on the subject ; possibly he was much in earnest about them ; nearly all great Mathematicians are profoundly pious ; and Euclid's ideas of man's relation to the Unseen were probably interesting and important ; but the *right*, the indefeasible *right* of our young engineers to know the relation of the hypotenuse to the sides of a triangle in no way depends on what Euclid, or anyone else, thinks of Zeus or Athene. An orderly habit of putting one's diagram properly on the blackboard, before beginning to comment on the text, is a more necessary qualification for interpreting a statement about a Spiral, than any amount of theological scholarship, or even of spiritual fervour. "*La Science prend son bien partout où elle le trouve.*" The Spiral of Jesus is the keynote of correlation for the sciences of Geometry, Meteorology, Electricity, Psychology, Political History, and Social Ethics ; it should be taught to young citizens of all classes, by properly trained Geometers, as a matter of purely secular instruction.

The cruel death of Jesus, hardly more tragic than His lonely life, in which opportunities for converse with persons capable of understanding Him seem to have been exceedingly rare, is surely an extra reason for losing no scrap of knowledge left behind by that brilliant young Prophet, so early cut off because no one understood Him. We may have all the respect possible for the feelings of pious persons and the clergy, as long as they are content to talk of matters which they understand. But to interpret the wonderful Spiral of Jesus is the duty of Mathematicians.

The conversation of Jesus about the Storm-Spiral, above alluded to, appears to have been, in the report of John, mixed up with another (or another part of the same), about being new-born of "Water and Wind." James Hinton interpreted this as becoming *fluid* ; not wasting force on trying to overcome what is, for the moment, stronger than oneself, but slipping round the corner, as water and winds, in the direction of least resistance ; not struggling

for the external appearance of power; but trusting to unseen influences which soak and penetrate out of sight.

WHO IS A PRODUCER?

THE classification between productive and non-productive people is, of course, idealistic and dramatic, not actual. If I had to walk from the station a mile or two, I could do nothing for days, or weeks, or perhaps ever again. If, therefore, my work is of any value, the cabman is a part-producer. No one can tell, on seeing an old woman take a cab, whether she is going to write text books or play cards when she gets to her destination. The farmer is a producer: but who is to say whether his barley will become "pearl-barley" for soup, or malt for beer? Whether his wheat will feed men, or be made into starch for the shirt fronts of dandies? The responsibility is individual all along the line, isn't it?

LETTER TO A CHILD ABOUT ARRESTATION OF PROGRESS

My dear Child—Somebody said once, "Go to the ant, thou sluggard; consider her ways and be wise." I don't know whether I am a sluggard exactly, but I have been taking his advice, and considering the ways of ants in an artificial nest, and their wild relatives.

Long ago, in the pre-vertebrate times, ants must have been in the very forefront of civilisation. How have they drifted behind? Why are they not dominating the world now? Why, when vertebration was needed, did not the ants take the lead in the new development? Why, when nature wanted vertebration, was she obliged to hark back and take up the thread of progress from a less-developed, less-civilised tribe of the invertebrates? It is not because ants are less brave, less industrious, or more selfish than other people. On the contrary, they are the standing model of the social virtues. It is not from want of brains. The ants' brain is said to be the most marvellous scrap of matter on the planet. Nor is it because they are individually small; small things can grow when the time has come. An ant is bigger than a grain of mustard, which in Palestine grows into a tree. And we all came from the amœba. It is the nature of small things to grow if nothing prevents.

What ails the ant? We like a few for pets as long as we can keep them in a cage, but when they invade our premises in large quanti-

*

ties we go for them with sulphuric acid or boiling water. But how is it we are able to do so ? Why is it that they are not able to go for us with sulphuric acid and boiling water if we make ourselves a nuisance ? What has put the world so topsy-turvy, that we selfish, stupid, and immoral barbarians compared to them have so manifestly the pull of the situation, and have so manifestly got God Almighty somehow on our side ?

I read something once—I don't know if it is true, but, if it is, it would seem to me to account for this anomaly—I read that ants have developed a very clever trick for arresting development in the interests of social convenience. When they find a grain of wheat, and want to preserve it for their own future profit, they bite the living germ out so that the wheat never sprouts in their granaries. It remains apparently perfect as they found it, as long as they like. It has lost its tendency to rot, and grow, and change, and stir the ground and make itself inconvenient. People who do that sort of thing seem mighty clever in their own eyes and those of their neighbours, but they lose the friendship of God. From among them are born henceforth any number of clever bureaucrats, industrious weavers of red-tape of the strongest quality and the most approved dye, but never a prophet, never an Abraham nor a Moses nor an Isaiah, nor any upsetting person of that sort. They have lost the Key of the Future.

Two or three hundred years ago a colony of such people went to Japan. The Japanese Government welcomed them as playthings and pets ; gave them nice little cages to live in ; encouraged them to stay for the amusement and instruction of the Japanese children and fed them plentifully with honey.

But after a time they got loose, and betook themselves to their favourite trick of stealing the seed-corn of the future and biting its eye out so that it might not grow. A hundred years ago the Japanese, who like their children amused and instructed, but who do not like the future of their race interfered with, gave these two-legged insects notice to quit (not merely in words, but with boiling water). Such of the two-legged ants as escaped came back to Europe and called themselves martyrs ; and now others of the same species are very busy here trying to bite the eye out of seeds of progress which otherwise might grow.

In England we have some sort of constitutional objection to the massacring of unfeathered bipeds. It is not my business to explain why the number of legs that a highly intelligent, virtuous, and well-behaved person has should affect the morality of our mode of dealing with him. I heartily accept the laws of my country as they stand, believing them to be brothers of the laws in Hades (as

Socrates said), so I do not wish to murder physically the correct and respectable persons who nibble the growing eye out of my cherished seed-corn.

But I don't mind letting you into a secret. I am spending much of my time and the best of my energies in devising means, not contrary to the law of the land, for making this country uncomfortable to them, or at least to such of them as do not stop in their nice little cages.—Yours affectionately,

MARY EVEREST BOOLE.

A PROBLEM OF TO-DAY

(A Free Thinker has an orphan ward, whom he is bringing up in an atmosphere of scientific enlightenment and religious freedom. But the child's parents, nominally Church people, had him baptized in church. One of the sponsors, having now become a fervent Anglican, has come forward, and asserts it to be his right and his duty to see that his godchild is properly indoctrinated with Catholic ideas about the Blessed Sacrament. The guardian asks how he can best minimise the risk of perplexity and confusion for his sensitive little ward.)

IT seems to me that the case of your ward is one in which honesty is the best policy; that the way out of your difficulty is to tell the plain truth to the child himself, and, as far as may be, to all parties concerned. The truth is simple enough.

In every science-lesson, there is a part which no human teacher can explain. The explanation should come *from* an Unseen Teacher, *through* the pupil's own meditation on the object of the lesson, *after* his mind has been suitably prepared by words spoken by the human teacher.

But it was found that in the process of accumulating information given by human teachers for purposes of examination—or whatever was the ancient equivalent to examination—this most important part of the lesson was often forgotten and slipped into disuse, and so true knowledge decayed; and people grew stupid, like crammed geese who don't have time to digest. Therefore wise men of old insisted on rituals, in which the proper order of a science lesson was rehearsed, so that everyone should be reminded of the right way to learn. A priest took in his hand some object, *e.g.*, a serpent, an olive or hazel wand, or a mistletoe bough, gave *his* lesson on it, and then held it up for people to look in silence, or

hide their eyes and *wait*, till The Unseen should come and give His share of the lesson.

In Palestine the authorities chose, as the object of the ritual-lesson, bread and wine, things made by taking ripe fruits just in perfection, and crushing them to death to make food for higher creatures. The Christ said that He was giving His body and blood for food for His Church. Therefore many people still go through the old Hebrew ritual, but now in remembrance of the Christ.

Some teachers of science introduce little rituals of re-collection and synthesis into lessons. (You can show the child one or two examples in my Logic of Arithmetic.) But not all teachers of science are wise enough to remember to do this. And, besides that, children ought to know about voluntary Sacrifice, and the Christ. The Church insists on a day every week when there are no lessons in the lower sciences, so as to leave time for learning the Science of Sacrifice ; and she provides godparents, whose business it is to see that this part of education is not crowded out. Those sponsors promise at baptism that they will see about all this, and of course they are bound to do so. Tell that to the child simply and reverently ; it will tend to harmonise the various influences that surround him. I do not think the most High Church clergyman could object. In case, however, the Catholic sponsors or priests make any difficulty, you may explain to them that the idea of teaching *Geometric Induction* as a process of prayer, a pause for communion with The Unseen Inspirer, has been borrowed from the works of a devout Oratorian Priest, Gratry.

And I think you will find if you give the child one such lesson while he is young, no one will succeed in making him *superstitious* about Mass. All that he is told about the Real Presence, etc., will go towards making him reverent about secular science. Every experiment in chemistry or physics is a mass ; the human teacher prepares and does things ; and then something *happens* which *he* does not and could not possibly do. No one sees the Power which makes it happen ; but the power is there—a real, living *Presence*.

LETTER TO A RADICAL REFORMER

In books which relate to the early part of the last century, we not infrequently meet with the statement that such a man "had imbibed the principles of the French Revolution." No more misleading phrase was ever invented to foster the enslavement of mankind. The true continuers of the French Revolution were not those who imbibed its principles, but those who studied its methods;

for men succeed in doing, not that which they think they ought to do, but that which they know how to do and have skill (either hereditary or acquired) in the doing of. Which is the more likely to rescue a fellow creature from drowning ? The experienced swimmer so skilful in his art that any opportunity for exercising it is a delight to him, or the humanitarian who has spent his spare time in youth preaching altruism on dry land, because he had conscientious scruples against wasting time on practising athletics for his own benefit ?

The great obstacle to the remedying of our social ills, nowadays, in England at least, is not anyone's ill-will or selfishness, but the fact that ruling other men, organising the labour of other men, buying in the cheapest market and selling in the dearest, all these are *Arts* ; and like all arts, delightful to those who have once acquired the necessary skill. The children of these artists take to ruling, slave-holding, using up other people's labour, not on any theory or principle, but because "it is their nature *to*" ; as baby ducks swim, even before they have learned that it is to their interest to do so, because their feet tingle, at the first touch of the water, with instinctive consciousness of hereditary faculty. Hens preach, to each successive brood of ducklings, earnest sermons on the folly and wickedness of going into the accursed element ; and the ducklings respond, as wealthy readers respond, when they have been reading solemn articles in socialist and reforming journals, by practising involuntarily the art in which they are skilled ; of directing other people's labour to their own uses.

What then is the remedy ? Not the preaching of principles, but the acquiring of skill by those who hold the principles. Who was the emancipator of Israel from the land of bondage ? Moses, the son of the enslaved Race, who became learned in the lore of the enslavers. Who made possible the organising of the Forces of the French Revolution ? The Encyclopædists, who had made a profound study of the methods adopted by tyrants in all ages* for organising men as slaves. When they had acquired this knowledge, they used it to organise the Proletariat for freedom ; but first they learned the art of organisation from the priests and tyrants among whom it had been evolved for selfish purposes.

The sight of a stray cat evokes in many boys a blind passionate desire to hunt something. If nothing else is provided, they hunt the unfortunate cat. To reproach them for their cruelty is to show oneself more stupidly cruel than they are ; the remedy is to start them on a hunt for the owner of the cat. This satisfies their instinc-

*See *L'Antiquité dévoilée par ses Usages*, and other works by the same author.

tive craving, and sets them free to indulge the instincts of kindness and protection, which are not lacking in the average boy, though weaker in him than the hunting lust.

There was much less difference than at first sight appeared between the Southerner who considered it the natural right of a white man to wallop his own nigger, and the Northerner who considered it his natural right to coerce the Southerners and prevent them from walloping niggers !

The mere idea of a collection of human beings awakens in some persons a craving to organise, dominate, legislate, as blind and unreasoning as that of a bee for making honey. When one has learned something of the secrets of state-craft, by studying in the spirit of sympathy the mind of the Imperialist statesman, one learns to find safe and useful employment for his faculties in organising the masses for communal self-expression and self-regulation. But this can only be done by those who know how ; that is to say, those who, instead of spending their own energies in propagandising the ideas and principles of liberalism, have studied both the habits of enslavers and the methods of great historic emancipators.

The Educational Reform now in progress, whatever may be its merits or demerits in other respects, is entirely a movement towards training the next generation in the Science of Mental Liberation, and the Art of Communal Self-expression. It is being carried on by Imperialists, Aristocrats, Plutocrats, and Priests. Their hereditary instincts of tyranny are being exerted in the direction of insisting that other people's children shall, whether the rate-payers like it or no, be set free to think, to organise, to know and to create.

Can Free Thought come from a State Church ? Can any evocation of the power of the masses be fostered by Conservative Imperialists ? Can any good come out of Nazareth ? There is only one answer possible to any such questions which take mere assumptions as proofs : *Come and see for yourself.*

THE BOOLE METHOD

HARDLY any scientific man in England knows what Boole's books are about.

George Boole showed how brain should be treated so as to give to its owner the greatest possible power of meeting unexpected emergencies—Engineering, Electricity, or whatever department of science he might in future take up.

The method is largely used abroad in preparing rivals for Englishmen in various walks of life.

The Japanese (who have lately showed considerable aptitude for meeting emergencies) were trained in engineering, etc., on Boole's Method. One of the Englishmen who taught them was in boyhood a pupil of mine, and read my husband's books with me before going to public-school. He has not returned to this country. Another former teacher under the Japanese Government is now in England. He tells me he always tries to use Boole's Method, but finds English boys come to him too late for him to be able to do so effectively. Their brains are warped and stiffened at school before they come to him.

By way both of exercising and of proving his own skill in meeting emergencies, George Boole invented a new mathematical notation, to meet a temporary need. Cambridge and Oxford give to this brilliant, but not seriously useful, invention the name of "Boole's Method," and refuse to inquire further.

About the year 1900, a few persons, who had formed their ideas of English education from watching certain things abroad, arranged that Boole's Method should be given a trial in England. The trial was made at Bedales School and in Mr. Scott's Preparatory School attached to Bedales.

It is now a practical working method, used with success in the Kindergarten Department, in preparing children for their future mathematical classes.

A book of simple directions how to begin using the Method is being prepared, and will probably be published within a few months.*

It is now pretty certain that, whether University professors can use Boole's Method or not, nursery-maids soon will do so ; if for no other reason, for its utility in keeping little children happy and out of mischief.

For it is found that as soon as a child is subjected to Boole's process, something happens to him ; some current is set up among his nervous tissues which gradually forges and transforms passion into power—the peculiar power of seeing what ought to come next : the child begins to absorb scientific knowledge and ideas with hardly any trouble to himself or anyone else.

A RIDDLE

WHY is England's Art inartistic, its Engineering not quite satisfactory, and its constructive policy in a muddle ?

**A Rhythmic Approach to Mathematics* by Edith L. Somervell. 1906.

The force known in Asia of old as Adonaë (or Adonis) is essentially *Creative* Force. Under suitable conditions, it generates babies. The aim of every decent schoolmaster is to prevent its acting prematurely on the organs of physical generation. For this purpose, Englishmen try to turn the creative force into a *destructive* force ; they set men to hunt something, to kill something or somebody. They set boys to antagonise something, to hit something, to play *against* somebody.

But some persons assert that, the Adonaë force being essentially a *creative* and *synthetic* force, the way to keep it away from the organs of generation is to set it to *create* something original, with hands or head.

Mr. Charles Benham of Colchester, Rev. G. Allen of Bradford, Dr. Somervell, Inspector of Music, and many others have abundantly proved that, by causing a glass pen to move in accordance with "Boole's Law," *i.e.*, the old Asiatic Law of Adonaë, they can make of it an original geometrician (Harmonograph or Sympalmograph), which turns out lovely curves previously unknown to man.

"Boole's Law" is allowed in England to train glass pens ; but, as a regulator of human brain-action, it is banished to Hungary, Japan, Chicago, and the native quarters of Indian towns. Why is our Art inartistic, our engineering weak, and our constructive policy in a muddle ?*

BOOLE'S LAW

A LETTER TO A CRANK READER

DEAR SIR—The Law called in modern times "Boole's Law" was known long before my husband's time ; as long as we have any written record. But the books about it have been written mostly by leisurely students for leisurely students. The nearest approach to a simple one I believe is my own "Logic Taught by Love : *Rhythm in Nature and Education*," published by Daniel.

The law itself is as simple as breathing. I will try to explain to you. Suppose you had asked me : "How can a man of forty, stiffened by a cramping sedentary occupation, improve his chest and lung power ?" I should reply : "Nothing can make you as flexible as if you had done good gymnastic from childhood ; but there are expansion-exercises which will improve your chest muscles." Well, now, what is the essence of all chest-expanding

*This is the article as Mrs. Boole wrote it. Its appearance in a different form gave rise to the very interesting letter on pp. 1194-96.—ED.

exercise ?—*Alternate* action ; especially in the muscles which your occupation cramps. You catch hold of a handle fastened to a weight, and you pull it *to* you, and then push *from* you, backwards and forwards. Or you take dumb-bells or Indian Clubs, and swing them as far forward as you can, and then as far backward.

If a girl is stiff in the loins from too much sitting, we make her stoop and place dumb-bells on her toes and then fling them back over her shoulders ; down and up, down and up.

Well, the brain gymnastic goes by the same law. Suppose a man's occupation is weeding corn. He gets mentally stiffened by a sort of feeling that the corn is good and the weeds rubbish. His gymnastic would be : a few minutes, once or twice a day, spent in thinking of the botanical differences and botanical likenesses between the corn and the weeds ; on their common properties ; on how Shirley poppies were evolved from wild poppies, such as those which he destroys in the corn-field ; on how corn-seedlings would be pulled up as "weeds" by a gardener who was growing Shirley poppies ; and so on.

We do not treat anything as "evil" in itself. "I make Peace, and I create Evil," saith the One God ; and we (the Boole's Law teachers) use the passions that we find. In the experimental centres, where we are trying the experiment, we utilise the fact that some children are keen on hunting and others are in sentimental sympathy with the hunted. We make the whole class go through a little ritual of alternate sympathy : "The dog wants to catch the rabbit, the rabbit wants to escape the dog ; the dog wants to catch the rabbit, the rabbit wants to escape the dog"—over and over again for perhaps half an hour, tracing on a card the paths of the two animals. Or, "A boy squirted a drop of water up, gravity pulled it down," tracing the curve it makes. The inspector's reports of the brain-fertilisation which is thus induced are rather astonishing.

You have not told me what your business is, so I cannot prescribe for you. If you happened to be, say, a stockbroker, I should advise you to sit down in a cool church, or some other quiet place, for ten minutes every dinner-hour (preferably where soft, slow music was going on), and make an alternate meditation on the emotions of the person you sold the last batch of shares to, and the one you brought them from, in the event of a great rise (or fall—either would do).

All this has been obscured by being mixed up with special dogmas about religion (which have nothing to do with it). We are introducing it as "secular" science. One Education Board Inspector has ordered that all children in rate-paid schools shall sing

old ballads—English, Irish, Welsh and Scotch. In South Africa he has ordered that both Dutch and English children shall sing together both Dutch and English patriotic songs; thus utilising, for purposes of brain-culture, the passions left quivering by the Boer War. He does not discuss who was right or who wrong, but uses, as fertiliser, the existing passions.

HOOLIGANISM

WHY, oh why, do British youths make the streets of the Capital ugly with Hooliganism, instead of combining, as the Japanese do, to make the suburbs beautiful? Is it possible that any one in Christian England has been *taking in vain* the name of God?

Or has any one been grieving the Holy Spirit by insisting on sending him to battle-fields, or hunting-fields, or fields of rough brutal sport, when he would rather have been at home teaching children the geometry of constructive Art and social organisation?

A LETTER ABOUT THE BOOLE METHOD

DEAR EDITOR,—The accident of my not seeing the proofs of June *Crank* gives me a fortunate opportunity of answering the question you have so often asked me, "What is the essential of Boole's Method?" The essential of Boole's Method consists in precisely the element which your proof-reader* has eliminated from my riddle.

I posed three questions, viz., "Why is England's art inartistic; its engineering not quite satisfactory; and its constructive policy in a muddle?" I then made a series of statements about educational methods in use in England. And finally I repeated the question. Your printer has substituted a statement, "That is why our art is inartistic, our engineering weak, etc."

The paper, as it stood when I sent it in, was a typical specimen of Boole's Method. As it stands now it has no relation to Boole's Method, except as being a rather typical specimen of everything which Boole's Method ousts wherever it is introduced, and therefore gives me an opportunity of showing what the method is.

Boole's Method works by what is known in the surveying business as Parallax or Triangulation. It depends on the Psychological law that man's brain is an implement which has the property of

* This was no accident on the part of the proof-reader, but a bit of "editing" which I herewith confess and deplore.—ED. of *The Crank*.

revealing new truth by the process of fixing attention on two truths, or aspects of truth, previously known, between which there exists some link of connection, the nature of which is not exactly known. I called attention to two sets of very well-known facts which nobody disputes, but which are not usually thought of as connected. In my opinion there exists a connection of some kind. What that connection is I neither know, nor think I know, nor wish any reader to suppose that I know. The educational methods to which I refer are probably an outcome of some cause, lying deep in the moral conditions of the country, which cause produces both them and the bad art and bad engineering, etc. No doubt bad education increases the inartistic quality of the country, but it is as equally sure that that inartistic quality causes much of the bad education. The two sets of facts act and re-act on each other. Anything which mitigates one set of evils would no doubt tend more or less to mitigate the other, but I should never dream of stating that either one is the cause of the other. To begin with, as I said, I personally do not think that it is so. Even if I did think so and wish to say so, it would have been my duty as a disciple of George Boole to make the suggestion in a modest and tentative way, such as, "That is perhaps one reason why our art is inartistic, etc." But the point to which I wish to call attention now is that the Booliness of the Method (as far as instructing the readers of *Crank* goes) depends essentially on my *not* making any statement as to the *nature* of the connection between two groups of facts. The "Method" is to set brains vibrating with the simultaneous consciousness of two groups of facts, *free from any hamper from any opinions as to the nature of the connection between the two groups*, and start them investigating the nature of the connection.

This is why your Readers sometimes complain that they do not "understand" my articles. Articles written on Boole's Method are not intended to convey to readers an immediate sensation of "understanding." My article, as it stands in the June *Crank*, will give readers the feeling that they "know now what Mrs. Boole thinks" about the subject matter of the article. They will have a somewhat false impression as to what I do think, but it is a pleasantly clear one. Some of them will remember it a long time, and perhaps quote it, and act upon it, possibly in a rather disastrous way. The article, as I wrote it, should have left them feeling a little foggy for a time. Then they would probably forget it ; but in a year or two they would begin seeing some things in a quite new light, coming, they would not know whence, from their own "unconscious cerebration" or "inner vision." In a few years' time some reader, looking through his old *Cranks*, might read over

again my riddle, and say to himself: "I don't remember reading this before ; it is very strange that I never noticed it ; Mrs. Boole has put here with startling clearness the things I have been thinking for the last few months."

That is the essence of Boole's Method.

In the Junior School attached to Bedales the children are taught Geometry on Boole's Method. Their minds are set to vibrate in sympathy with the wishes of a dog who wants to catch a rabbit, and the wishes of the rabbit who wants not to be caught. No positive sentiment is talked on the side of the hunted ; no positive sportsman-like instinct is evoked on the side of the hunting animal ; the teacher does not suggest being interested in either side. The children's attention is simply fixed on the fact that *both emotions exist*, and that *each animal modifies the path of the other*. They are set to trace out in detail the curve which results from the mutual interaction of the two. In this work the teacher gives them no assistance beyond helping them to keep their attention fixed on the question in hand. About this process and others of a similar nature the Inspector, in his last Report, says : "Children in the Junior House are, whether they know it or not, becoming familiar with the properties of curves."

Please notice the phrase, "whether they know it or not."

The method is essentially communal, not competitive. Hardly ever are any two children working on quite the same problem ; therefore there can be no competition as to who answered best or quickest. At the end of the lesson, the whole class are in possession of some information which no member of it possessed before. It is not something told them by the teacher ; it is often quite new to the teacher herself. The skill of the teacher is shown, not by the knowledge which she imparts, but by the manner in which she utilises the thinking power of the children for the purpose of finding out what she does not yet know.

Just so do I wish, with your permission, to utilise the brains of *Crank* readers. I wish, not to tell them my opinions, but to set them thinking on problems which need to be solved ; but I wish to do this, not in a haphazard fashion, but in a way which Boole's Method indicates as the one most likely to "forge and transform" their "passion into power."

HINTS TO A REFORMER

1. Get into the habit of occasionally spelling any compound word with a hyphen, and especially the word Re-form.

2. When you are in doubt which of two jobs to do first in order of time; if they are matters of outer business, do first the one most irksome to yourself; this pulls your nervous system into business line for doing the other. But if they are about psychic or spiritual relations, viz., writing advice to people, etc., do first the one which will give pleasure to someone else; this pulls you into right psychic relations with Humanity, ready for the other.

3. If you can see that you have been mistaken in something, correct that first of all; it sets currents flowing harmoniously between you and Humanity. Therefore welcome every chance of acknowledging that there has been something which you did not understand.

4. Get into the habit of welcoming disappointment. If you do so you will find out gradually that it is the indicator of the fact that you were going to do something not quite in the best way, and that Them Above are prepared to show you a better way. But you are likely to miss seeing the better way if you are in an attitude of repulsion at the first impact.

5. Get into the habit of thinking of whatever you see to be wrong in the public, as the consequence of the public having got into the habit of living too much in one thin stratum of time, its own; and think of yourself as trying to make a current between those that have gone before and those that shall come after.

6. Keep on your study wall a diagram of the *tree* of knowledge; and remember always that its fruit is the knowledge of good *and evil*.

7. Keep also on your wall a diagram of the storm-spiral,* and on your mantelpiece a coiled wire standing up on end. Study them, and remind yourself sometimes that the serpent who gives the fruit is the living, moving, coiled spiral.

8. Remember that the serpent mystery and horror grew naturally out of confusion between two facts—viz., the serpent as *coil* is the wholesome and most natural object of worship to both the scientific and the artistic minds; the best and truest of teachers; while the poisonous snake means swift, mysterious, treacherous evil. When the ignorant saw the scientific man worshipping his truest and best inspirer, they thought he was doing homage to a bad demon; and this confusion of emotions helped priests to keep the masses ignorant by setting them against scientific and artistic truth. And this is a sample type of what has been going on throughout the ages. This clue will enable you to disentangle many a riddle, in religion, history, ethnology and politics.

*See p. 722.

9. Beware of letting yourself be decoyed on to the shifting quicksand : and be still more ware of being used as a decoy-duck to lead others on to it. The quicksand is made of a mixture of investigation among investigators and moral edification for others. Thus : a group of people associate themselves ostensibly for the purpose of investigating some problem or group of problems. While they are investigating, they should hold themselves equally ready to welcome what strikes them as evil, and what strikes them as good.

When they go out from their laboratory or meeting place, or private consulting journal, to instruct or edify an outside public, they must say only what they think is good for those who depend on them to hear.

But if the two aims are *mixed together*, there is constant opportunity for the president of the meeting, editor of the journal, or most influential member of the group, to *bias* the result of investigation by admitting statements which seem to him edifying, and suppressing others as "dangerous for the general public" or the "weak brothers." This is a continual opportunity (and therefore temptation) to the presiding influence to make the result of a *communal investigation* seem to confirm his previous conclusions, or limit it to what he can understand.

Another form of quicksand is made when an editor or publisher holds himself at liberty, first, to accept an article, promising to publish it, and then (when the psychologic moment has passed, and other journals are perhaps less willing to accept an article on that topic) refuse to insert it on the ground of some "conscientious scruple." This kind of tactics converts the editor into a tool in the hands of a party for the *suppression* of Truth ; it is the readiest mode of selling himself to the Father of Lies.

10. Avoid, whenever you can, at least in England now, the use of high falutin' words about Altruism, Sacrifice, Humanity, etc. Use instead, whenever possible, words which imply common honesty, duty (due-ty), and symbiology. We have had a great wave of tall talk about Altruism, etc., but the average Englishman gets out of all that by remembering that he has no right to emotional luxuries for himself till he has secured what he calls "advantages" for his children. But the average Englishman has not yet arrived at finding out that he is bound to cheat at cards or pick pockets in the street for the sake of sending his son to Eton. Therefore do all in your power to make him understand that if he does not repay to humanity as much as he gets from the common stock, he is a common parasite, a vulgar cheat, and that if he does repay the value of what he has consumed, he is only doing the

average due-ty of a decent citizen. Tall talk about high ideals is the bane of re-form.

11. Beware of all high tension utterance, *i.e.*, of uttering to others what seems to you, while writing it, specially inspired, and what you feel, on reading it over, to be specially luminous and valuable. Let no one see what you have written thus, for some years afterwards, except your doctor, and a few calm and dispassionate advisers.

If you find that high tension utterances come to you while speaking, be very chary of lecturing or preaching impromptu. Such utterances are an effective means of working up a party; but the action on yourself of the psychic waves which you thus stir up in others is a kind of brain prostitution, and will be fatal to your power to become a true Re-former. The best use of all such material is to leave it for executors to deal with after your decease. When your work strikes you as calm, composed, prosaic and uninteresting, see to the disposing of it while you are there to direct.

VIRGINIA DE MÉRICOUR.

THE DIVINITY OF CHRIST

DEAR EDITOR—You tell me you have friends who are troubled because they think you disbelieve in the divinity of Christ. Words are misleading things. Perhaps you would come to an understanding with your friends better if they knew what the so-called doctrine of the divinity of Christ has been and meant in England for over a century.

In the end of the 18th century a strong movement started in England, France, Germany and Switzerland, in favour of what I think you *now* call Tolstoyanism. One group called it Hahnemannism. Another group called it Transcendental Mathematics. The details varied slightly in the different groups, but the essence was everywhere the same; the life of Jesus Christ was *not* to be treated as an exhibition of magic, but as a standard model for man, not possible to imitate exactly, but a standard; a sort of model, related to ordinary men as an accurately drawn ellipse made by an ellipsograph is related to the pupils in an art school who are learning to draw ellipses by hand.

One of our great precursors wrote, "Priests were appointed to lead men into Truth, but in all ages they have *feared* lest men should find the right road and walk in it." I need not waste words on describing to you, who have been a pupil of Tolstoy, why the

parties in possession objected to this attempt to treat Christ's teaching as a normal and non-magical director of human life. They did object, and their opposition took the form of "Jesus was God, it would be presumption for you to try and imitate it."

To which we replied—Twaddle! God kills people. When He wants that part of Himself represented on earth, He makes volcanos, and tigers and rattlesnakes. Jesus was sent, not as "God," but as representative man. Do you fancy you see Jesus blowing Indians from the mouths of cannons?

When I was quite young the rector of our parish, who was a Hahnemannian, and considered unorthodox, was trying to train me into setting in the village an example of how poor girls could, and might, and ought to dress and behave. Pious ladies were trying, on the contrary, to teach me that print dresses and bonnets, not too fashionable, were very well for the "lower orders," as they called them, but I owed a "duty" to my class and caste; and that duty involved keeping up a perpetual reminder that I was not one of the "lower orders" by sticking artificial flowers in my bonnet and spending on silk frocks for myself money which I wanted for comforts for my sick friends in the village. I said to one of these ladies, "It is all very well for you to talk in church about following Christ, when you know I can't literally do it because He isn't here to follow; but I should like to see your face if you caught me walking down the street to listen to a carpenter who was preaching heterodox doctrines." The horrified answer was ready at once: "But, my dear, Jesus was *God*; things are quite different now."

We have behind us over a hundred years of this deadly fight with humbug crystallised round the doctrine of the divinity of Christ. Your friends who profess to believe in that doctrine mean something very serious, I am sure. I have every respect for them and for whatever it is they do believe; and I should be very sorry to hurt their feelings. But I think they ought to have similar respect for us to whom the words convey nothing except the deification of ecclesiastical humbug and self-advertising pomposity and vulgarity.

But alas! Now I come to think of it, the words "divinity of Christ" have been the excuse for something far worse still, about which I mean to tell you some day. But it's too big a subject, and too horrible, to enter upon just now.

Yours truly,

VIRGINIA DE MÉRICOUR.

UNIVERSAL GOOD-WILL

DEAR ODD MAN—I have been studying your paper on Thearchy and find that I do not catch your drift quite. The difficulty centres round the words "universal goodwill." I do not understand in what sense you use the words "universal" and "good." *E.g.*, the universe contains both men and typhus germs. Is God supposed to *will* that the germs *should*, or *should not*, successfully effect colonisation and prosperity at the expense of the men? The interests of the two clash. I can form no conception of any state of will or desire which does not include desiring the suffering and destruction of one party or the other.

I understand the statement that God is inconceivable, and we *know nothing about His Will*, or wishes, or state of mind; or again, if you said that *man* is a creature who receives illumination from the Unseen better when he (the man) is willing happiness and health to some creature than when he is wishing pain and destruction to some creature; *e.g.*, that he becomes more inspired when he is thinking of the man whom he wishes to save from typhus than of the germs which he wishes to destroy—I agree.

Or, if you said that man becomes more inspired when he is planning to give health and pleasure to some other man (or creature) at his own cost, than when he is planning to give pleasure and health to himself at the cost of some other—I agree. Or, if you mean that he becomes more inspired when he is trying to bring about the satisfaction of two or more needs than when he is thinking about antagonism—I agree. But I don't make out *which* of the above you do mean. And neither of them, nor any other conception I can frame, seem to me to fit the words "Universal goodwill."

Yours truly,

VIRGINIA DE MÉRICOUR.

THE DIVINITY OF CHRIST

DEAR EDITOR—I hear that Virginia de Méricour's comments on the "Divinity of Christ" doctrine have hurt the feelings of some Christian readers. May I venture to interpose with what may perhaps be a harmonising suggestion?

No reasonable being has any right to object to, or to treat with disrespect, the doctrine of the Divinity of Christ in itself. But we have a right to object to the habitual *mishandling* of truths of any kind. Every man has a right to keep in his house an altar dedi-

cated to such Truth as he knows. "The Truth," to any man, is that which he "troweth" (*i.e.*, cognizes). But no one has a right to put anything *which he knows* on the altar of "The Unknown."

That, you will observe, is the essence of all that I am trying to teach schoolgirls about algebra. No one disputes the *truth* of arithmetical truths. But the perpetual acceptance of them is hardening, deadening, demoralising and distorting, unless the statement, "I know so and so," alternates constantly with the other statement, "I do not know."

This—and not any falseness in the doctrines themselves—is the danger of what is called "Christian Science." The affirmations, "There is no evil," "Matter is only a mode of human apprehension," "My feeling of pain is a mistake," etc., are true ; but the habit of asserting them is dangerous, unless the believer forms also the habit of asserting, "There is something which *I do not know*, which causes me to feel the illusion commonly called pain."

So it is with the doctrine of the Divinity of Christ. Whatever evils may be traceable to injudicious teaching of that doctrine, they would, it seems to me, have been obviated, if the priests and teachers had accustomed their congregations to alternate the statement, "Christ is God" with the antithetic statement, "I do not know God," or, "God does things which Jesus apparently did not do ; and I *do not know* how Jesus can be God."

This perpetual self-reminder of the limits of one's knowledge, this habitual bringing into consciousness of the fact of one's ignorance, is the great vivifying purifier of the life of the mind and soul. It is the keynote of the difference between the science which "measures the earth, weighs the stars, and illumines the universe," and the science whose be all and end all is facility in cheating the public and making "combines" and "corners." It marks also the difference between the religion of Anne Askew and that of Torquemada or Calvin. All three believed intensely in the Divinity of Christ ; but Anne Askew believed also in the fact of her own ignorance ; and did not forget to remind herself and other people of the limits of her—and their—knowledge.

MARY EVEREST BOOLE.