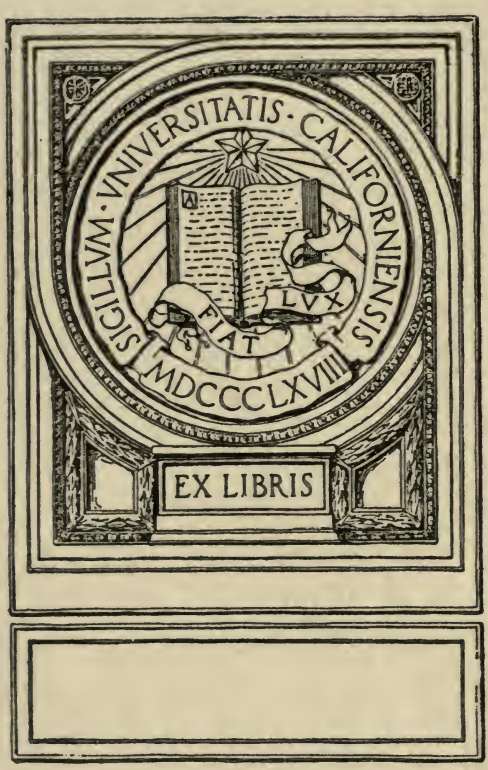
A PRIMER OF SCHOOL METHOD

BY
DEXTER AND GARLICK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BY

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PREFACE

THE young teacher used to spend four or five years learning his professional work. Theory and practice went on side by side. The practical work has now been limited to a one year's course, and theory has disappeared from the syllabus. Under these circumstances it is thought that many young teachers will more than ever require assistance to supplement their very brief and very empirical training. This little primer is a contribution towards that assistance, and it is hoped that it may be a real aid to those for whom it is written.

T. F. G. D.
A. H. G.

CONTENTS

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CHAPTER I

DISCIPLINE

In learning the practical side of his work the young teacher has to face a double task. He has to learn not only how to teach, but to manage; to become not only a teacher, but a disciplinarian; not only to educate, but to rule. Both conditions must be fulfilled if he is to be a success, and it is pertinent to note that the failures of the teaching profession are found almost exclusively on the disciplinary side. Successful teaching rests upon capable discipline, hence the power to maintain discipline must be regarded as the first requisite of a good teacher.

I. DISCIPLINE DEFINED

A great variety of meanings now attaches to the word discipline. From the teacher's point of view, its chief characteristic is that *it is a force for moral training*. It is the natural trainer and corrector of character, and should embrace the control, regulation, and guidance of all those forces which contribute to the growth of character.

II. HOW TO MAINTAIN DISCIPLINE IN SCHOOL

1. **BY GOOD GOVERNMENT.**—Discipline implies government by rule. Rules imply restraint, hence—

a. They should be as few as possible.

For this reason over-government should be avoided. It is the antithesis of feeble government, and is as much to be condemned. The rules should deal with representative faults only, and should not waste themselves with details.

b. They should be well understood.

For this reason all duties and offences should be expressed in simple, clear, and precise language.

c. They should be reasonable.

The restraints of discipline should be made as little irksome as possible. Kindness wins assent. It is more profitable to persuade, to advise, and to instruct than to compel, although compulsion may, at times, be necessary. If the sense of freedom is to grow, as is necessary, the child's circle of freedom must be gradually extended. For this purpose a child should always be trusted within reasonable limits. He will then learn to respond to the confidence placed in him, and will gradually recognise that rational conduct conduces to general comfort, as well as to personal progress.

d. They should be regularly enforced.

Good government will also make some use of the older children as an aid to discipline:

(1) By persuading the elder children to show a good *example.* Admiration and esteem for the elder scholars is generally manifested by the younger ones, and this admiration often shows itself in the form of imitation.

(2) By allowing the elder scholars to exercise a certain amount of *supervision*, both inside and outside the school. They can control the games of the younger ones, or they can share them. They can act as monitors, assist in regulating assembly or dismissal, change of room or class, and generally hold a light controlling hand over their younger schoolfellows.

2. **BY A PROPER USE OF PUNISHMENT.**—Discipline must be obtained in one of two ways—by personal influence, or by force. "It is better to gain it by force, than not to gain it at all."

All offences should be graded. Punishment may be necessary at times, but the less the punishment, the better the government.

a. **General Principles influencing the Selection of the Kind of Punishment.**—Most careful selection will be necessary.

(1) Punishment should be founded on a sense of honour, and no kind should be selected that has a tendency to weaken that sense.

(2) The selected punishment should be corrective and formative rather than retributive. It must deter, but it must only just be sufficient for the purpose. As a formative force it should not convey the idea of lasting disgrace, or all incentive to improvement is checked and character suffers.

(3) As in the case of rules, the punishment should be within the grasp of child intelligence, so as to gain the support of school opinion—a great aid to discipline.

(4) It should also be capable of being remitted if possible, so that a mistaken judgment on the part of a teacher may be corrected, as in the case of giving bad marks.

(5) It should be present or near, since the remote has little or no influence with children. For first offences, as a rule, it should be sharp, and in early childhood it should be short and sharp.

(6) Where possible, the punishment should be natural; that is, the punishment should bring its own consequences. Such discipline is sometimes described as "the discipline of consequences," as when a child is burned

through playing with fire, or a querulous child is shunned by his playmates, or a rash child is injured. Such natural punishments are always best when they are available, as there is no retributive or personal element in their infliction, since in each case the punishment is a *natural one*. Furthermore, the punishment sets up a *right moral standard*, since it is not dependent on a system of rewards and punishments—a system which is radically wrong in the eyes of some good authorities. Again, *it does not hamper the child's sense of freedom* like the imposition of a set of rules; and finally, as a rule, *the penalty follows quickly on the offence*, and so is therefore more effective. And yet their use is open to serious **objections**. *The penalty is not always immediate*, for the worst penalty of laziness, for instance, may not show itself for years. It is *not always available*—theft may lead to prison. The penalties are often *disproportionate*—a careless child may seriously injure himself, and we cannot let children find wisdom through such experience. On the other hand, the penalty may be *insufficient*. The inattentive child loses the benefit of the teacher's lesson, but the loss is not appreciated by the child, and so does not act as a deterrent. Again, *the chief penalty may fall on others*. A boy smashes a window or robs an orchard; but it is the father who has to pay. The great weakness of the system is that *it is physical only*, and so lacks the moral element.

(7) The punishment inflicted should distinguish between moral offences and mere breaches of discipline. The latter can be adequately dealt with as routine punishments, as they are but minor offences. There are occasions even when the less the notice taken of a fault the better the disciplinary management. Among such cases would be included those

(*a*) Where the power of conscience is strong in the offender.
(*b*) Where the offender is of a retiring disposition.
(*c*) Where he is a child of deep feeling.

(8) The punishments used should be graded; *e.g.* truancy and untruth combined should be punished more severely than simple truancy. Besides, the same punishment for the same offence in all cases alike would be unfair, for such a discipline would make no allowance for age, constitution, sex, temperament, position in school, home influences, degree of provocation, or temptation.

b. Kinds of Punishment available for the Young Teacher.

(1) **Censure.**—All kinds of censure may be used, because they are the first, most ready, and best. But it must not be overdone, or the children may regard it as "nagging" or "jawing," and then its moral effect is lost. Strong terms may be used even more sparingly, and such terms should always be general, and not personal or particular. A child should not be called a fool, although his conduct may be aggravatingly foolish; nor a liar, although he has been guilty of untruthfulness. Righteous and controlled anger, expressed in general terms, is a powerful weapon which should be reserved for special occasions. Fénelon says, "Never tell a child of a fault without at the same time suggesting some mode of redressing it which will induce him to put it into practice; for nothing is to be more avoided than that chagrin and discouragement which are the consequences of mere formal correction."

(2) **Disgrace.**—School government offers ready and simple forms of this punishment, like *Isolation*, *Bad Marks*, and *Class Degradation*. Such forms appeal readily to the sense of shame. They depend for their value on the sensitiveness of the pupil, and the influence of class opinion. They are not suited to great offences, and so are generally *used for first offences* only, for they lose strength by repetition. Isolation is very effective, for it opens the child's eyes to the fact that he is a social unit and dependent for his pleasures on the society of his fellows.

(3) **Detention.**—The stopping of play and the loss of liberty are very painful to children. Hence detention *should be used only for habitual offences* like misbehaviour and unpunctuality. The punishment has the merit of being a natural one, for the unregulated impulse to activity is met by withholding its ordinary legitimate outlets. Nevertheless, by some good authorities it is considered a bad form of punishment, and yet the range of school punishments is too limited to discard it.

(4) **Deprivation of Pleasure.**—This is only a special form of the punishment recommended in the previous case; but the chief difference is that *it should be used for casual offences, and not for habitual ones.* Deprivation of play, exclusion from the school ramble, from the school game, from a visit to some museum, from the filling of some school office, or from some favourite school function, are forms that readily suggest themselves. There is an alternative to this form of punishment, and that is, where suitable, to take the offence itself and dose the offender until he is salted with it; *e.g.* a child forgets a book, a pen, pencil, or drawing instrument, and cannot, as a consequence, take part in a given lesson. A first offence may be forgiven. For a second offence the offender should be made to sit perfectly still throughout the lesson or lessons. The ennui produced is a good corrective. But this is not so much deprivation as saturation.

(5) **Tasks and Impositions.**—Here the pain lies in the weariness produced. There is also the irksomeness of confinement. Such punishments might be used for neglect of lessons, for unpunctuality, for inattention, carelessness, and disobedience. But there is a strong division of opinion about their value. It is asserted, and with some truth, that they create a distaste for school work, and so while attempting to check one evil, they succeed in producing another; that is, the remedy is thought to be worse than the disease. There is the further consideration that they punish the teacher at the same time, and often bring him into conflict with unreasoning parents.

3. **BY A PROPER USE OF REWARDS.**—School government is dependent on a system of Rewards as well as Punishments; in fact, in school life Rewards are considered indispensable. A child should do his lessons and behave himself properly from a sense of duty; but, unfortunately, the sense of duty is weak in a child, and has to be cultivated. Again, for the adequate accomplishment of a duty a moral impulse is at least occasionally necessary. But a moral impulse involves a moral sense, and here again children are lacking. The cultivation of a proper moral sense is the great aim of school life, but this is the work of years. Then, since the best motives are weak, some inducements to right conduct must be held out to children: hence the necessity for rewards. The natural appetite of a healthy child is for play, and as all work cannot be made play, then rewards become necessary as an inducement.

a. Kinds of Rewards available for the Young Teacher.

(1) **Praise.**—This is the chief and readiest form of reward at the disposal of the teacher. But to be effective it must not be indiscriminate. It is a powerful incentive to the mind, and sets up a proper association between right conduct and commendation. Subsequently right conduct becomes a habit, which is sufficiently strong to exist without rewards, and so the bestowal of praise becomes a powerful force in the building up of character.

(2) **Place-taking.**—This, in the form of emulation, is perhaps the most powerful known stimulus to mental effort. Its defects are—

(*a*) It is apt to be anti-social; *i.e.* it is apt to raise enmities in the class.
(*b*) It is often too energetic in its application. Children are sometimes moved up and down so frequently, and in such a summary fashion, that its force as a legitimate stimulus is lost.
(*c*) It is limited to the gifted.

(3) **School Privileges.**—These will include such things as the right to occupy certain places in the class or school, to fill certain offices like those of monitors, curators, librarians, and the marking of certain forms of school work.

(4) **Prizes and Decorations.**—The prizes can take the form of books, certificates, medals, &c. They are often valuable in themselves, and are tokens of mental, moral, or physical superiority. They may appeal to love for parents or respect for the teacher in the stimulation of the necessary, sustained effort to gain them, but they are open to the same objections as place-taking, only in a more intensified form. Decorations, when bestowed, should be of a simple character. They are a powerful incentive to action, as a little observation outside the school will show.

b. **Risks incurred in the Bestowal of Rewards.**—In addition to the risks incidentally mentioned above, other evils may follow their use.

(1) *Their use may Degenerate into Bribery.*—This is a possible result when they are used incautiously; hence a wise use of them also includes an appropriate use. For this reason they need grading.

(2) *Their use may Stimulate the Lower Feelings.*—This is one of the possible risks of tangible rewards. Praise is always welcome, but it is not always considered adequate by the recipient.

(3) *They are often Misapplied.*—Too often they are given for intellectual merit, and too rarely for moral excellence. They thus may stimulate a love of excelling rather than a love of excellence.

4. **BY THE PERSONALITY OF THE TEACHER.**—The teacher's manner should be quiet and pleasing. A quiet manner indicates that obedience is expected, and gives the impression of a reserve of strength. The voice, eye, dress, and general bearing will all need attention. A certain formality and dignity should be maintained, as it aids his influence and generates a certain amount of advisable awe. In the exercise of authority the teacher should be firm, kind, prudent, impartial, patient, and uniform; for a lax discipline means frequent irritation, incompetency, and punishment. Example is a great former of character, and imitation, which is strong in childhood, proceeds most easily where the given action falls in with the natural bent of the child.

5. **BY THE LEGITIMATE USE OF CHILD ACTIVITY.**—Drill, marching, music, assembly, dismissal, change of lessons, a proper alternation of subjects in the school curriculum—*e.g.* a mechanical lesson like writing might follow a lesson of great mental effort like grammar—orderly changes of place and attitude, and generally every incident in the school programme should be conducted and regulated with a due regard to their value as aids to good discipline.

6. **GOOD PHYSICAL SURROUNDINGS,** such as buildings, lighting, warming, furnishing, ventilation, decoration, and sanitation, and *good school organisation* and management, are also factors in the product; but like *corporal punishment* and *expulsion*, since they are elements outside the influence of the young teacher, they are simply mentioned.

III. SOME SPECIFIC CASES OF DISCIPLINE

Having dealt generally with the question of discipline, it is now proposed to examine a certain number of specific instances, with a view to the further assistance of the young teacher in his somewhat difficult task of effective class management. But it must not be expected that the treatment suggested will fit every apparently similar case. The contributory causes will never be exactly the same for any two cases. The margin of difference will always make a demand upon the natural ability and upon the native resource of the teacher. In other words, a broad average of treatment will be suggested; but the finishing touch must depend upon the personality of the teacher.

1. **DISOBEDIENCE.**—Obedience is mechanical at first; it becomes rational only by experience and education. Commands should be well considered before they are given, and then there will be no need of retraction, which is a sign of weakness. Prohibitions are more successful than commands, as is seen in the Ten Commandments. They arouse less hostility, for they seem to restrict a child's sense of freedom less than commands. The teacher's ultimate object should be to get the child to will voluntarily as he wills. The order of progression then is as follows :—

(*a*) The child first obeys the teacher's authority.
(*b*) He next obeys from a sense of duty.
(*c*) The teacher's aim and the child's goal are the same—the self-government of the child.

In dealing with cases of Disobedience the teacher will note two well-marked forms—the impulsive and the wilful.

a. How to Deal with Impulsive Disobedience.

Ignore the child for a time. Proceed with the lesson, and allow the impulse to fade. Watch the case. When the child has regained his normal temperature, repeat the order gently, and it will probably be obeyed. The repeated command should be short and decided, not permitting of recall. At this stage do not explain the reasons for obedience, and do not argue with the offender. Subsequently, if the child is old enough, point out the reasons for obedience; but do this in private. If the child is too young for an appeal to his intellect, appeal, in private also, to his affection. In either case, gently and firmly make the offender understand that the offence must not occur again.

Should the second appeal fail (an extreme case), give further time for cooling and repeat the order. Be patient still; be kind; avoid a contest if possible. Remember that obedience is difficult in its first steps for some children, as it necessitates the submission of the will to that of another. If the child should still remain obdurate, the case then becomes obstinate or wilful.

b. **How to Deal with Wilful Disobedience.**

Here the pupil throws out a challenge and invites to a contest, which the teacher must in no case decline, and which he must win single-handed if possible. Isolate the boy, deprive of school recreation, and detain until obedience is given. It then becomes a question of endurance between the teacher and the pupil. The irksomeness of confinement, the loss of play, the painful promptings of hunger soon step in as allies for the teacher, and the contest is won. The boy should then be made to understand that a command is an absolute power against which he can accomplish nothing. Should the detention bring up one of the parents, point out to that parent the serious disadvantages attaching to a habit of disobedience with regard to the boy's future; enlist his (or her) aid by asking him (or her) to let you settle the matter yourself. If the parent is hostile, refer the matter to the head teacher. Should the offender still remain obdurate, repeat the treatment of isolation, deprivation, and detention through other sessions until the child yields. Appeal to the head teacher only as a last resource.

2. **DISORDER.**—Order is absolutely essential for effective instruction and training. It is said to be Heaven's first law; it certainly ought to be the first law of the school. The teacher should demand order, and then see that he gets it. The disorder may be individual; it may be general.

a. **How to Deal with a Case of Individual Disorder.**

(1) A look or a word may be sufficient. It generally is.
(2) Keep the child busy; give no time for play in work time.
(3) Maintain self-control. Reprove quietly. Do not threaten.

b. **How to Deal with General Disorder.**

(1) Check the disorder at once. Let the command be short and sharp. Stand where you can see every child in the class.
(2) Order being resumed, try to retain it. Stop work. Give a little sharp class-room drill. The object is to brace up the class by a display of activity, and to afford a change of position and occupation.
(3) See that the length of the lessons regulates the method of teaching. General disorder, as a rule, is the result of neglect on the part of the teacher; yet "wholesome neglect" is good at times if it is not overdone.
(4) Maintain a constant and effective supervision.
(5) Let your commands be few and brief. Let them be preceded by a call to attention, and see that they are promptly and simultaneously executed. Use signs where possible. They demand a closer attention, contribute to a quiet atmosphere, and save the teacher's voice.

3. **IDLENESS.**—A lack of diligence, as a rule, does not mean a lack of work, but rather a lack of prescribed work. The so-called idle work, and some of them fairly hard. Few people in this climate are really lazy. Climatic influences are against it. Recognising this essential fact, the young teacher must learn to differentiate between that form of idleness which is primarily due to constitution and the wider form which is primarily the result of disposition.

a. **How to Deal with Idleness due to Constitution.**

(1) If the idleness be due to weak health, deal kindly with the child and lighten his tasks. In such cases do not force work beyond the point of pleasure or strength.

(2) Some children are "bone" lazy—human sloths. In such cases the work is harder, and the results desired are slower to appear. Constant supervision will be required, and the child must be kept at work. Make the work as pleasant as possible, so that an association may be formed between work and pleasure. But do not go out of your way to do this. The less pleasant tasks must be performed with the more pleasant if the child's training is to be sound. The object is gradually to form the habit of work. Show the boy a good example, and if he be old enough, try to make him understand the necessity for work, and place the advantages of a reputation for industry before him. If these means fail, then authority must step in and enforce the work. The plan would be to work first through pleasurable channels; form as much of the habit of work as possible in those channels; and then gradually divert into less pleasurable kinds.

b. **How to Deal with Idleness as Influenced by Disposition.**—The following classes may be recognised in every school:—

(1) *The Dull and Indolent.*—Their dulness and laziness make them very troublesome. As a rule, feebleness of body and a weak will go with indolence. Skill and patience are required. Indolence here, as in other cases, should be attacked through facilities for special aptitudes (if any), and through play, until the habit of some kind of work is formed.

(2) *The Dull and Ill-willed.*—This class includes those dullards who are ill-willed by nature, wrong-headed, and generally spoiled. Because diligence is a duty, their dulness and ill-will will often make them idle. It is suggested that these should be left alone, if it is found, for a time, impossible to improve them. In such cases the teacher would have to rely largely on the discipline of consequences, and watch for suitable moments in which to make his educative efforts. These efforts should take the lines of least resistance. Get the boy to share in any work, physical (games), social or mental, where he is likely to succeed fairly well. Let him feel the delights of success, and the pleasure of approval. His appetite being once whetted, he will seek or readily respond to further invitations or opportunities. Soon his growing delights will urge him to a wider field of effort, and so ill-will will slowly starve, killed by a nobler feeling, and the habit of work will settle upon him.

(3) *The Clever and Indolent.*—The indolence here is only relative or special. Indolence rarely goes with ability, for ability implies some form of activity. If it arises from ill-health, the difficulty will disappear with increasing health. The teacher's methods may not make demand upon the boy's activity; or his teaching may be pitched below the level of the boy's intelligence; or it may be neglectful of or unsympathetic with the idler's natural aptitudes. The remedy is obvious in each case—it rests with the teacher rather than with the child.

4. **INATTENTION.**—The obstacles to attention may be either physical, constitutional, or educational.

a. **Physical Obstacles to Attention.**—These are chiefly due to an unsuitable physical environment.

(1) *Noises in or near the Class-room.*—The noises distract the attention. The young teacher should get rid of or modify the distracting noises to the best of his power. The noise of the street lies outside his influence; but the noises of the class-room are amenable to his discipline. Loud talking in the room, a noisy use of apparatus, a shuffling of feet, a noisy teacher in the next room, a neighbouring noisy class, and similar disturbing causes can either be removed or modified. Quietude is the *sine quâ non* of the child's attention.

(2) *A hot, badly-ventilated Class-room.*—This lowers the child's respiratory and circulatory powers in particular, and the whole of his vital force in general.

Lack of energy and consequent diminution of attention follow. The teacher who finds a general lassitude creeping over the class should look to the windows. Generally they will be found closed or not sufficiently open.

(3) *A too long continuance of the Body in one Position.*—This kills attention. Mobility is one of the characteristics of the child. It is almost impossible for him to keep still for a prolonged period. The child has need of movement even when he is studying, for an inactive body soon produces an inactive mind. Hence make suitable provision for the child's love of motion.

b. **Constitutional Obstacles to Attention.**—The obstacles here may be weakness of bodily powers, sluggishness or vivacity of temperament.

(1) *Weakness of Bodily Powers.*—The only true course in cases like this is to gain the child's attention through interest, and so to work slowly and patiently towards the development of the higher powers of attention.

(2) *Sluggishness of Temperament.*—Find out the boy's special aptitude and work through it. One department of knowledge is linked with another, and the child who is interested, and consequently attentive, in one department gradually becomes interested and attentive in another. The teacher should also be active and vivacious in his manner. By the bond of sympathy his example then would have a stimulating effect upon the sluggish child.

(3) *Vivacity of Temperament.*—This temperament is usually found in the sharp, precocious child. He is too clever to attend always. His conceit is obvious. Question him after some new matter has been presented to the class. Question him dry, and so expose his self-imposed ignorance. His self-esteem will be hurt by the exposure, and he will thus learn that strict attention is as much a necessity for him as for the rest of the class.

c. **Educational Obstacles to Attention.**—These are more directly connected with the teacher and the lesson.

(1) The lesson may be too hard, or too easy, or the matter may be unsuitable.

(2) There may be a lack of sympathy between the teacher and his class.

(3) The teacher's methods may be unsuitable.

(4) The lesson may be one of a series logically connected. Children who have been absent at the previous lesson then find it hard to follow the teacher, and so cease to pay attention.

5. **UNPUNCTUALITY.**—The causes must be carefully ascertained, and the treatment should be made to suit them. The majority of cases will be traced to accident, habit, indifference, or some form of temptation.

When due to *accident*, it should be overlooked. If the accidents become too numerous, it then passes into carelessness, and verges upon habit. When due to *habit*, it may arise from laziness or dilatoriness, and in such cases play should be stopped and some task set whilst the others are at play. If the habit persists, shame might be used. Extreme cases should be passed over to the head teacher. Where unpunctuality is due to *indifference*, the moral sense, or the sense of duty is weak. The evil effects of the habit upon the child's future prospects might be pointed out. No one will continue to employ an unpunctual person. If the indifference passes into habit, in so far as it produces the same results it should be treated in the same way. The *temptation* of the local show, &c., may be a cause. Do not punish such cases, but appeal to the boy's better nature. Urge him to cultivate a stronger sense of duty. Meantime be punctual yourself, and bring in the aid of registration, term reports, and rewards to assist you.

6. **TRUANCY.**—Of late years school attendance has improved greatly, and the attractive nature of many of our modern schools has apparently diminished the offence of truancy. But there are still truants, and probably always will be till the millennium comes. Truancy is either casual or habitual.

a. Casual Truancy.

This may be due to the temptation of a fine day, a local show, a local "treat," race, or excursion. It may also be due to personal influence: the sharp boy over the dullard, the strong over the weak, or the great over the small. The personal influence may even lie with the teacher, who may have been guilty of harshness, cruelty, irritability, or some other provoking cause.

In the last case the remedy is a ready one. Let the teacher's manner improve and the truancy will cease. Meantime, the boy should have been cautioned and some mild form of detention imposed; for provocation may modify punishment; it should rarely excuse it. In the other cases the punishment should be more pronounced. Pleasure has been sought by a defiance of authority; therefore authority will assert itself by depriving the offender of some pleasure. Where parental co-operation is assured, this may take the form of impositions to be done at home, or of deprivation of play. Where parental aid is not attainable, there should be detention after school hours, deprivation of school play or any other school privileges, and, for a time, a removal of confidence.

The chief difficulty of dealing with cases of truancy lies in the fact that the worst offenders often come from homes that are unsympathetic, or even hostile to punishment, if it takes the form of impositions or detention. Hence in dealing with cases of truancy the young teacher should always make a special effort, if necessary, to win the aid of the parents, for truancy should be regarded as a greater offence against home authority than against school authority.

b. Habitual Truancy.

Habitual offenders often come from ill-regulated, ill-disciplined, or bad homes. Self-indulgent, over-indulgent, or immoral parents can hardly expect a sense of duty to be developed in their children. The training of the will is misdirected or neglected. Unrestrained at home, the children will not willingly face the restraint of a school. Nor is this the whole of the parental influence, for heredity may be a factor in truancy. The tendency to roam, to shirk discipline, may be born in the child, and local circumstances may be unfortunate enough to develop them. Local circumstances may include bad companions, and these may be the cause of habitual truancy.

The treatment of the habitual truant is hardly a case for the young teacher. It falls rather within the special province of the head teacher. The treatment prescribed for the casual truant has failed, and severer measures have become necessary, such as the truant school. But in so far as the cause may be traced to bad companions, an effort might be made by counter and proper attractions to detach the offender from his companions, and to set up new and pleasurable associations.

7. **CLEANLINESS.**—The teacher's work will embrace a regard for the cleanliness of the body, of dress, of school furniture, and of material.

a. How to Deal with the Unwashed Boy.

If he will not wash at home, have him washed at school. Send him into the lavatory, and under proper supervision make him wash himself well. Buy a strong metal comb and see that the rough heads are combed. Make

the offenders understand that there is no escape. If they do not wash at home, they will certainly have to wash at school. The consequent feeling of comfort, the sense of shame, the certainty of the washing, and the condemnation of his dirtiness by his class-fellows will soon cure him.

b. The Case of Dirty Clothing.

The school must provide, if necessary, a clothes brush, shoe brushes and blacking. As in the previous case, if the clothes are dirty (dusty or muddy), have them brushed under supervision. Dirty boots should be blacked by the offender at school. Let there be no escape in either case. The treatment is exactly the same as for the unwashed boy.

c. The Case of School Furniture and School Apparatus.

Do not allow the pupils to shake their pens on the desk or on the floor; nor pupils sitting in the back row of a class to lean their heads against the class-room wall; nor thoughtless or mischievous scholars to smear or deface the desks. Children should be made to wipe their boots well before entering the school; a monitor placed at the door at each assembly would ensure this. For pupils who create unnecessary dirt, let the discipline of consequences operate. Make them clean it away. The certainty of this penalty would soon appreciably reduce the objectionable habit. Meantime, maintain a constant and effective supervision, for after all, prevention is better than cure.

The teacher should be constantly working through example and precept. He should be clean in his own person, dress, and habits of work. He should (if necessary) enlist the aid of the head teacher to see that the school-keeper keeps the windows, blinds, walls, floor, and pictures clean. The children should live and move in an atmosphere of perfect cleanliness, so that the silent force of example may ever be operating on them.

Precept will point out that cleanliness is essential for health and influences the whole mental life; that it adds to comfort, increases and maintains self-respect, and improves the taste. It will point out that dirt is often accompanied by an inclination towards crime; that religion demands cleanliness, since it is next to godliness; that the law wars against gross breaches of it, and that public opinion condemns all breaches of it.

8. **ILL-MANNERS.**—Good manners supply the oil which makes the social machine run smoothly. An ill-mannered person is therefore a chronic source of irritation. In seeking to destroy the ill and create the good, the teacher must remember that manners are a matter of breeding or habit; hence any effort in the direction of good manners must go through habit.

a. Work through the Force of Example.

The imitative faculty is strong in children, hence the teacher should be well-mannered. He should see that the pupils are well-mannered to him and to one another, to visitors and officials. He should also see that he is well-mannered to his pupils. *Maxima reverentia debetur pueris.* All the little courtesies of life should be regularly practised—the respectful address, the becoming manner and speech, the raising of the hat, courtesy to ladies, and a due regard for conventionalities generally.

b. **Help the Class to Feel the Importance of Good Manners.**

There is a common tendency to think too much of intellectual excellence, and to take excellence in bearing as a matter of course. If the class once understands that the teacher attaches as much importance to good manners as to good scholarship, the improvement will be rapid and wide. For this purpose rewards should be given for conduct as well as for ability. Good manners form a large element in conduct, and their cultivation will thus be encouraged.

c. **Cultivate their Dispositions.**

Inculcate a feeling of proper self-respect. Do not let there be too much humility; hypocrisy or bashfulness may be the result, and both are ill-bred. A person who respects himself usually shows some respect to other people. Where respect exists, there will be a reluctance to offend. Good manners should be cultivated because they are good; because they are beautiful, kind, considerate, and proper. They ought to be the outward and visible sign of the inward and spiritual grace—a benevolent disposition. Even if the disposition is missing, the association is still a valuable one. The manners may give rise to the feeling, and the feeling the manners.

d. **Make use of Good Literature.**

Place good literature in their way. Let them read of cultured and refined people; let them imbibe cultured and refined thoughts, and the mellowing influences of such agencies, though probably slow in operation, will certainly bear fruit by improving their manners.

9. **SELFISHNESS.**—Selfishness is not an uncommon fault among children, especially boys. Selfishness must be destroyed by the cultivation of Benevolence. The duties of Benevolence are very wide, and they must be freely given. Benevolence is based on affection and the doing of good, irrespective of any direct consequences to the person who practises it. The work of curing selfishness is sometimes very slow; for habit has to be broken, and disposition modified.

a. **Work through the Discipline of Consequences.**

A selfish, self-pleasing boy is disliked by his fellows. Their expressed disapproval is a chronic force stimulating to improvement. In some cases it is eventually sufficient, and no active interference on the part of the teacher is necessary.

b. **Work through Example.**

Be unselfish in your own daily life, especially in your professional life. Show a willingness to do all that which you think it necessary to teach under the heads of practice and precept.

c. **Encourage the Children to practise Benevolence.**

Practice will embrace little acts of kindness, the exercise of pity and sympathy for those in misfortune; the display of courtesy and consideration to those around them, and the humane treatment of animals. In this way practically cultivate their sympathy and their affections, and teach them to desire the happiness of others. Thus the desire to please will grow with its indulgence, and the child will have no idea of happiness except as associated with the happiness of others.

d. **Teach Benevolence through Precept.**

Selfishness refers rather to the gratification of the appetites; self-pleasing to

a disregard for the feelings of others. School offers many opportunities for the treatment of the latter; it offers few opportunities for dealing with the former. Hence the need to support your practical educative efforts by precept. Use set moral lessons; utilise any suitable incident in any portion of the day's work; place suitable literature within their reach, and see that they read it; do not talk of people's necessities, but rather of the joy arising from the relieving of them—joy appeals more readily to children than necessity; let the set moral lessons deal as much as possible with child life, and do not obtrude the application; and let the goal be the practice of that charity that loveth all, that endureth much and suffereth long.

10. **QUERULOUSNESS.**—This is a fault of temper. An excess of feeling is displayed every time any little check or misfortune overtakes the child. Denial of anything brings complaints, repining, and discontent.

a. **Work through the Medium of Play.**

A querulous temper indicates a feeble will which wants bracing. The best medium is play, which supplies a stock of little knocks, bruises, and disappointments. These the child should be taught to bear with fortitude. Unfortunately, a querulous child does not play with other children; hence the teacher's work will be to encourage him to that play.

b. **Utilise the Force of Example.**

The example of the more hardy and uncomplaining children should be pointed out, and the weakling should be exhorted to imitate them. Real suffering should meet with a ready sympathy, but trivial and fancied ills should be good-naturedly ignored.

11. **CRYING.**—Locke tells us that the crying of the "cross-patch" is of the stubborn or domineering kind. It is a striving for mastery. Such children want their own way, and as they have not the power to obtain it, they maintain by their clamour and sobbing their right to cry. If this kind of crying is permitted, the teacher is merely encouraging the child's unreasonable desires. The will must be bent, for it is there that the fault lies. In dealing with this fault, the special circumstances of the case and the child's temperament must be considered.

(1) Ignore the child, having first isolated him. Then let him cry till he is tired.

(2) When the storm is over, talk to him calmly and gently. Tell him how silly and childish it is, and how he suffers in the eyes of his class-mates. If necessary, use a little good-natured banter.

(3) If these means fail and signs of a fresh storm arise, or if the first storm has never subsided, then the case becomes one of obstinacy, and must be so treated (see p. 20).

12. **COWARDICE.**—Cowardice arises from fear. Its distinctive characteristic is an element of meanness. Certain children of passive or susceptible temperament are prone to it. It produces a general depression of tone; and mental depression, however arising, is exaggerated distrust of good and anticipation of evil. Its cure will proceed through its cause.

a. **When due to Fright.**

Avoid bogey stories, ghost stories, excessive or capricious punishments, the shutting of children in cupboards, the locking of them in dark rooms, violent threats and outbursts of temper.

b. **When due to Ignorance or Uncertainty.**

Knowledge is the remedy for ignorance. Uncertainty is a species of ignorance, and is thus sometimes productive of fear or cowardice.

c. **When due to Ill-health.**

Such cases require kindness, sympathy, and forbearance. The best remedies are beyond the teacher's reach, for they include good or improved conditions of life. Closely allied with this is the cowardice which is the result of injudicious treatment at home, weak health often being one of its results. The task is harder in such cases, because the efforts made in school are discounted at home.

d. **When due to Weak Intellect.**

Such children are mentally defective, and their proper place is a school for mentally defective children. Otherwise, the remedy is to work chiefly by a course of manual training, varied or suitable occupations, and kindred methods of teaching. Such cases practically lie outside the young teacher's influence.

e. **Moral Cowardice.**

This shows a weak moral sense, which needs strengthening—a long and slow process. The whole of this chapter is practically an instruction how to deal with the strengthening of the moral sense.

13. **ANGER.**—The feeling is a primitive one, and arises from a sense of injury. There is always a strong and immediate desire to retaliate. The anger is not concentrated on the individual only; it often extends to persons and even objects associated with him, especially when it is not possible to strike directly. The teacher's task is a double one. He has both to repress and preserve; to check and refine. He has also to make allowances for—

(1) The temperament of the child.
(2) The nature of the provocation.
(3) The special form of anger displayed.

a. **Suggested Treatment for a Sudden Outburst of Temper.**

(1) Remove the angry child. Isolate him. Allow no chance of retaliation; for in such cases the child strikes, then thinks. Besides, retaliation brings joy, and so strengthens the feeling. Nor is anything or anybody near always safe. The sudden and intense nature of the feeling sometimes causes it to spread to other persons and objects.

(2) Allow the passion time to cool. The child's activities are roused to excess. He is incapable of reflection. In fact, remember that anger is short madness.

(3) Subsequently inquire into the cause of the outburst. Hear both sides—the angry child, and the child who caused the anger. Be impartial. Subsequently demand atonement—some demand an apology. Remember that your judgment should make allowances for temperament. "For instance, a child of active temperament, sensitive feeling, and eager purpose is more likely to meet with constant jars and rubs than a dull, passive child, and if he is of an open nature, his inward irritation is immediately shown in bursts of

passion. If you repress these ebullitions by scolding and punishment, you only increase the evil by changing passion into sulkiness." A cheerful, sympathetic tone is the best antidote in such cases.

(4) In all cases, avoid provocation. Make the restraints of discipline as little irksome as possible. Especially in issuing commands or administering reproofs, let there be nothing irritating in your tone.

(5) Where possible let the discipline of consequences operate, for anger often brings its own punishment.

(6) Find natural outlets for the passion in the story and suitable literature. In this way you will cultivate the defective powers of the child and alter his habit of thinking. If you cannot eradicate the feeling, you can, in this way, divert it into legitimate channels, so that the child may learn to be angry and sin not.

(7) Cultivate his social feelings. Appeal to him to bear and forbear. Point out the dreadful effects of anger. Show how it exhausts the energy; gives pain and annoyance to others; makes enemies; and brings dislike and distrust. Make him understand that he should be the master, not the slave of his passions, for angry people are wisely shunned.

b. **The Case of Deliberate Anger.**

One boy owes another a "grudge." He nurses his anger to keep it warm, and waits for his opportunity. Unfortunately, the feeling may have existed some time before it is detected by the teacher. The feeling has thus become stronger and rooted. Unlike the previous case, the feeling can be dealt with at once. The provoked and the provoker should be kept apart, for the feeling is contagious, and other boys may take "sides." The case should never be delayed, because it is a peculiarity of such anger that the longer the satisfaction of the provoked one is delayed, the greater the sweets of success over the provoker when they arrive. With the exceptions named, the treatment will then proceed as in the previous case. The chief difference will be that greater efforts must be concentrated on the intellect and the will; for the boy has thought out what to do, and made up his mind to do it. That is, both mind and will have been called in to the aid of deliberate anger, while in the sudden outburst both have been submerged by an excess of feeling.

14. **VIOLENCE.**—Violence may take one of two forms. It is largely confined to boys.

a. **How to Deal with the Impulsive Form.**—This may be due to an exuberance of energy and animal spirits, a consciousness of muscular strength, a love of power, a desire for fame or distinction. In such cases the violence of temper or action is not always an unmixed evil. In fact, it is a hopeful fault, because good qualities may underlie it. Just as obstinacy is, in some forms, an excrescence of firmness, so it has been asserted that some forms of violence are excrescences of that frankness and decision which it is an object of education to cherish. It may even be joined with an earnest and generous temper. Sometimes, however, it is due to a faulty memory, as when it forgets the consideration due to others.

(1) A word or a look is often enough to check an impulsive outbreak. But the teacher's work is not only to check the violence, but to divert the underlying force into other channels. Energetic school work and organised play are two means that suggest themselves. School drill is also a good safety-valve.

(2) **Allow Time for the excited Feelings to Settle.**—This will be the next step if the above has proved ineffective.

(3) **Appeal to the Child's better Nature.**—This will sometimes set his moral reason in motion and prevent any further display. But the appeal should not be made too soon after the outburst. See paragraph on Anger (p. 14).

(4) **Force must not be Used except in extreme Cases.**—To oppose violence by sheer force is like pouring oil on fire—the blaze becomes bigger. The teacher should rather aim to make the violence non-effective; and he must do this with calmness and firmness. He will then have made a very good beginning. Remember the object is not to crush, but to restrain and guide.

b. **How to Deal with the Malicious and Furious Form.**—This type of violence is often the result of uncontrolled anger and the desire to inflict injury on others. This is violence in its worst form. Unlike the previous form, it is characterised by malice.

Since this kind of violence is almost invariably the result of Anger, the treatment will be the same as for Anger.

15. **CRUELTY.**—Much of the alleged cruelty of children, especially in the case of boys, is a spurious article, as very often there is no malicious intention to inflict pain and to rejoice at the sight of suffering. Many supposed cases are open to other and truer explanations. In the treatment of cruelty this fact must be remembered, and the real motive discovered. The occasional act of cruelty requires different treatment from the habitual act.

a. **How to Deal with occasional Acts of Cruelty.**

Underlying every act of cruelty is the child's *love of activity*, which leads him to interfere with his fellows or with animals. His *love of power* gives a rough element to this interference, which may show itself in harsh treatment, or in the milder forms of domineering or teasing. If no opposition is offered by the victim it often ends here; not otherwise. Any attempt to thwart the young tyrant is likely to lead to the infliction of pain, because a contest has been invited, which he gladly accepts. But the motive is not cruelty; it is the primitive desire for conquest, the love of power.

Stop all forms of cruelty, whether physical, verbal, or written. Treat the practice of cruelty as a breach of discipline. Make the class understand that you are prepared, if necessary, to protect the weak. Try to enlist the aid of the better boys, and support your attitude by a humane example. Meantime, strike at the source of the offence. A misplaced love of activity was the cause; check that activity by detention and by deprivation of play.

Favouritism may give rise to feelings much nearer to the real motive for cruelty than a love of activity. The remedy lies with yourself. Be impartial.

Curiosity is insatiable in some children, and its gratification sometimes leads to acts of apparent cruelty. This will explain, in some measure, the treatment meted out to the fly and the worm. This destructive form of cruelty is also more or less the result of ignorance or thoughtlessness. Under the stimulus of a keen curiosity the child forgets that he is inflicting pain. The remedy is to remove the ignorance or heedlessness, and gratify curiosity by suitable object-lessons and nature study. Literature might be called in to aid, and a practical interest might be aroused in the competitions of the Society for the Prevention of Cruelty to Animals.

When cruelty is due to Anger, it should be treated as a special case of Anger (see p. 14).

b. How to Deal with habitual Acts of Cruelty.

Here the problem is a more difficult one. The causes, in some degree, may be the same as for the occasional act, but they operate simultaneously and continuously. In addition, there is usually a low moral tone, and often a poor mental development. Opportunities for the gratification of the feeling must be removed, so that the feeling may die for the lack of exercise. In addition—

(1) The school discipline and curriculum must allow for the natural love of activity. Both should also be kind and just.

(2) The love of power must be diverted into healthier channels. School life provides plenty of legitimate contests for this purpose.

(3) Curiosity and ignorance should be dealt with as already suggested.

(4) Sociability should be cultivated by organised common interests and common pursuits—clubs, games, &c.

(5) Differences in temperament and disposition should be recognised and allowed for.

(6) Precept, supported by example, should step in and teach that nothing should be spoiled or destroyed but for the sake of something better; that they should strive to do as they would be done by; and finally, sound principles of religion and morality should be implanted in the heart.

16. **UNTRUTHFULNESS AND DISHONESTY.**—Lying is a dependent vice; it is the servant of the motive. Seek out the motive and work through that.

a. The Causes of Untruthfulness.—These are various, but the chief may be reduced to four.

(1) *Selfishness.*—This is the chief cause, and many other causes may be traced back to it—the desire to secure some gain, to remove some obstacle, to win some contest.

(2) *Cowardice.*—The desire here is to escape some punishment.

(3) *Imagination.*—A redundant imagination combined with great self-esteem is the cause of much exaggeration, which stretches over the boundary line of truth.

(4) *Envy and Malevolence.*—These are motives which often prompt to the vice of lying.

b. How to Deal with Untruthfulness.

(1) On a first occasion show surprise, and gently reprove with an appearance of sorrow at the disgrace involved. Children are prone to exaggeration, and truth often suffers as a consequence. But if the exaggeration be always met with a solemn silence, it is starved at its roots—the love of approbation.

Where necessary for this purpose, control and regulate the imagination, for a redundant imagination leads to inaccurate statements. Object-lessons are a good corrective, although by no means sufficient in themselves. Anything which tends to cultivate careful observation and exact statement will be found valuable. The cultivation of the intellect generally will materially assist, if it proceeds on right lines; *i.e.* it should recognise that it is easier to teach young children not to deceive than to tell the truth, because of their weak intellects and limited experience.

(2) If further treatment be necessary, rebuke and show displeasure. Remove confidence. Subsequently it should be gradually restored, but only after penitence has proved its worth by rigid truthfulness. Confidence should always be associated with truth. The stimulus of hope should then be applied so as to encourage the mending effort.

(3) Should confession be made, deal tenderly with it. The feeling which prompts it should be gently recognised, for it may denote the growth of a sensitive conscience.

(4) Let there be nothing provocative in the school discipline. A lax discipline, a careless correction of work, an inefficient supervision may tempt to acts of dishonesty, since they afford opportunity for cheating and kindred faults. Undue severity is equally injurious. It drives the vice deeper home. It converts lip-lying into deceit. Conduct, on occasion, may give rise to suspicion, which should rarely, if ever, be shown. A revealed suspicion often invites to a contest. The boy does not necessarily become better because he is suspected; he only becomes more cautious and cunning in his vice. Hence do not be too ready to accuse of falsehood, since the accusation proclaims suspicion. Be certain before you accuse.

(5) Finally, the moral sense of the children should be cultivated. A habit of truthfulness should be formed. Precept must be supported by example. Good literature should be utilised, and every effort should be made to implant sound principles in the disposition. Moral arguments should be used with a view to fostering a sense of honour and a sense of shame. A sensitive conscience will show a preference for truth, will keenly feel the baseness of lying, and will love truth for its own sake. The moral arguments to be used will vary somewhat according to the age of the scholar.

c. Moral Arguments to be used with an older Scholar.

The teacher's resources are obviously greater with an older than with a younger scholar, for in the former case the will power and the intellect are stronger, and experience is wider.

(1) Help the scholar to understand his own nature and disposition. The perfervid imagination, the love of approbation, the desire to snatch a temporary advantage, to escape a threatening ill, are motives frequently prompting to untruth, and if these are calmly and feelingly pointed out, the pupil is both forewarned and forearmed against the dangerous tendencies in his nature.

(2) An older scholar is also in a position more or less favourable to understand the disastrous consequences of lying, both immediate and prospective, and these should be dispassionately pointed out. He could also be made to understand the social necessity for truth. Given a general state of untruthfulness, and social life would become impossible. It would simply degenerate into a state of savage chaos.

d. Treatment in the Case of a younger Scholar.

(1) Much of the so-called untruthfulness of young children is "fibbing." Fancy runs riot, so that their statements are often half play and half self-deception. This is primarily due to their tender intellects and their very limited experience. The world is still more or less a fairyland to them.

Jean Paul says: "In the first five years our children say no true word and no lying one; they only talk. Their speaking is a loud thinking; but as half of a thought is often 'yes,' and the other half 'no,' and as they—unlike us—utter both, they appear to lie while they only speak to themselves. Furthermore, they enjoy playing with a bit of speech new to them; thus they often speak nonsense, only to listen to their own knowledge of language."

(2) As the children grow older the motives will approximate to those of the older scholars, and in such cases the treatment will become somewhat similar. The arguments used will be simpler and more restricted, and they will rest on respect and mutual affection. The necessary discipline will also be milder, but more dogmatic in its rules and teaching. Rules, so far as possible, will be negative. Vices will be prohibited; duties commanded, as seen in the Ten Commandments.

e. How to Deal with the Convinced but Unproved Lie.

(1) Watch the suspected one carefully, but unobtrusively. Let your opinion rest on good circumstantial evidence before it leads to action. Detection and conviction may await the lie; if not, it adds at least one more link to the circumstantial chain.

(2) Show pain and sorrow at the moral cowardice displayed, and exhort to special efforts to remove the cowardice. Remind the suspected one that moral courage is the highest form of all courage.

Then point out the disgrace of lying itself, apart from the question of moral cowardice. Then proceed as in *c* (2), p. 18.

(3) Remind the boy that although a feeling of shame is justly attached to a lie, no such feeling is attached to a confession. Remind him that confession requires moral courage, moral backbone, and is an act deserving commendation rather than condemnation. If you are thoroughly convinced there need be little fear in acting, for the consciousness of lying can hardly support a feeling of injury in the offender.

(4) There must be no bribery. The offender must be made to understand the certainty of the penalty if the offence is once proved.

(5) Suitable cases might be chosen from the Scriptures, from history, literature, or school experience to show the futility of lying, and the impossibility of escape.

f. How to Deal with "Copying."

(1) *When due to Ignorance.*—The child does not know his work, and his ignorance may or may not be partly due to the teacher. But, in any case, it is the teacher's duty to discover and remove the ignorance. If more help is required, it should be given. If the ignorance is due to mental weakness, then the boy is badly classified. The head teacher might be asked to examine him with a view to placing him in a lower class.

(2) *When due to Idleness or Indifference.*—There may have been a reluctance to make the requisite mental effort at the time of the "test" or other exercise. The idleness may have been persistent and yet have escaped notice. In such a case, the copying is partly a reflection on the teacher. The idleness ought to have been detected earlier, and arrangements made to deal with it. In any case, honest work should be enforced, and an attempt made to create some interest in the work. The copying may sometimes be special to an unpopular subject. The remedy is to withhold the child from a popular subject and have the neglected work prepared in that lesson. There is a risk that the dislike of the unpopular subject may be intensified; but it must be taken. The pupil must be braced to face *all* necessary work, and a growing improvement will gradually weaken and finally destroy the distaste for the less favoured subject.

(3) *When due to Inattention.*—Here again the teacher may be partly to blame. He should improve his methods of teaching, his manner, and his supervision. The boy should be closely watched, and promptly served with a question upon the least sign of inattention. Attention will then be compulsory, for the least neglect will subject him to exposure. Meantime the power of concentration will be developing, and the offending cause will gradually disappear.

(4) *When due to Physical Weakness.*—From physical weakness, nervousness or shyness, the child may be unable to stand the strain of continuous work. In such cases the offence is pardonable, and needs sympathy and patience. Lighten the work, if possible; if not, deal with it as in the case of ignorance.

(5) *When due to Bad Moral Sense.*—This is the worst case of all, for copying is merely one evidence of the cause.

(1) Use mechanical means to make the copying impossible. Any facilities left within the reach of the pupils, especially young pupils, constitute cruel injustice. The moral sense is not yet sufficiently developed, hence no undue strain should be placed upon it at this stage. Remember that copying knows no caste, no age, no creed. Its probable existence is recognised from the bottom to the top of the educational ladder; from the precautionary measures of the primary school to the "bull-dogging" in University examinations.

(2) Utilise the discipline of consequences. The children resent copying, since they feel that it is unfair to them—they are unfairly handicapped; unfair to the teacher—who is deceived; and gives an unfair notion of what the boy himself can do.

(3) Impress on the class the certainty of the penalty, whatever form the circumstances may require that it should take.

(4) Cultivate the moral sense, and do this as much through example as precept. The untrustworthy teacher must not be surprised if some idle or weak member of his class should copy him as well as his neighbour's lessons.

17. **TALE-TELLING.**—A clear distinction may be drawn between this and untruthfulness. The motive is different. In one case the motive is bad; in the other it may or may not be good. The tale may be truth—and something more. It is a vice sometimes in the clothing of a virtue. There is an appearance of virtue in the apparent desire to check some breach of discipline or morals; but this may be subservient to the desire to pay off a "grudge."

a. **When the Motive is Bad.**

Inquire into the case carefully. Cross-examine the child; lay bare the motive. Then point out calmly and with evident pain the enormity of the offence—cruelty and falsehood combined. Remove confidence for a time. Punish by censure, bad marks (to influence term report), degradation from office (if any), and deprivation of play. The offence is a mean, cowardly, and spiteful one, with probably little or no provocation to condone it, and the penalty must be as certain as it is well-deserved. The discipline of consequences will assist you. A spiteful tell-tale is despised and boycotted by the class.

b. **When the Motive is Doubtful.**

There may be no malice, but a desire either to curry favour or to please the teacher. The "currying" should be received with cold disfavour, and the boy should, for a time, be ignored. The desire to please shows a motive which is good, but weak. The motive should be recognised, but the boy should be advised to try and win favour by good conduct and honest work.

c. **When the Motive is Good.**

A good teacher will place the honour and discipline of the class as much as possible in the hands of its members. They are invited to tolerate nothing that is wrong, and if necessary to bring the case under your notice. To act thus requires great moral courage, for the act is sure to be unpopular with the weaker members. But this is not tale-telling as generally understood. It is a courageous discharge of duty, and as such will win the commendation not only of the teacher, but of the better portion of the class.

18. **OBSTINACY.**—Obstinacy is the worst offence against

school discipline, and the most difficult to deal with. An obstinate child *apparently* puts his will into direct conflict with that of his teacher, and some young teachers are too prone to put *at once* their will against the child's—often with results disastrous to the child, the class, and the teacher.

In all cases of obstinacy, an earnest endeavour should be made to diagnose the *causes* in order that the proper kind of remedy may be applied. But this requires time. Hence, *most cases of obstinacy do not admit of immediate remedies.*

a. How to Deal with Obstinacy on the Part of a Child newly Admitted into the School.

(1) Isolate the child; keep him under your own observation; but so far as the class-room will allow, free from the observation of the class. There is no need to harden him by advertising him. Should this be insufficient, send him out of the room; but see that he is still kept under supervision.

(2) Ignore the child, and proceed with the lesson. Meanwhile, consider the possible causes and their appropriate remedies. Then deal with him at the end of the session.

(3) *The Obstinacy may be due to Temper.*—A hot temper merely requires time to cool, and provided the teacher has given sufficient time, he will find that he has an exceedingly tractable and penitent child to deal with.

(4) *The apparent Obstinacy may be due to Fear of Novel Surroundings, or to Sheer Ignorance of what is really Required.*—The child may not have acted simply because he did not know exactly what to do, or because he was afraid of doing the wrong thing. Some such question as, "Didn't you understand what I wished you to do?" followed by the reply, "No, sir," and perchance some tears, will easily dispose of such a case.

(5) *The Obstinacy may be due to the Fact that the Child comes from a badly Disciplined School or Home.*—In the case of many children, the time given for reflection and the knowledge that the other children obey, will have had a softening influence; and a brief interview (preferably after school), in which the teacher points out that the other children obey, will often bring about an altered and more desirable frame of mind. If, however, the child remains sullen, obdurate, or perchance defiant, the teacher may know that he has a difficult case to deal with. *Defer the contest.* Send him home some time after the other children, and hope for better things. Should the offence be repeated, enlist the sympathy of the class against the offender. A third case would bring the case under the head of "Persistent Obstinacy."

b. How to Deal with Obstinacy on the Part of some daring Member of a Class new to the Young Teacher.

(1) Keep as cool as you can. If you get "flurried" the class will be quick to note your discomfiture, and other less bold spirits will copy the offender.

(2) As quickly as possible consult the previous teacher of the class and the head teacher; but still endeavour to keep the matter in your own hands. It is a contest, and you must try to win unaided, if possible.

(3) If the boy is reported as of good character, speak to him kindly but firmly after school. Tell him it is a duty he owes both to himself and to you, to maintain his good character. If, however, he has been guilty of previous similar offences, proceed as under the head of "Persistent Obstinacy."

c. How to Deal with Obstinacy on the Part of a Pupil who has been for some Time under your Control.

(1) The case may be one of mere temper. If so, proceed as in *a* (1).

(2) The cause may rest with yourself. A harsh discipline, an irritating manner, a feeling of undeserved reproof, or some similar action on your part may have goaded the boy into his obstinacy. Do not reprove the boy. Keep him after school, question him quietly and kindly, and if you trace the cause to yourself, avoid the sources of irritation for the future.

d. **Persistent Obstinacy.**

Here the remedy is probably beyond the control of the young teacher. The case had better be handed over to the head teacher, especially as it is one demanding severe treatment.

THE FORMATION OF CHARACTER IN SCHOOL

Summarising all that has been said in the present chapter, it will be seen that the great aim of discipline is the formation of character, and the following practical suggestions have been made by a great body of expert opinion for that purpose :—

1. The reading books should be such as hold up high ideals of conduct; they should contain stories of heroism, self-denial, and integrity, and thus give the teacher the opportunity of teaching the value of character.

2. Songs which stir the noblest emotions should be encouraged. Songs tend to form the character of the young.

3. Pictures which illustrate heroic deeds might be placed upon the walls.

4. Scholars should have their attention drawn to the laws of health and Christian conduct, from which the evils of intemperance and gambling and other vices which degrade national character could be pointed out.

5. Teachers could, by superintending games in the playground, promote manliness of character, self-control, and a love of fair play.

6. The formation of an old scholars' association cultivates loyalty to the school and a wholesome *esprit de corps*.

CHAPTER II

METHOD

DISCIPLINE is the first essential for class teaching; the power to teach is the next. The power to teach implies adequate knowledge on the part of the teacher, a sympathetic nature, and good methods of teaching. Good method embraces both the *what* and the *how* of teaching; that is, the teacher has to decide not only the kind, quantity and quality of his subject-matter, but also the way in which that matter shall be presented to his class. To do this successfully it will be necessary to recognise the double aspect of Education, and to clearly distinguish between the process of Instruction and that of Education.

1. **THE DOUBLE NATURE OF EDUCATION.**—Education is both an Art and a Science.

a. **Education as an Art.**—Art implies practice; the doing of something. An art teaches to do, and prescribes rules and methods for the processes involved. Education is an art because it applies rules and principles for the acquisition of knowledge, and affords plenty of exercises for the application of those rules. It views learning of value as an acquisition for the practical side of life, and for this purpose it utilises rules and methods of teaching rather than frames them. It is the medium of the *what* and *how* in teaching.

b. **Education as a Science.**—A science teaches us to know. It unfolds the *why* and the *wherefore* of our rules and methods. It examines the laws of the mind and its development, and lays down rules and methods in accordance with those laws. The chief aim of the art is informing and doing; of the science, training and developing. Science is thus the mental legislator; art, the mental administrator.

2. **INSTRUCTION AND EDUCATION.**—Roughly, it may be said, then, that the Art of Education instructs; the Science of Education trains. But each school subject brings both its instructive and its educative side into play. Either the one side or the other may dominate the work of teaching that subject, but both sides should be present. Speaking generally, those subjects are the most valuable which offer the best mental training.

a. **An Examination of some School Subjects.**—The double function of these subjects will be readily recognised.

Subject.	Information.	Training.
Arithmetic .	Arithmetical rules taught for practice as useful information; *i.e.* a scholar is shown a rule, and then works examples under that rule.	The examination of processes for the discovery of the rule; *e.g.* the reason why $\cdot\dot{3}4\dot{5}=\frac{345}{999}$
English . .	Composition can be taught merely as guidance in speaking and writing with exactness; *i.e.* as an imitative process. Children from educated homes illustrate this.	Sentences can be examined, parts of speech discovered, their order in the sentence learned, their change of form for inflection recognised, and the rules of syntax formulated with a view to Composition.
History . .	The details of a campaign in some war might be given; battles might be named, losses and gains given, &c.	The incidents preceding the war might be sought, and cause and effect traced. The reasons for war generally might be questioned out; the usual and common results of most wars might be inferred.

b. **The Difference between Instruction and Education.**—From an examination of the above illustrations it will be seen that Instruction and Education are not synonymous. The chief differences are as follow:—

Instruction (*Synthetic*)	*Education* (*Analytic*)
1. Feeds minds to make them grow; *i.e.* it promotes mind growth.	1. Exercises minds to make them develop; *i.e.* it promotes mind development.
2. Is a monologue method of teaching; *i.e.* it is the lecture form of teaching, utilising description and explanation.	2. Is a dialogue method of teaching; *i.e.* it is a method of discovery, utilising experiment, observation, questioning and the conversational method.
3. Is the method of proceeding from "generals" (*e.g.* rules of arithmetic) to particulars (*e.g.* examples or exercises under those rules).	3. Is the method of proceeding from particulars to "generals" (see p. 25).
4. Is a method of specialisation; *i.e.* it may prepare for special pursuits and callings (*e.g.* shorthand and typewriting for the clerk).	4. Is a method of generalisation. Its aim is to fit the pupil generally for the battle of life.
5. Mathematically it may be explained as: Much information + little training.	5. Mathematically it may be represented as: Much training + little information.

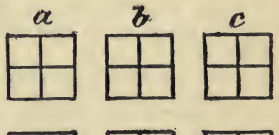
Having mastered these essential facts the young teacher is now in a position to study some of those cardinal principles or educational maxims which should fashion all good methods of teaching. These principles are really few in number, although, from the use of synonymous forms, they may appear to be many. The object of this chapter will be to explain these principles, thus incidentally reducing their number; and to introduce some order into their classification. In pursuit of this aim Methods of Teaching may be considered from three standpoints: (1) the learner, (2) the matter taught, and (3) the teacher.

I. METHOD AS INFLUENCED BY THE LEARNER

Children learn to think long before they enter a school, and like all sane people, they think in certain well-defined ways; that is, they have certain common forms of thought. The essential point here is, that nothing can be readily learned unless it is apprehended under one of these forms of thought. We are thus led to the first great principle of teaching, which may be described as proceeding from the Particular to the General, or from the Individual to the General.

1. **FROM THE INDIVIDUAL TO THE GENERAL.**—The teacher's task is to give the child individual notions, and then to aid him to pass from those individual notions to general notions.

a. **The Individual Notion.**—All knowledge is obtained from notions, because they form the elements of thought. The individual notion is obtained through the senses; *i.e.* by observation. The children see, feel, handle, taste or smell the object, and so get a stock of ideas about it. This is what is known as the *Objective Method* of Teaching. Its most familiar application is the Object-Lesson and the various Kindergarten exercises. But it has a much wider scope, for it should help to fashion the teaching of many other subjects in the school curriculum.



(*a*) A boy's individual notion of a plum is the sum-total of the sensations which the plum gives him—form, colour, weight, taste, smell, &c. The notion then is complex, for it is built up of many elements. Now *all knowledge begins with these complex individual notions, and therefore all education should start with them.*

(*b*) Place the three squares *a*, *b*, *c*, upon the B.B. Let class count the number of small squares (12). Remove one small square from each of *a*, *b*, and *c*. Count number of small squares

remaining (9). Class notes that there are three small squares left in each of the figures *a*, *b*, and *c*; that each figure is now $\frac{3}{4}$ of its former size. The children thus get an individual notion of the fact that $\frac{3}{4} \times 3 = \frac{9}{4}$.

From these examples we learn that:—
(1) Individual notions may be of different kinds.
(2) They are not all gained through the senses.

It is thus seen that all real knowledge must start with and must be based upon concrete individual notions.

b. **The General Notion.**—The teacher performs an experiment to show that water presses downwards, and the class thus arrives at the fact that water presses downwards; another experiment shows that water presses upwards, and the children gain another individual notion; similarly another experiment gives the individual notion that water presses sideways. The child then easily passes to the general notion that water presses in all directions.

Again, a child sees an animal which runs about, has four legs, wags his tail and barks. He thus gets a complex individual notion of this animal. He sees a number of similar animals, some being large, some small, some with woolly coats, others with smooth coats; and he hears all these animals called "dogs." He thinks of the common properties of all these animals—four legs, tail, running about, barking—and so forms his general notion "dog." It is true that his general notion "dog" may recall some pet dog for the moment, but his general notion has, nevertheless, to lend itself to the idea of *any* dog. If he expresses his idea of "dog" in a definition, it must be such as to embrace *all* dogs.

The general notion then refers not to individuals, but to classes. The notion is fixed by words in the form of a definition; for as soon as the child has formed a class—*i.e.* as soon as he has passed to a general notion—he has framed a definition of that class; *e.g.* his definition of a dog is an enumeration of the common properties of all dogs—four legs, tail, barking, &c.

It will thus be seen that the process of passing from the Individual to the General is done by the aid of words in the form of a definition; and for this reason this method of acquiring the general notion has been called the *Defining Method*.

2. **FROM THE CONCRETE TO THE ABSTRACT.**—This is no new principle. It is merely a re-statement, or a particular aspect of the previous one. An examination of an instance will show this.

2 sticks and 3 sticks together are	5 sticks	}	and so on, varying the instances or objects.
2 cubes and 3 cubes ,,	5 cubes		
2 marbles and 3 marbles ,,	5 marbles		

The child thus learns that 2 of anything and 3 of anything are 5 of anything, and so ultimately that 2 and 3 are 5. The child has thus progressed from the knowledge of individuals (sticks, &c.) to general classes (2 and 3 are 5); from a knowledge of the concrete things to that of their abstract qualities; from the individual notions (sticks, &c.) to the general notion or mathematical definition (2 and 3 are 5).

3. **FROM EXAMPLES TO RULES, LAWS, AND DEFINITIONS.**—"Examples and details must precede rules and formulas, whether in the region of science or language." This is another sound maxim of teaching, but it is not new. Its truth is embodied in the two previous maxims.

a. Read paragraph (*b*) on p. 25. From the examination and manipulation of individual squares the child discovers the rule that to multiply a fraction by an integer he may multiply the numerator by that integer.

Again, the teacher may lead the child to see from a further study of this same example that:—

$$\frac{3}{4}\times 3=\frac{3}{4\div 3}=\frac{3}{\frac{4}{3}}=\frac{3 \text{ wholes or } 9 \text{ thirds}}{4 \text{ thirds}}=\frac{9}{4}.$$

The rule is then inferred that to multiply a fraction by an integer he may divide the denominator by that integer. The general rule is then deduced.

b. The class examines selected sentences (examples); *e.g.* cats purr; dogs bark; birds fly. By questioning, the *subjects* of speech in each case are elicited—cats, dogs, birds. Further examination discovers that the second word in each sentence expresses an action; *i.e.* it says, asserts or *predicates* an action of its subject. The class then gives the definition of predicate—provisional in this case. An examination of further sentences (examples) would lead to a final definition.

In each case the teaching proceeded through examples to rule or definition, through an examination of individual cases to general truths or laws.

4. **FROM THE KNOWN TO THE UNKNOWN.**—A child's knowledge is vague and imperfect, hence the teacher should question to discover the value and extent of what the child "knows" before he begins to work from it as a starting-point. His aim should be to start with adequate and accurate knowledge, so that the reasoning involved may be accurate. Reasoning is the faculty of deducing unknown truths from truths already known. If the initial knowledge is imperfect the reasoning cannot be satisfactory

(*a*) When a child comes to school he already knows words. What he does not know is the elements—the letters, symbols, names, and sounds. Hence the teaching of Reading should commence with words and not with letters.

(*b*) A young seedling is pulled out of the ground. Its root is cleansed and noted to be white. A stick of celery is shown. Some ordinary, freshly-plucked leaves are examined, and in each case the under side is noted to be paler than the upper side. These facts and similar ones are observed and known. It is then inferred that light is necessary for the production of colour in the plant—a fact which was unknown.

(*c*) Read 3 *b* above. The known element was the sentence in each case. The unknown was the nature and function of the predicate. The latter was learned from an examination of the former; *i.e.* the teaching proceeded from the known to the unknown.

In each of the above instances the teaching proceeds from the known to the unknown; from concrete, individual examples (words, plants, sentences) to abstract rules, definitions or general truths.

The transition in the first case (*a*) may not be clear to the young student. But from an examination of a number of *concrete* examples (words) voice, eye, and hand all being used, the child *abstracts* the marks or characteristics of a certain sound, and learns to associate the sound, symbol, and name. For example, from the words *bat, cat, fat, hat,* &c., the letter *t* might be learned. The letter once learned becomes concrete, and then in its turn is used as an aid to further abstractions.

Again, words (examples) are studied and a definition of a certain symbol (*t*) is learned. The child can now define *t* as a symbol with a certain shape, sound, and name. Knowing a thing implies a power to define it.

The general notion embraces not only notions of material objects, their qualities and relations, but definitions. From the individual notions (words) the child has reached a general notion (definition of *t*).

5. **FROM THE SIMPLE TO THE COMPLEX.**—The word "simple," as used in this maxim, must be taken relatively. The starting-point, in any given case (*i.e.* the simplest idea or ideas for the pupil), will depend upon his mental development, his attainments, and the teacher's degree of knowledge of these facts. What may be simple to an older scholar may be more or less complex to a younger pupil.

(*a*) In a Writing Lesson a child first makes the right line, then the link, the hook, &c., and gradually combines these elements into words. He thus proceeds from the simple (elements) to the complex (written words).

(*b*) In a Reading Lesson or a Word-building Lesson the child starts with small words of regular notation, and proceeds to harder, and more complex examples; *e.g. at* may successively become *hat, chat, chatter, chatterbox.*

(*c*) In the study of grammatical analysis, the child starts with the simple sentence, and proceeds through the compound to the complex sentence.

6. **FROM THE INDEFINITE TO THE DEFINITE.**—A child's brain is immature, and it remains immature throughout the whole of his school life. His ideas are vague and crude. Hence the teacher starts with the crude, vague, indefinite notions of the child, which, with the aid of tuition, experience, and observation, gradually become clearer, more precise, and more definite.

(*a*) The child's idea of a cat is probably that of a domestic pet. His knowledge of the cat will embrace some details of structure and habit, but that knowledge will be both vague and incomplete. After an Object-Lesson on the cat he not only learns more detail of its habits and structure, but he learns something of the adaptability of structure to habit. His knowledge is progressing and becoming more definite.

(*b*) An older pupil receives a lesson on the Houses of Parliament. The teacher elicits conversationally perhaps that the class has some vague notion of the constitution and function of Parliament. Having found his starting-point, he proceeds to explain in proper detail the constitution, &c., and so tries to make the knowledge of the class fuller, clearer, and more definite. In both cases the teacher has proceeded from the less definite to the more definite, or, more generally, from the indefinite to the definite.

7. **FROM THE EMPIRICAL TO THE RATIONAL.**—Every branch of instruction should proceed from the empirical to the rational. By empirical knowledge is meant that which is the result of experience. Rational knowledge, on the other hand, is regulated by reason. It scientifically explains the facts which have

been learned from observation and experience. It arranges those facts, analyses them, and shows their connection with general laws or truths.

(*a*) The child knows that iron rusts if exposed to the air and left unused or uncleaned. The garden-gate, the water-pipe, the uncleaned bicycle all tell him this. His knowledge is empirical. The Object-Lesson or Chemistry Lesson explains the law of oxidation. The reason for the rust is now laid bare. The facts are brought under a chemical law. The knowledge has been made rational.

(*b*) A child lives in a mountainous or hilly district and learns from experience that it is colder up the hill than down in the valley. He migrates south and finds it is warmer than the north. He reads that it is very hot in Africa and very cold at the North Pole. He has even sung of Greenland's icy mountains and Afric's sunny fountains. His knowledge is empirical. The Geography Lesson explains the influence of latitude, altitude, and other factors influencing climate, and the boy now "understands" the why and the wherefore of these variations. They all occur in obedience to natural laws. His knowledge has left the empirical stage and become rational.

In each case the child started with individual notions and proceeded to general notions; he set out with examples or concrete cases and passed over to abstract laws; from what was known to what was unknown; from what were simple facts to him to laws that were complex in their operation; from what was vague and indefinite in its origin and work to more definite knowledge on these points. This point has been purposely laboured a little, in order to press upon the young student the close connection or similarity of these maxims of education.

8. **THE HEURISTIC METHOD.**—This "happy" method has been most unhappy of late in its advocates, who have tried to push it beyond the bounds of reason. It is the method of "discovery," and it demands that a child should find out everything for himself. He is to be told nothing. The teacher may supply the material for the process, but after that the child is to be independent of the teacher. He is to be placed in the position of an original discoverer.

The position is absurd; for if the method is sound it should apply to all branches of instruction. The method then becomes antediluvian, and demands for its practice an average age equal to that of Methusaleh. It casts away the accumulated experience of past ages, and creates, in so far as it can, successive crops of juvenile Adams and Eves without the stimulation of an Eden.

Interpreted rationally the method is both sound and interesting. What a child may discover for himself under reasonable conditions of time, cost, and mental profit should be learned by this method; other things should be told, explained, or demonstrated to him. It has already been pointed out that a child's ideas are "scanty and ill-organised; and so the teacher's business is not to leave him to fumble his way as best he can, but to give him just as much help as will enable him to make real and encouraging progress in the paths of simple research."—(*Raymont.*)

"The best of teachers will tell a class some fact in natural history, when he might have taken them into the fields to observe it for themselves. The fact is wanted then and there; to observe it directly would cost half a day; to omit all mention of it would be to omit a necessary qualification of an important principle which is being worked out. If we are to make our natural science absolutely for ourselves, we must be prepared to spend some centuries upon it."—(*Miall.*)

For the working of this method see Induction (p. 31).

II. METHOD AS INFLUENCED BY CIRCUMSTANCES.

If I am teaching grammar to a class of adults who are ignorant of the subject, I shall not adopt quite the same method as that suitable for a class of young children. The older pupils, though they know little of grammar, have attained a stage of general intellectual development at which they can readily grasp general statements without the need of such careful grounding in the concrete as would be necessary in the case of young scholars. *I may even start with definitions* which will be understood in the light of previous experience. Similar remarks apply to other subjects; *e.g.* chemistry, arithmetic, mechanics, &c. This latter method is sometimes called the *Synthetic Method*, to distinguish it from the other, which is often called the *Analytic Method.*

It is fairly easy to see why the method which has already been described in explaining the foregoing maxims is called *Analytic.* Take, for example, the case (*b*) cited under Maxim 3 (p. 27). Children are familiar with sentences as *wholes* long before they come to deal with grammar. But after careful examination of these wholes, they come to see their parts or elements. They arrive at new knowledge by analysing that with which they are already roughly familiar. When, however, I start my pupils with definitions (of

subject, predicate, noun, verb, &c.) they gradually *build up* the same new knowledge which was acquired in the other way by *Analysis*. In other words, they arrive at the same information by a process of *Synthesis*. Although we have spoken of employing the Synthetic Method with adults only, it is obvious that it can be employed to some extent with children.

In the Synthetic Method the maxim which instructs us to proceed from the Individual to the General is reversed. We start with the General and proceed to the Individual. We follow out a general proposition or definition into its particular applications ; *e.g.*—

The teacher tells the class that a Pronoun is a word used instead of a Noun. He then applies the definition by asking the class to supply suitable pronouns to sentences which he gives ; or he may ask the class to supply the sentences containing the pronouns. In each sentence given he may then ask which word is a pronoun and why it is thought to be a pronoun.

We are now in a position to summarise all the maxims or methods which have been explained in this chapter. There is a common principle running through the first eight, which appears also in the Analytic Method. The Synthetic Method introduces us to what may be called the "return" maxims or methods ; viz. the method of proceeding from the General to the Individual or Particular ; from the Abstract to the Concrete. The former methods are INDUCTIVE ; the return methods DEDUCTIVE. These are the two great methods of reasoning used by the teacher in his important task of training the minds of the children. We will now compare the two methods.

FIRST METHOD (*Analytic*)	SECOND METHOD (*Synthetic*)
1. Teacher obtains an iron ball which will just pass through a ring. He heats the iron ball, and again places it on the ring. *It does not pass through.* **Inference : Heat has caused the ball to expand.**	1. The teacher enunciates the principle : **Matter expands with heat.**
2. The experiment is repeated with brass, copper, &c., all of which are solids ; therefore **solids expand with heat.**	2. He argues solids are a form of matter ; iron is a solid ; therefore **Iron expands with heat.**
3. Further experiments are made with liquids and gases. Liquids and gases are forms of matter ; therefore **Matter expands with heat.**	3. He then proceeds to work an experiment to prove his assertion.
	4. He argues that liquids and gases are forms of matter, and infers that **liquids and gases expand with heat.**

CHIEF DIFFERENCES BETWEEN THE TWO METHODS

1. Particulars (*i.e.* single cases) were first dealt with, and from these particular cases general laws were inferred. This method of reasoning is known as **Induction.**	1. The general law was first enunciated, and particular cases were then shown to be examples of this general law. This method of reasoning is known as **Deduction.**
2. Induction is the method of *education.*	2. Deduction is the method of *instruction.*
(*a*) It is an *upward* movement of thought leading to definition, or rule, or principle, or theory.	(*a*) It is a *downward* movement of thought leading to a more perfect comprehension of the general principle, rule, theory, &c.
(*b*) It leads to new knowledge.	(*b*) It does not lead to new knowledge.
(*c*) It is the method of discovery.	(*c*) It is the method of verification and explanation.
3. It is a *slow* method. All knowledge has to be acquired first hand by the observation of particular cases.	3. It is a *quicker* method than Induction. The child avails himself of knowledge others have acquired.
4. It is a *safe* method. The general notion or law is reached step by step. Its meaning is well grasped and it can then be accurately applied to new cases.	4. It is *not so safe* a method as the other. The general law may be imperfectly grasped; hence there may be faulty application to new cases.
5. It is a method which *fosters self-reliance.* Children are trained to depend upon their own observation, ideas, and judgments.	5. It is a method which encourages *dependence on others.*

III. METHOD AS INFLUENCED BY THE TEACHER

Knowledge may be imparted by the teacher in the form of the monologue or the dialogue. Both forms will be in constant use, but both forms will depend largely for their value on the personal qualities of the teacher.

Mentally the young teacher must be well-read, with an ample knowledge of the subjects he is teaching. His great aim is to acquire the power of imparting knowledge. If he does not possess the knowledge he cannot impart it. Nor is it sufficient to be the proverbial bone ahead of his class. Good teaching requires *full* knowledge; hence the teacher must be a good student. But even that of itself is not sufficient. His lessons must be carefully prepared, and they should be based on good models. For this purpose he will need to observe "method" in school; to read "method" at home.

His *manner* must be cheerful and sympathetic. Sympathy is contagious and profitable, helping the young teacher to feel the pulse of his class, calling forth the respect of the pupils and parents, and making school a happy place. But cheerfulness is as essential as anything. Its association with work is a valuable lesson to the children, for they learn that work need not necessarily mean dulness. His dress should be neat and clean, and his bearing that of a gentleman.

Physically the young teacher should be a fair adept at some of our national games, so that he may maintain his own health and sympathise with, or share the games of his pupils. He should be alert, quick of eye and ear, so that it may be known that nothing will escape his notice. His voice should be nicely pitched, pleasant, yet authoritative; and for the purpose of discipline it should be used as little as possible.

Morally his character must be beyond reproach; for no one is more restlessly watched, no one is more persistently copied than a teacher.

1. **THE MONOLOGUE FORM.**—By this is practically meant the "Lecture" form of teaching. Except in the form of the story or narrative it is not suited to young children. Its proper use in the teaching world is for very senior scholars and adults. But in its partial forms of Explanation, Description, or Definition it is applicable to all grades of scholars.

(*a*) *Explanation.*—By "explanation" in teaching is meant the process of clearing away from a word, phrase or statement all obscurity of meaning, so as to make it intelligible. The meaning is made plain or else it is not explanation; *e.g.* to most children there is no explanation in calling a glen a dale.

(*b*) *Description.*—By description is meant the act of representing a thing by words or signs, or by both. It tries to give an account of the nature, properties or appearance of a thing, so that the children may receive an accurate idea of it. In its best form it is a word picture.

(*c*) *Definition.*—When we define a word we seek to determine its common qualities or marks. We seek to lay bare the whole meaning of the term; *e.g.* we may define eloquence as "the faculty of influencing the affections of men by means of language." But a definition can also be expressed in the form of a proposition, in which case the term to be defined is the subject and the explanation the predicate; *e.g.*—

Subject.	*Predicate.*
Man (*the term*)	is a food-cooking animal (*explanation*).

Singular and Collective terms cannot be defined, but they can be described, the description serving the purpose of the definition; *e.g.* I may say "George

is a short man, dark, and stout, a schoolmaster by profession, living in the High Street." I cannot define George; I can only describe him.

One or two other points need noticing. A definition must not contain the name defined; it must say only what is just sufficient; and it must not be negative where it can be positive.

2. **THE DIALOGUE FORM.**—This form embraces the device of Questioning, the treatment of Answers, Oral Examination, and what is known as the Conversational Method of teaching. It is essentially the form for the school, and especially for young scholars.

a. **QUESTIONING.**—Few parts of a teacher's work offer such fine opportunities for showing his professional calibre as questioning. Skilful questioning is not easy, nor is it common. Among other things it demands—

(1) A full and accurate knowledge of the subject-matter.

(2) Good powers of description.

(3) A good logical faculty.

By this is meant the power to recognise the parts of which the whole is composed, to estimate the relative values of those parts and to present them in their right order.

(4) A knowledge of child nature.

Some knowledge of this kind may and should be obtained from books; but the best book is the careful observation of the pupils themselves, and of child life generally. The questions must not go beyond the pupils, for that is discouraging; they must not be beneath them, for that is disappointing. Good questions will fit the mind of the child exactly.

(5) A suitable manner.

The teacher's manner should be brisk, pleasant, and sympathetic. A good question is a testing or teaching gem; the teacher's manner is the "setting" which adds to the value of the gem.

(*a*) **The Objects of Questioning.**—Most of these are obvious.

(1) To find out what the child knows.

(2) To prepare for new information.

The second object arises naturally out of the first.

(3) To maintain attention and stimulate mental activity.

Questions demand answers; answers imply knowledge; knowledge requires attention; attention proclaims mental activity.

(4) To introduce variety into the teaching devices used.

The dialogue form comes as a welcome change to the monologue.

(5) To train the mind.

Roughly speaking, all questions can be thrown into one of two classes. Their function is either to test or to teach.

(1) *Testing Questions.*—These follow teaching and arise out of it. Their function is to measure the individual success of the teacher's and pupil's work; to find out whether that work is remembered and understood; and where it needs amending or repeating. They are of a revising nature, and incidentally give good practice in the art of composition, provided the teacher always demands whole sentences as answers.

(2) *Teaching Questions.*—The object of these is to train the mind, to lead it forward to the discovery of new truths, to cultivate the reasoning powers, to give the child not only mental power, but

the consciousness of that power, so as to encourage him to fresh efforts.

Unlike Testing questions, which can be used in all subjects of instruction, Teaching questions are best restricted to such subjects as Object-Lessons, the Science of Arithmetic, Grammar, Geography, History, and generally to those lessons, or parts of lessons which afford scope for the training of the reasoning powers. The functions of the two classes are in nearly every case distinct. The testing question produces a resurrection, the training question a birth; in the former past knowledge is recalled, in the latter new knowledge is revealed. The testing question merely examines, the training question educates and develops; and while the former is primarily for the benefit of the teacher, the latter is primarily for the benefit of the class.

(*b*) **Objections to Questioning.**—These objections, in so far as they are pertinent, arise from the abuse of questioning as a teaching device, rather than from its use.

(1) Questioning is apt to destroy connected thinking.

A dozen questions are often asked where one should have been sufficient. The result is that the teacher alone does the connected thinking instead of the child and teacher.

(2) As a means of acquiring information it is extravagant in time.

(3) It encourages guessing.

(4) It presents difficulty after difficulty, and so becomes discouraging and confusing.

(5) In a large class its equitable or judicious distribution is almost impossible. For this reason it may induce speculation. The casually idle or indifferent pupil may speculate on escaping notice.

b. **EXAMINATION.**—This is merely a form of questioning. In its oral form it is questioning pure and simple, and is usually described as *vivâ voce* examination. But the word "examination" usually implies a written test, and it is this application of the word with which we are most familiar. Both forms have their advantages, which will be obvious to any thoughtful student; but the best form of examination as a teaching device will be a combination of the written and *vivâ voce*, as is seen in our University and other higher examinations.

c. **ANSWERING.**—Answers are the natural complement to questions. The proper treatment of answers is therefore an important matter for the young teacher.

1. **The Characteristics of Good Answering.**—A good answer will be recognised by the following tests :—

(1) It will always show *thought*, although it may not be a ready answer. A *ready answer* will depend upon :

(*a*) The ability and attainments of the answerer.

(*b*) The nature of the question put by the teacher.

(*c*) The amount of attention paid by the answerer.

(*d*) The quality of the teaching.

(2) It will show clearness of expression.

(3) It will show correct interpretation, and it will be exact as far as it goes.

(4) It will show good arrangement.

This, like the previous quality (*a*), applies more especially to written answers.

(5) It will show, in the case of written answers, a proper economy of time, space, and language.

2. **Answers that should be Received.**—As a rule, all answers should be given in complete sentences. This rule should be invariable for written answers, but it may be modified on occasion for oral answers.

(1) *Good Answers.*—These should not only be accepted, but also commended.

(2) *Honest Answers.*—These may or may not be good, but they should always be accepted.

(3) *Partial Answers.*—An answer need not be rejected because it is not full or exact. The missing information might be supplied by the class, but the inaccuracy should be corrected by the teacher.

(4) *Equivalent Answers.*—The form of the answer may not be that desired, but yet it may be a fair equivalent. In such cases it should be accepted; but the better form should also be placed before the class, either by the pupils themselves or by the teacher.

(5) *Swollen Answers.*—These may take a speculative form. The quick-witted pupil anticipates the teacher's aim or goal and answers, not only the question put, but those that he thinks are going to be put. He is "too previous," but the answer should be accepted, the superfluous matter being quietly ignored. Again, the speculative element may be missing, but the answer still overloaded. The sense of proportion is lacking or there is a desire to make a display of knowledge. As in the previous case, the essential should be accepted, but the irrelevance of the superfluous should be pointed out.

3. **Answers that should be Rejected.**

(1) *Flippant or Careless Answers.*—These should be discouraged and repressed. Foolish or ridiculous answers should be treated in the same way. A little judicious exposure will be useful for this purpose. But there should be no snubbing or ridiculing, for educationally the result is disastrous.

(2) *Hasty or Random Answers.*—As a rule these should be reproved. They should be refused, but at the same time they should receive attention. The motive which made them hasty or random must be sought, and the correction applied to that. The fault may be found to lie with the teacher.

(3) *Guesses.*—These should be rejected, for they usually arise from idleness or inattention. They are a species of gambling. The child speculates and "has a shot." In such cases a little good-natured banter may be useful. Where they arise from stupidity or ignorance they will require kind treatment. Otherwise the guesses should be exposed by further questioning.

(4) *Conceited Answers.*—These may contain a part or the whole of the truth. In either case the subject matter of the answer is immaterial. It is not a fault of the intellect that requires attention, but of the character. The answer should either be ignored, or the pupil should be questioned further up to the point of failure.

(5) *Boomerang Answers.*—Here the teacher is the sole worker. He asks a question, which comes back to him for an answer. He is both questioner and answerer, and the class is relegated to the ranks of the unemployed. The cure lies with himself, for the occasions justifying such a method are very few.

(6) *Dishonest Answers.*—The treatment is obvious.

(7) *"Yes" and "No" Answers.*—These may be "guesses," or they may indicate ignorance, indifference, or inattention. The fault may even lie with the teacher, through a careless use of "leading" questions. Practically a

leading question is one which requires nothing more than "Yes" or "No" for an answer, and is, therefore, a type of question to be avoided.

4. **Simultaneous Answering.**—This is an attractive form of answering both to teacher and class, with distinct advantages, especially to young pupils, and with equally distinct disadvantages. Hence it should be used with caution.

a. **Its Advantages.**

(1) It gives a *maximum result* for a minimum outlay of effort on the teacher's part, since it keeps the whole class at work.

(2) It is a *stimulating process*, giving life and "go" to the class, and encouraging weaklings to effort.

(3) It is *economical in time* as well as effort, for it affords a means of rapid recapitulation of the chief points of the lesson.

(4) It is *popular* with the class, since it appeals to the juvenile love of activity, and affords a welcome variety.

(5) Its total effect is to make the children *ready* both in thought and speech.

b. **Its Disadvantages.**

(1) It is often *deceptive*, for at times there is far more show than reality.

(2) To certain pupils it is a *weakening force*, for they learn to rely on others. These are mental weaklings.

(3) It is *noisy and distracting*. A separate class-room is essential for its indulgence.

(4) It fosters *shirking*. The lazy shelter themselves under the sum total of the class noise.

(5) It offers *little training*, for it necessarily limits the nature of the questions, which can demand little more than monosyllabic answers.

(6) It encourages *sham* and sometimes *deceit*. Answers when right are often only superficial. But under cover of the class noise a shifty pupil may say something incorrect, and so give the appearance of answering, or there may be lip movement without voice. These are moral weaklings.

d. **THE CONVERSATIONAL METHOD.**—This device is fully explained by the word conversation. It is free from the cramping or deadening effects of examination or formal questioning. It invites expressions of opinion, it does not demand them. It narrows the gulf between teacher and taught, for it allows greater freedom of thought, greater freedom of speech, and greater latitude generally than any other teaching aid. It stimulates mental activity, breeds confidence, generates interest, maintains attention, and avails itself of much that is charming in conversation generally.

SOME HAZY TERMS EXPLAINED.—Young teachers often see such terms as Instruction, Information, Education, Training, Elicit, Educe, Deduce, and Inference "as in a glass darkly." It was necessary to explain the first four in the early part of this chapter. It is now proposed to say a few words about the other terms.

1. *Elicit.*—The meaning of this term is to draw out, to bring to light, to deduce by reason or argument, or to educe; *e.g.* truth may be elicited by discussion; sparks by collision. It is a wide term, and practically embraces all the terms which follow. It is often used to denote both inductive and

deductive reasoning. Young teachers sometimes use the term loosely, and say elicit so-and-so, without indicating their method of eliciting. The statement is vague in its incompleteness. Facts may be elicited by observation, experiment, questioning, or reasoning, but the particular method chosen should always be indicated.

2. *Educe.*—This term is more or less synonymous with the previous one, meaning to draw out, to extract, or to cause to appear. More particularly, from the teacher's point of view, it is applied to all inductive processes, and makes a free use of observation, experiment, and teaching questions. Broadly speaking, facts are elicited; general truths are educed. Eliciting is therefore primarily the handmaiden of Information; educing of Training.

3. *Deduce.*—We may express the opinion or judgment that all men are mortal. We notice that John is a man, and we *deduce* that John is therefore mortal. The term "deduce" should be confined to deductive processes (see p. 31).

4. *Infer.*—To infer is to derive one truth from other truths, either by induction or deduction.

Summarising, we may say broadly that "educe" should be confined to inductive processes, "deduce" to deductive processes, "infer" to both processes, whilst "elicit" may be applied to either, although not exclusively confined to them.

CHAPTER III

READING

I. THE VALUE OF READING

No school subject is more valuable; none more important. Nearly every branch of school work is affected by it, and education goes on by means of it as long as life lasts. It is the most important educational instrument placed at the child's command. It adds immensely to the pleasures of life, for it lays bare the world of culture, registers the progress of the past, and points out the hopes of the future. It is also a great instrument for mental and moral training, for directly or indirectly it probably influences every faculty of the mind, and appeals to all the higher feelings.

II. THE PROBLEM IN TEACHING READING

In the teaching of Reading the primary aim is to enable the child to understand the written thoughts of others, and to give adequate and audible interpretation to those thoughts. At the same time the child must be given a love for the subject, and to secure this love, the willing co-operation of the child must be obtained by the aid of various teaching devices. It by no means follows that a good reader is necessarily a good teacher of Reading; hence the necessity for method and preparation. The best method will give efficiency with economy of time.

The young teacher should learn something about the organ of speech and the method of producing voice. The structure of the larynx could be learned from some good elementary text-book on Animal Physiology. Students attending pupil-teacher centres will now receive lessons on Voice Production; other students should provide themselves with a reliable text-book on Voice Production, and regularly follow out its instructions and exercises. Breathing exercises will form part of the instruction in Voice Production, and they are also an essential part of the Physical Exercises which are now a compulsory item in the curriculum of all Primary Schools.

III. THE ESSENTIALS OF A GOOD METHOD

Whatever method of teaching Reading may be in use in any particular school, there are certain essentials for any method which aspires to the title of good. It must recognise the real nature of the task, include careful grading, promote good spelling, provide good pattern work, efficient correction, and it should not attempt too much. In the early stages type devices might be used. The method should also include lessons on Word-Building; it should be supported by good School Reading-Books, and provide adequate explanation. Finally, it should embrace lessons on Recitation, and make provision for silent reading.

1. **THE NATURE OF THE TASK.**—Audible reading is a triple task. For instance, in learning to read audibly the word "cat," we have—

(*a*) The idea in the mind—the mental image "cat."
(*b*) The spoken word—the sound or vocal symbol.
(*c*) The printed word "cat"—the visual symbol.

That is, we have the idea, the sound, and the symbol. If the idea is translated by sounds, we get spoken language; if by written or printed symbols, we get reading. The first combination is already formed when children enter school; for they have, within certain limits, learned to express their ideas by sounds (words). The teacher's work is to form the association between the words and the symbols; *i.e.* between the sounds and the characters which represent them.

2. **THE WORK SHOULD BE GRADED.**—The following principles should be observed :—

(*a*) Phonetics should be carefully taught, especially in the early stages.
(*b*) Simple combinations should be taught before the more complex.
(*c*) Regular combinations should be dealt with before irregular.
(*d*) There should be careful classification for the purpose of simplification.

In the early stages the sequence will thus be phonetics, word-naming, individual practice. In the later stages expressive reading will follow.

3. **READING AND SPELLING.**—Reading gives natural facilities for learning spelling, since spelling rests on a habit of the eye; and when it is remembered that the common words of regular notation in our language number more than three-fourths of the whole, it will be seen that some form of the Phonic Method is most likely to meet the condition of promoting good spelling. The subject of "spelling" is dealt with in the next chapter.

4. **PATTERN READING.**—Pattern work should be given (1) by the teacher; (2) by selected scholars. The teacher supplies the ideal and sets the standard; the selected scholars show that the ideal is attainable and the standard reasonable, for they help to bridge the intellectual gulf between the teacher and his class.

Under most circumstances "pattern reading" should be long. Speaking generally, short pattern reading is of doubtful value, although "special justification is claimed for it in those parts of the country where the popular speech is a droning monotone. If given by a teacher to children before they have themselves tried a passage, it discourages effort to get naturally at the right rendering through a first-hand comprehension of the meaning." Indeed, some go so far as to say that "it is best to choose a passage which the class is *not* on this occasion about to read; and the passage worked out by the children under the direction of the teacher may be read aloud by the teacher, or by a bright pupil, at or towards the end of the lesson, serving a purpose like that of a 'fair copy' of a written exercise or of a properly corrected and worked sum."

5. **THE CORRECTION OF ERRORS.**—The teacher must know when and how to correct. As a rule, mutual correction is not advisable. It may, and probably does, stimulate attention, but it is not always accurate, it produces frequent and unnecessary interruptions, and it occasionally generates bad feeling between the scholars. The teacher is the proper person to make the corrections, and for this purpose he should often listen with a closed book. He will thus be in a better position to correct all kinds of errors; for good reading places the listener in as good a position as the reader, and unless the teacher feels himself to be in that position, he knows that there is something needing correction.

6. **THE EXTENT OF THE TEACHING.**—The amount attempted will naturally depend upon local circumstances. For instance, allowance should be made for the nature and extent of the local provincialisms, for the average intelligence of the children, and for the width of the curriculum. Obviously, in a "slum" school, or in a village school, the same amount can hardly be expected as in the more favoured districts. Other factors requiring attention are the length of time the children stay at school, the degree of regularity of attendance attained, the amount and quality of the staff, and the material equipment of the school. The teacher's task is to gauge the average ability and the average opportunities of his class and to regulate the quantity of work accordingly.

7. **THE USE OF TYPE DEVICES.**—In the early stages type devices may be used with great advantage. For instance, thick type and larger print may be used to indicate certain words of regular notation, or the use of coloured letters may be utilised to indicate broad distinctions of sounds; *e.g.*—

Thick Type	*Coloured Letters*
I **pat** the **hat.**	Voiceless letters (*e.g. p*), printed in blue.
I **pat** the **mat.**	Voiced ,, (*e.g. b*), ,, black.
I **pat** the **cat.**	Silent ,, (lam*b*), ,, brown.
I **pat** the **fat cat.**	Vowels ,, red.

Note.—1. The thick type is used in the Type-word Method of South Australia; the coloured letters in Dale's Method. Both are Phonic Methods and much alike, but Dale's Method is more elaborately developed than the Australian method.

2. The distinction between voiceless and voiced consonants is explained on p. 45.

8. **WORD-BUILDING.**—The teaching of Word-building is dealt with in the chapter on Spelling.

9. **READING-BOOKS.**—Great care should be exercised in the choice of reading-books, as they bear largely upon the character of the reading of the school. The task is not difficult, for many of the books now upon the market are excellent.

It is true that the young teacher will probably have no voice in the choice of the books, but it is also equally true that he ought to learn to gauge the relative value of such books. The books should be written in good English, should be carefully graduated, should contain suitable subject-matter dealing with incidents within child experience or child intelligence, and as a rule in the form of stories, connected stories being best. Books scrappy with information should be avoided, as one of the main objects is to create a love for the subject itself. The books should be well illustrated, and should contain for the lower classes at least 80 pages of small octavo print, and 120 pages for the higher classes, in each case exclusive of illustrations and other matter. Each book should be a *reading*-book and not a curriculum omnibus, carrying lists of spellings, writing copies, arithmetical figures, &c. Such adjuncts detract from the interest of the book and militate against the creation of a love for reading. Finally, the printing should be bold and clear, and the binding strong.

10. **SILENT READING.**—Silent reading may be practised in most classes above the primer stage, the quantity increasing as the pupils progress. A little oral questioning at the end of the lesson will test the success of the silent effort, which, in the early stages at least, should always be made on interesting reading matter. The idea is to develop self-effort, self-reliance, and a love for reading; and this love should show itself in home-reading through the medium of the school or circulating library. The process is pleasurable, for the pupils read with little or no restriction; they are continuously occupied, and so Satan's chance for mischief is minimised; they learn to rely on themselves for grasping the point and meaning of the subject-matter; they are not harassed by the many points of discipline incidental to an oral reading lesson; they read with greater physical comfort; they read more than by the oral method and they become better spellers.

11. **EXPLANATION.**—The development of the intelligence is

one of the aims of the reading lesson, hence strange words may require explanation; for there can be no intelligent grasp of a passage which contains words meaningless to the young reader. The context may make the meaning clear enough for intelligent reading, and then explanation (if any) may be left till the end of the lesson. If the context fails to do this, the explanation should be briefly given and the reading resumed. The more brief the explanation, provided it be adequate, the better; for a reading lesson should not be converted into an exposition lesson.

Elder "children should not be asked to read a passage aloud until they have had sufficient time to master its general meaning by silent study. Until they have been allowed to do this, it is neither fair nor profitable to expect them to read with intelligence. It is a peculiar and marked defect of our common primary school practice to give the children so little at any time and in any subject to 'get up' for themselves; they suffer from lack of what has been called 'a little wholesome neglect'; the teacher too often tells or 'elicits' all that they are expected to know. There is, therefore, too little intellectual activity, readiness, discursiveness, or originality in some of the best of our schools; and, in consequence, there are too few signs, in reading aloud, of the individuality of expression which we call intelligence."

12. **IT SHOULD EMBRACE LESSONS IN RECITATION.**—Recitation is a great aid to a good vocal delivery and intelligent reading. Here the mechanical difficulties are at a minimum, and almost the whole attention can be concentrated on the intelligent rendering of the passage. Really good reading is not the gift of the many, for it makes considerable physical and mental demands upon the pupils. Those demands can be partly met, with the assistance of other aids, by good practice in Recitation, which assists in developing the requisite qualities.

"If well taught, it serves as a chart or compendium of the points which the pupil must observe in order to acquire the power of easily audible and acceptable speech. No doubt recitation permits, perhaps even requires, a declamatory emphasis which is quite inappropriate in ordinary reading; but it is easy to overdo this device, for recitation, it should be remembered, is not always necessarily dramatic, even though it be the rendering of a passage from a drama. What is appropriate enough coming from the stage may be disagreeable and embarrassing to an auditor in a lecture-room, where circumstances require more moderation and reserve. Recitation and acting are quite different things, and a strained attempt to unite the two in uncongenial circumstances produces a very ungainly effect."

The Advantages of Recitation.

(*a*) It improves the *taste* by forming acquaintance with some of the choice portions of some of our best authors.

(*b*) It cultivates the *imagination*, for poetry is a great field for the play of the fancy. The power of picturing what has never been seen but only described is of the utmost value to education.

(*c*) It improves the power of *composition* by giving new thoughts from the best models for imitation, and by storing choice specimens in the memory. In this way also it improves the *style of reading*.

13. **SIMULTANEOUS READING.**—Simultaneous reading is not an essential of a good method, but it will sometimes form part of the reading lesson, and so requires attention. It is an aid to reading, but how and when to use this aid requires careful judgment on the part of the teacher. The method and quantity will vary according to the class ; but speaking generally, the less there is of this kind of reading the better, for probably the disadvantages attending its use outweigh the advantages.

Advantages.	Disadvantages.
1. It increases the quantity of reading for the class.	1. It is uncertain whether the reader follows with his eye the words he repeats after the teacher ; and it may, in the hands of an indifferent teacher, encourage idleness and even deception.
2. It increases the command over the organs of voice, and so facilitates fluency. It improves pronunciation, enunciation, and articulation, if carefully taught. It improves the pace of the reading, stimulating the slow and checking the fast. Each has to go the same pace, and each is encouraged under cover of his class-fellows' voices to greater vocal effort. In this way the pitch of the voice is regulated, modulation is learned, common faults of intonation are cured, and individual mannerisms are modified.	2. Unless taught with great care, it may produce inaccuracy and indistinctness, and accentuate the vocal faults it is alleged to cure. Furthermore, it encourages an unthinking uniformity.
3. It improves the intelligence in some cases, especially when dovetailed with individual reading. From the pattern reading of the teacher more expression is given, and the sense of the subject-matter is better grasped.	3. Children, from too much repetition, get to repeat from memory, and it has often been found that they can proceed with the lesson without the aid of the book. In this way it represses individual mental effort.

IV. THE QUALITIES OF GOOD READING

Certain essential conditions have been laid down which the method of teaching Reading should satisfy. The goal is good audible reading, and it now remains to point out the marks or qualities of good reading.

1. **CORRECT PRONUNCIATION.**—Correct pronunciation depends upon the proper sounding of the *vowels*, hence the proper teaching of the vowel sounds is all important.

Much of the faulty pronunciation of the present day is due to the careless

way in which children have been allowed to acquire the vowel sounds in their first reading lessons at school. Most cockneyisms rest on imperfect or inaccurate vowel sounds.

The method of teaching should be by vocal demonstration and imitation, and the sounds should be fixed by vocal drill.

2. **GOOD ENUNCIATION.**—As good pronunciation depends upon the vowels, so does good enunciation depend upon the correct sounding of the *consonants*.

Consonants are produced by obstacles to the out-going current of breath, although in some cases they are preceded or followed by vowel sounds. In teaching these sounds the chief thing to aim at is economy of breath in their production, hence the teacher should insist on the difference between voiced and voiceless sounds.

In sounding a letter like *b*, the breath, as it passes through the throat, sets the vocal chords vibrating. The rest of the sound is then produced as in the case of *p*. Consonants like *b* are called *voiced;* where there is no vibration they are said to be *voiceless*.

a. Some **common errors of enunciation** are now given, and methods are suggested for dealing with them.

Errors.	Examples.	Treatment.
w for **v**.	*wery* (very); *wan* (van).	A common Cockney error some years ago. Teach the children to place the top front teeth on the lower lip, and do not allow the lips to be pursed together.
f and **v** for hard and soft **th**.	*fing* (thing); *muvver* (mother); *fāver* (father); *fumb* (thumb); *nuffink* (nothing); *frough* (through).	*Thing, thumb, through.* In these words the point of the tongue is placed against the edges of the top teeth, and the breath passes between the teeth and tongue. In the case of *mother, father, nothing,* there is also vibration of the vocal chords. The error is explained from the fact that the mode of producing the sound *th* and *f* and *v* is very similar, as in each case the friction of the breath is past the upper teeth.
m, n, ng become **b, d** or **k**.	*borning* (morning); *dothing* (nothing); *nothink* (nothing).	This may be only a temporary defect, due to a cold in the nose, but it is also a shibboleth of certain races or nationalities. In the sounds *m, n, ng,* the breath is driven through the nose, the *stoppage* (see p. 52) for *m* being in the same place as for *b*, for *n* in the same place as for *t* or *d*, and for *ng* in the same place as for *k* and *g*. In producing these nasals the defective children must be made to exhale the breath through the nose.

Errors.	Examples.	Treatment.
r becomes **w**; **er** or **a** becomes **ah**; **r** also becomes **th**; **r** (obtrusive) as in idear.	*bittah* (bitter); *heah* (here); *ideah* (idea); *idear* (idea); *vewy* (very); *bthown* (brown).	The sound *r* is formed by raising the front of the tongue, which gives the trill. The trill is perhaps overdone in the north; it is certainly underdone in the south, where, when it is the final letter, it is only pronounced when followed by a word beginning with a vowel, and not always then. This will explain such faults as "the *idea*(*r*) of it;" "I do not care one *iota*(*r*) about it;" "*Russia*(*r*) and Japan." If the method of producing *th* (see above) and *r* be compared, *bthown* will be explained. Demonstration, imitation, and vocal drill are the remedies.
h, elusive and obtrusive.	*'is* (his); *'at* (hat); *hidea* (idea).	A common difficulty. Vocal drill is the remedy. In producing the *h* sound the breath is practically unobstructed. Hence it is unlike all other consonants.

b. **Stammering or Stuttering.**—Speech is a muscular act involving co-ordinate action between certain nerves and certain muscles. Stammering results when this co-ordinate action fails. *Stuttering* is a form of stammering which is now more or less limited to the useless repetition of sounds, while *Stammering* includes all forms, such as the glide, the hesitation, the holding on to a sound, and the stop. It is the chief imperfection of speech. It may be interesting to note that—

(1) It occurs only among people highly civilised.
(2) It is more common among the Teutonic races than the Latin.
(3) It is more common among males than females.
(4) It rarely shows itself before the fourth or fifth year.
(5) It usually begins in youth, but may arise at any age.

Its **causes** may be various.

(1) It may be due to heredity.
(2) It may be acquired by imitation, for, like yawning, it is infectious.
(3) It may be due to mental strain or shock.
(4) It may arise from ill-health.
(5) The immediate cause is always in the larynx, and this is sometimes complicated by bad breathing. Stammerers generally manage their breath badly, for they are always trying to speak when their lungs are not properly inflated.

A vowel is produced by a current of air which receives its distinctive mark from the shape of the mouth, whereas consonants are produced by closures of the parts or organs of the mouth. Now, stammering on a vowel can occur only in the vocal chinks, but there are six consonant closures on any one of which it may arise, the most common being at *b* and *p* (labials), *d* and *t* (dentals), and *g* and *k* (gutturals), because the closure is firmer in these cases

than in the other three. The stammerer is said to have no difficulty in shaping his mouth to produce the sounds. He easily forms the closure, and it is then his difficulty begins. He cannot undo the closure so as to get at the vowel which is to follow the consonant. The tongue seems to cling to the teeth, and that is because the breath is badly managed, and the vowel (current of air) does not come at the right moment through the vocal chink to undo the closure.

There are three **modes of stammering.**

(1) *The Stop Stammer.* This arises when the vocal chink does not open soon enough.
(2) *The Stutter.* This arises when the vocal chink flutters.
(3) *The Glide Stammer.* This arises when the vocal chink opens too soon.

c. **The Treatment of Stammering.**—Stammering can be cured, and it often disappears gradually, curing itself, and this is especially so as one gets older. But in some cases it requires constant effort. There are two methods of cure suggested, the second of which is the more important.

(1) *The Musical Method.*—This included not only singing, but chanting and intoning. It rested on the fact that most stammerers can sing.
(2) *The Breathing Method.*—The breath should be regulated. The patient should be made to habitually use the chest voice, and so produce deeper, steadier vibrations of the vocal chords. The reason given is that people generally stammer in a "head" voice. There should be vocal drill on the sounds where the stammer is produced.

d. **Lisping.**—This is the habit of pronouncing the sibilants (*s*, *z*) imperfectly, as by giving them the sound of *th* or *dh*. It is curable.

The pupil should be practised in the production of these sounds, after their production has been explained and demonstrated. The following plan has been suggested by good authorities. The pupil should hum a scale on the sound *sh*, beginning at a low pitch. As the notes become higher the *sh* will be found to approximate more and more closely to *s*. If the sound is once obtained and recognised, then all that is required is energy and practice. For the purpose of this practice the pupil should be made to sound the word *-sting*, and then *bur-sting;* the whole word being repeated more and more rapidly until the pronunciation becomes correct. Similar exercises could be given with similar words like *la-sting*, *hoi-sting*, *win-some*, &c. Plenty of practice in reading will then be required, particular attention being paid to the *s* sounds.

It should be noted that *s* gives little difficulty at the beginning of a word. The chief difficulty occurs when *s* is inside a word.

3. **GOOD ARTICULATION.**—By articulation is meant the proper fitting or joining of the syllables of a word the one to the other. In its fullest meaning it has a threefold reference :—

(*a*) The proper formation of elementary sounds.
(*b*) The formation of these sounds into distinct syllables.
(*c*) The formation of these syllables into words.

Bad articulation is often due to faulty enunciation. Children are slovenly, too quick, careless, and inattentive at times ; whereas "in just articulation the words are not hurried over nor melted together ; they are neither abridged nor prolonged ; they are not swallowed, nor are they shot from the mouth ; neither are they trailed, and then suffered to drop unfinished ; but they are delivered from the lips as beautiful coins are issued from the mint, deeply and accurately impressed, neatly struck by the proper organs—distinct, sharp, perfectly finished."

Clear articulation may be taught in two ways—

(*a*) By carefully graduated exercises.
(*b*) By constant supervision of the *reading* and *speaking* of the pupils throughout the whole of the school day. Clear articulation must be made a habit, or the effort of the reading lesson will be wasted in the imperfect articulation of the rest of the day. Special defects should be met by vocal drill in specially prepared exercises.

Pitch, modulation, and pace will also require careful treatment.

4. **CORRECT ACCENT.**—Accent is a superior force of voice, or of articulative effort upon some particular syllable of a word, distinguishing it from the others. Sometimes it means more than this, as when it signifies a peculiar or characteristic modulation or modification of the voice, as when we say a person speaks with a good accent. In poetry it also indicates a slight stress upon a tone to mark its position in the measure. In such cases the accent is regular and constitutes the rhythm.

5. **PHRASING.**—Phrasing is closely associated with accent and indeed arises out of it. In accent we have "a stress or bounding of the voice, followed by a slight pause, which groups in pronunciation those words that are so closely combined in sense as to convey but one notion, and to separate which would be to destroy the sense. It also draws attention to that word on which the notion to be conveyed depends. By means of accent, phrases are read, not as a succession of words, but as a series of notions, which are in this way made distinct. In fact, accent is the expedient by which every distinct notion is separated and distinguished in reading. In some cases, two phrases are so intimately joined in sense as to form but one compound notion ; and at such times two accents are heard, a primary and a secondary—the primary being placed on the word that limits the phrase, or renders it more specific."

6. **EMPHASIS.**—By emphasis is meant the stress of utterance or force of voice given to the words or parts of statements intended to be specially impressed on the listener. It often removes the accent from its natural or customary position to some other word in the sentence. What accent is to the word emphasis is to the sentence, and as it is the sense which regulates the place

of the emphasis, emphasis has been defined as a *sense-accent.* Its chief effect is to indicate a contrast, *e.g.*—

This is the *house* that Jack built—as contrasted with other buildings.
This is the house that *Jack* built—as contrasted with other builders.

It requires good analytic power, and it is this which makes it a mental attribute of reading; for a proper analysis means a clear comprehension of the text. It may be expressed in a variety of ways. The voice may be raised and intensified, or lowered and softened; there may be a sudden change of voice, the use of the pause, or even gesture may be utilised.

Emphasis has been divided into—

(*a*) *Emphasis of Sense.* See examples quoted above.
(*b*) *Emphasis of Feeling.* This is found in impassioned writing, and especially in poetry. It is an attempt to interpret vocally the emotion expressed in a given word or phrase; *e.g.* in the line

"*The ploughman homeward plods his weary way,*"

"plods" and "weary" should be uttered more slowly, whilst there should be a tinge of weariness in voice in reading the latter word.

In the reading of poetry there is often a conflict for the young reader between the verse-accent and the emphasis. The teacher must carefully guard against this; *e.g.*—

Verse-accent. Ben Battle *was* a soldier bold.
Emphasis. Ben Battle$_{\wedge}$ was a soldier bold.

7. **PAUSE.**—In every sentence of any length words fall naturally into groups, and pauses are the slight stops which any good reader instinctively makes between these groups. The pause may or may not be indicated by punctuation—very often it is not. Hence the phrasing, or proper grouping of the words, involves a proper understanding and translation of punctuation, and something more. Words have to be grouped into notions, and the various relations of these groups of words have to be vocally indicated.

"There can be no good reading without frequent and sometimes long pauses. They convey an effort of *spontaneity*, which rivets the attention of the hearer; while unbroken fluency, especially in the reading of complex sentences, will never sustain attention, because it is manifestly accompanied with little or no thought on the part of the reader. Appropriate clausular pausing will lead the reader to *think*, to exercise his judgment as he reads."—(*Bell.*)

Pauses are divided into—

(*a*) *Pauses of Sense.* These are sometimes known as Logical Pauses, and they are used to mark off groups of words, each group expressing a notion, or to call attention to the emphatic word in a sentence; *e.g.*—

This-is-the-way he-does-it.
It-was-*luck* that-made-his-fortune.

(*b*) *Pauses of Feeling.* These depend upon the temperament generally, and the state of feeling of the reader at the moment in particular. They

enable the reader to render vocally the emotion expressed in each group of words, and so catch the sympathies of the audience; *e.g.*—

> These are the arts, Lothario, which shrink acres
> Into brief yards—bring sterling pounds to farthings,
> Credit to infamy; and the poor gull,
> Who might have lived an honoured life,
> To ruin, and an unregarded grave.

On the use of the Pause, Mr. Sheridan Knowles says: "Give the sense of what you read: MIND is the thing. Pauses are essential only where their omission would *obscure the sense.* The reader who, in the act of delivering himself, is studiously solicitous about parcelling out his words, is sure to leave the best part of his work undone. He delivers words, not thoughts. Deliver thoughts and words will take care of themselves. I repeat it—*be in earnest.*"

V. METHODS OF TEACHING READING

The difficulty and importance of Reading as a subject of instruction are shown by the methodised attempts that have been made to improve its teaching. But all these methods can practically be reduced to three, viz.:—

1. The Alphabetic Method.
2. The Phonic Method.
3. The Look-and-Say Method.

1. **THE ALPHABETIC METHOD.**—The best method of teaching Reading depends entirely upon the nature of the language to be taught. Now an Alphabetic Method is a method of teaching Reading by Spelling, hence it would be a good method for teaching Italian, the spelling of which is practically phonetic; or German, which is largely phonetic, because the letters represent the true sound elements in the words. In Italian, from half-a-dozen carefully selected words, it is said that the whole system of spelling may be built up, and that few difficulties would be left. In proof of this, it is further asserted that Italian children learn to read in three months, whilst a German child requires only thirty weeks.

But the system is not suited to English, because our alphabet is both redundant and defective. As a result, in many irregular words the spelling is a hindrance to acquiring the word-sound. Furthermore, the method is tedious and very often produces a dislike for reading. Fortunately, the method is now practically obsolete.

2. **THE LOOK-AND-SAY METHOD.**—This is a method of reading without spelling. Each word is taught as a whole, and its

sound is associated with it as a whole. The learning of the alphabet is no part of the plan, although it gets to be known by the children. Each word becomes the picture-sign of a sound, so that the method associates sound, sign, and idea in a natural way. It is asserted that a child learns to read more quickly by this method than by any other, but the truth of this statement is doubtful. It has one great recommendation—it suits the circumstances of common schools, for it requires less preparation than the Phonic Method.

The teacher takes a reading-sheet containing short sentences composed of small words, points to a word, sounds it, and the class repeats it after him. A sentence is thus read. The class then reads the same sentence simultaneously as the teacher points to the words. Individual reading of the same sentence then follows, and the next sentence is dealt with in a similar way—and so on to the end of the lesson. Letters are learned from words, not words from letters.

3. **THE PHONIC METHOD.**—A purely phonic method of teaching reading is possible only where the number of letters and elementary sounds correspond; but in English the letters are but five-eighths of the elementary sounds. Yet, in our tongue, as in French, elementary sounds are often represented by two or more letters, and such combinations can be reckoned as sound elements. Hence English is best taught by the Phonic Method. French is anomalous, and yet it is asserted that French children learn to read in twelve months as against several years for English children to learn English. The difference is said to be largely one of method.

A. A Brief Plan of a Phonic Method

We are now in a position to sketch a brief plan of a Phonic Method. Children should not learn the alphabet first. The sounds of the letters should be learnt before the names, the short vowels first, then the consonants and double consonants, followed by the long vowels and diphthongs; that is, the first lessons should be phonetic.

1. **THE TEACHING OF THE SHORT VOWELS.**—These should be taught in such an order as to show the position of the tongue in their production. Starting with the front of the mouth and working to the back we get the following order:—

(1) *i, y* (city)
(2) *e* (let)
(3) *a* (cat)
(4) *ŭ* (hut)
(5) *o* (cot)
(6) *u* (bush)

Note that in sounding *i*, *e*, and *a* there is a broad slit between the lips, the *front* part of the tongue being at its highest for *i*, half way for *e*, and slightly raised for *a*. In the production of *ŭ*, *o*, and *u* the *back* part of the tongue is slightly raised for *ŭ*, is half way for *o*, and is at its highest for *u*.

These should be taught by vocal demonstration and imitation. To accustom the ears of the children to the sounds of the vowels the teacher might say *in*, *egg*, *at*, *ŭp*, *ot*, *un* very slowly, and then drop the consonant.

2. **THE TEACHING OF THE CONSONANTS.**—The consonants should be taught through the medium of selected words of regular notation, and these words should be such that they should contain all the short vowels, all the consonants, and such consonant combinations as denote one sound (ch, sh, th, wh, ph). In the reading lessons these words of regular notation might be distinguished in some way—coloured ink, thick type, or italics. The sounds should be taught in the following order:—

(1) **Stops.**—In sounding *p* the breath passes freely through the throat and mouth until it is *stopped* by the lips being pressed together. The sound bursts or *explodes* through the lips. Hence such letters are called stops, *explosives*, or labials. In *point* stops, the breath is stopped earlier than in the explosives by the *point* of the tongue. In *back* stops the stoppage is caused by the middle or *back* of the tongue being pressed against the palate. We thus get the following classification:—

a. Lip stops, explosives, or labials—
p (pat), B (bat).
b. Point stops or dentals—
t (tell), D (dell).
c. Back stops or gutturals—
k (lock), G (gall).

Note.—Small letters (p, t, k, &c.) are voiceless; capitals (B, D, &c.) are voiced (see p. 45).

(2) **Continuants.**—Continuants may be classified as follows:—

a. Pure Labials (lips only used)—
wh (when), WH (where), W (were).
b. Teeth Labials (lips and teeth used)—
f (fill), V (vile).
c. Dentals (point of tongue and teeth used)—
th (thank), TH (than).
d. Sibilant Dentals (point of tongue only used)—
s (sell), sh (sash), c (city), ch (inch), S (hiss), S (rise), Z (zeal).
e. Gutturals—
h (hat).

In continuants the breath is *not* stopped. The sound may be continued as long as the breath lasts. In the pure labials (*a*) the breath rubs against the lips, which just allow it to pass through. In the teeth-labials (*b*) the sounds are made by pressing the lower lip against the upper teeth, the breath then passing through the teeth. In the dentals (*c*) the point of the tongue is placed against the edges of the top teeth, and the breath thus issues between the point of the tongue and the teeth. In those dentals which are

called sibilants (*d*), the *s* sounds are formed just behind the teeth on the gums, the *sh* sounds being produced a little farther back by the point and the blade (part just behind the point) of the tongue; hence these letters are sometimes called blade continuants.

The continuants are the connecting link between the short vowels and the consonants. It is difficult in some cases to say where a sound ceases to be a vowel and begins to be a consonant.

To get the exact sound of a consonant many teachers pronounce a short word ending with it, as *cab* for *b*.

(3) **Double Consonants.**—These cannot be arranged on any rigid plan, but in Dale's Method the following order of teaching is suggested :—

x (tax), X (exact), NK (tank), NG (conquest), NG (finger), ch (chop), tch (hatch), G (logic), DG (ridge), J (jack).

An illustrative lesson now follows, based on Dale's Method of teaching.

3. HOW TO TEACH A "NEW" SOUND.

(1) A new sound should be *taught through the medium of a story*, which should run through the whole lesson. The object of the story is to interest and to introduce words containing the new sound; *e.g.* let the story be of a pet dog. The teacher begins: "*Pat is our pet dog.*" The children are told that the new sound is in each of the words "pat" and "pet."

(2) The word "pat" (or "pet") is repeated by the whole class simultaneously. The children watch the teacher's mouth. They are led to note that the lips are pressed together and then suddenly opened to produce the first sound of the word. The story runs on: "*Pat put his paw on the path*" —introducing other words with the sound of *p*, the class noting and distinguishing the sound in each case. This goes on until sufficient practice for the new sound has been given.

(3) The vocal production of *p* is then further explained. The lips are pressed together and then suddenly opened to let out the breath. The emission of the breath is better noticed if the children are instructed to hold their hands in front of their mouths when uttering the sound. More vocal drill follows in the simultaneous sounding of the *p*, either through the medium of the story or otherwise.

(4) The children next determine whether *p* is voiced or voiceless. It is found to be voiceless.

(5) *Having learned the sound, the class is next taught the symbol*, or picture of the sound; *but no name is yet given to the symbol.* An association is set up between the sound and the symbol, and the symbol is now shown in its simplest form (p) to the class. P is then printed on the B.B.—in coloured chalk if colour is used to show that it is voiceless. The children watch carefully.

(6) Then follows *ambidextrous free-arm drawing in space.* The children draw the symbol in the air, first with the right hand, then with the left, and then with both together.

(7) They then *print the symbol* on their own little B.B.'s* or squared paper, using first the right and then the left hand. If desired, further kindergarten practice may follow. The symbol can be pricked and embroidered, blue cotton or silk being used.

(8) A picture alphabet sheet, or alphabet picture cards, might be shown. The children pick out the one with the symbol *p*, and repeat the word containing it; *e.g. p* for "pig."

(9) Recapitulation and revision should follow through the medium of the story.

* In Dale's Method each child has a B.B. cloth nailed inside the desk.

4. **EARLY LESSONS.**—An early lesson should be based on a word of regular notation; *e.g.* the word "hat."

(1) The word should be introduced by *a conversation lesson* on the object; or failing that, on a picture of the object.

(2) The children should then be taught to *draw* the picture on squared paper—with both hands.

(3) The teacher should then both *print and write* the name of the object on the B.B. The children should copy, the work being ambidextrous again.

hat, h a t.

(4) An *analysis of the sound* should then follow. The child knows the sound of the word as a whole; he now learns the sounds of the parts; *e.g. a*, *a*(*t*), (*h*)*at*. The child sees the letter and makes the sound; the teacher utters the sound, and the child picks out or writes down the letter.

In all these exercises the children should be taught to watch the teacher's lips closely.

5. **THE WORD-BUILDING STAGE.**—Some typical words of regular notation having been learned in the early lessons, new words may be learned by combining the sounds already learned; *e.g.* suppose the words *hat* and *cap* to have been learned;

then **hat** could introduce **pat, rat, mat, sat, bat, cat, fat, vat;**
cap „ „ **gap, lap, map, nap, rap, sap, tap.**

The children should be supplied with loose letters on bits of cardboard, and they should then build up for themselves the words sounded by the teacher. On a suitable word-building frame the teacher could then combine words; *e.g.*—

fat cat, fat rat, nap hat.

The children should watch, name, and sound each letter as it is introduced. They might then build similar combinations from dictation with their cardboard letters.

6. **THE STAGE OF SIMPLE READING LESSONS.**—Having learned some simple words of regular notation and some combinations formed from them, the children should now be ready for several simple reading lessons based on these words. Simple primers should be used, and each lesson should contain a picture—coloured if possible—illustrative of the first sentence. A new feature will now have to be introduced—several little words will have to be learned by the Look-and-Say Method. The exercises should be carefully graded, and these little words of apparently irregular notation might be printed in different type. Subsequently, some of them will lend themselves to treatment as words of regular notation; *e.g.* **he, she, the, me.**

First Exercise.—Look-and-Say words: *I* and *the*.

Picture of child patting a hat.

I pat the hat.
I rap the bat.
I tap the mat.
I rap the rat.

Second Exercise.—Look-and-Say words: *is, on.*

Picture of cat on mat.

The **cat** is on the **mat.**
The **rat** is on the **vat.**
The **sap** is on the **cap.**
The **tap** is on the **map.**

Third Exercise.—Look-and-Say words: *in, has.*

Picture of fat cat sitting on a vat.

The **fat cat sat** on the **vat.**
The **map** is on the **mat.**
I **tap** the **cap** on the **hat.**
A **rat** is on the **bat** in the **gap.**
The **cat** has a **nap** in the **lap.**

Other words of regular notation are taken and treated in a similar way. As the number of such words increases, so do the lessons expand in length and interest. Look-and-Say words are introduced very sparingly. Words of regular notation may still be printed in thick type, and all such words should be read by their sounds. The children should not be told the sounds; so far as possible they should discover them by making the sounds of the individual letters and then combining them.

7. **LONG VOWEL SOUNDS AND DIPHTHONGS.**—The children should learn these after the short vowels and consonants are known. For this purpose another set of words should be carefully selected, and suitable lessons should be built on them; *e.g.*—

ā as illustrated in **ball, saw, gate, rail, dray.**
ī ,, ,, ,, **kite.**
ē ,, ,, ,, **wheel, leaf.**
ō ,, ,, ,, **globe, boat, moon.**

As in the previous cases, the selected words will be taught by drawings, and other words will follow, differing but slightly from those selected. As the selected words contain long vowel sounds, it is not advisable to try to get the children to pronounce the sounds of the long vowels separately. *They should always be taught in syllables.* In each lesson the new selected word might still be printed in thick type* or distinguished in some other way. The selected words should be learned from the B.B. in the first instance.

When one selected word has been mastered, the lesson (or lessons) based on it should be read from Primers before the next selected word is taught. Prior to this, however, other words (than the selected ones) which appear in the lesson (or lessons) should be put upon the B.B., and *read by sounds; i.e.* they should practically be read by the phonic-syllabic method. In their turn these words will become selected words, or members of a selected list.

* Like the Type-Word Method of South Australia (Adelaide Primers).

For instance, suppose the word *kite* to be selected. A list of words containing the long *i* sound is formed and learned from the B.B. ; *e.g.*—

k -ite	w -ide	wh-ile	f-ine	b -ike	p-ipe
b -ite	h -ide	m -ile	n-ine	str-ike	w-ipe
qu-ite	r -ide	sm-ile	l-ine		w-ife
wh-ite	s -ide		t-ime		
dr-ive	in-side	t-ire	n-ice		
h -ive	be-side	f-ire			

These words might be worked up into two or three lessons. The number of *sound-words* required to be learned will depend upon the composition of these lessons and of previous ones. A suitable picture should still be placed at the head of each lesson, which should be in the form of a short story. The following sentences * are typical of the style of composition to be used :—

The day was **fine** with a **nice** wind.
He **likes** to **ride** be-**side** his father.
They had a **fine** long **drive** of **nine** or ten **miles.**

8. **LATER LESSONS.**—In the later lessons, type (or colour) differences should be omitted. At this stage the task is chiefly one of grading. Phonetics and word-naming have hitherto been the chief aim of the teaching. As these difficulties grow less the higher qualities (see p. 44) of audible reading will require attention.

B. The Advantages of the Method

Certain advantages are claimed for a method such as the above. It is based on a scientific and systematic study of sounds. The words used in the early lessons are carefully classified, so that gradual progress is assured. It appeals to the logical sense by the grouping together of similar words. It embodies the childish love of colour, love of movement and love of pictures, and so arouses and maintains interest, and breeds a love for the subject. It educates both eye and ear, cultivates careful habits and a sense of accuracy. It also trains the children to be ambidextrous. Similar movements are made with each hand, and the letters are printed on squared paper with each hand. And finally it co-ordinates, without straining, Reading, Writing, Drawing, and Spelling.

VI. THE MANAGEMENT OF A READING LESSON

(*For a Higher Class*)

The Reading Class should be properly arranged, but the specific management will necessarily depend upon the nature of the rooms and the space at the disposal of the teacher. Where possible a class might stand for Reading. It provides a desirable change of position, and facilitates supervision and attention. In many of our large modern schools the reading lesson has to be given in the

* Adelaide Second Primer.

desks ; but whether standing or sitting the main object should be to see that the position of each child is comfortable and orderly. The teacher's position should allow every child to fall within his range of view.

So far as the lesson itself is concerned, there might be a few minutes' conversation on the subject-matter to whet interest and insure understanding. The new words and difficult words should be written on the B.B. and rapidly learned. There need be no explanation at this stage. Even when given, the amount and quality of the explanation must depend upon the class. But the acquirement of the qualities of good reading (see p. 44) should be kept constantly in view.

As regards points of discipline, in addition to what has already been said, there should be proper arrangements made for the orderly passing and collecting of the books. Each child should have a book. There should be no "looking over." Children should not always read in turn. When inattention is detected or suspected, the offender should immediately be called upon to read.

In writing notes for a reading lesson it will be necessary to take only a portion of the subject-matter to show the method of treatment.

VII. NOTES OF A READING LESSON

1. PREPARATION.

(1) **Language.**—The chapter should be read through and marked—

a. To show the amount to be read by each child.
b. To mark emphasis and accent where necessary.
c. To prepare a list of difficult words for learning.
d. To mark words producing provincialisms.
e. To prepare a list of words likely to be confused.

(2) **Subject-Matter.**

a. Explanations of allusions (if any).
b. Preparation of a few illustrations (if necessary).
c. Ability to give a brief explanation of the whole chapter.

2. **SAMPLE OF SUBJECT-MATTER.**—"Who is this that cometh from the south, thinly clad in a light *transparent garment?* Her breath is hot and *sultry;* she seeks the *refreshment* of the *cool shade;* she seeks the *crystal brook* to bathe her *languid limbs.* The *tanned haymakers* welcome her coming, and the *sheep-shearer* who clips the *fleeces* of his flock with his *sounding shears.*"

3. THE LESSON.

(1) **Individual Reading.**—Weaknesses of Word-naming and Style will be revealed. Teacher corrects, noting difficulties for further and subsequent treatment.

(2) **Pattern Reading.**—Where necessary, given both by teacher and class to improve style. After primary pattern work by the teacher, secondary pattern work may be given by some of the scholars.

(3) **Imitation by Scholars.**—The scholars will then imitate the pattern set them. The form may be varied; *e.g.* it may be—

a. Individual imitation.

b. Sectional imitation. (This arouses emulation.)

c. Class imitation.

(4) **Practice: Simultaneous and Individual.**—Plenty of time should be given to the reading of unpatterned portions. A portion might be read individually and then simultaneously. (The object should be to give as much practice as possible.)

(5) **Emphasis.**—This should be placed on *this*, *hot*, *sultry*, *tanned haymakers* and *sheep-shearer*. Where necessary *accent* must receive attention.

(6) **Difficulties of Language** (in sample).

a. Who is this, &c. Personification of the S. wind. Explain personification. Describe the characteristics of S. wind to the class, and show the appropriate nature of the various descriptions.

b. Clad in bright, &c. Referring to the clear sky which generally accompanies this wind.

c. Other phrases for explanation: *Hot and sultry breath; crystal brook; languid limbs.*

VIII. HOW TO OBTAIN GOOD READING AMONG TEACHERS

The Board of Education says that reading for teachers is a subject of first importance, for the following reasons:—

1. A teacher cannot teach well unless easily understood. Distinctness of utterance implies audibility; an easy and pleasant-sounding speech secures the attention of those whom shouting and stridency distract and tire.

2. Good reading is an exercise in voice-economy, and voice-economy is useful in all degrees. It is always a saving of physical effort; at the least it is a protection against common forms of throat disease to which those who live by talking are prone; and at the best it is an admirable and health-giving gymnastic. It is a most painful fact that many of our teachers suffer from more or less developed and recognisable forms of throat disease which a little exact knowledge and careful practice in the earlier stages might have cured, if not avoided. And experiments have satisfactorily shown that even in cases of advanced deterioration carefully graduated exercises have gone far to mitigate the mischief already done.

3. The best reading is evidence of many good physical and mental qualities which are capable of cultivation, though rarely communicable by mere pattern-giving.

Stages of Teaching

(1) The first step is to see that students recognise the value of (*a*) easy audibility, for the effective teaching of a class, and (*b*) voice-economy, for the preservation of the health and vigour of the teacher.

(2) The instructor next discovers idiosyncrasies and provincialisms, and invites reasonable conformity to the standard of pronunciation and intonation

common amongst people of fair cultivation. No one can pretend to lay down the limits of divergence from this standard permissible in a primary school; it is obvious that in many parts of the country large allowances should be made. But teachers should be invited to range themselves with other liberally educated persons, not merely because they are themselves to be exemplars, but also because provinciality and inaccuracy of accent carry with them certain social disadvantages which lower the average acceptability of teachers.

(3) The third step is to devise exercises in breathing, in the management of the lungs, throat, mouth, and lips, so as to get the maximum work out of them with the minimum of exertion and the most unconstrained use of every available organ. These exercises are, of course, to be carefully graduated, and should be taken at appropriate stages for a short time before every reading lesson.

(4) It is now possible to take every consonant and every vowel separately (see p. 50) and give careful drill in accurate production. If at this point the instructor is competent, as he should be, to compare allied sounds in another language—French is best—the lesson in phonetics is of far greater practical value. But English reading, and, it may be added, English speaking, fail in audibility mostly through want of precision in the consonantal sounds, and particularly because of the carelessness which allows the final consonants to be corrupted by or assimilated to the initial consonants of other words.

(5) The final stage is to put these lessons into combined practice; to cultivate proper pace, which, in the first stages, should always be very slow; to secure intelligent phrasing, not by pedantic rules depending on punctuation (which serves as a guide to the eye as well as to the voice, and is therefore untrustworthy), but according to the limits of a completed idea or image. Indeed, more than one good purpose can be served by the occasional practice of reading an *unpointed* passage, prose or poetry; though in the latter case particular vigilance is needed to make the reader mark, if ever so lightly, the regularity of verse rhythm. If the reader comprehends the relations of the constituent clauses of a sentence, and the relations of the constituent sentences of a paragraph, has a fairly flexible voice properly used, and is encouraged to render the passage in phrases produced distinctly, as it would be naturally spoken when meant to serve as information, the instructor can at this stage do little more.

CHAPTER IV

SPELLING

I. THE DIFFICULTIES OF SPELLING

SPELLING is one of the most trying branches of school education. Children learn to spell correctly with difficulty and forget what they have learned with ease. They spend years in acquiring, and little more than weeks in forgetting. Some never spell correctly at all, and absolutely correct spelling is anything but a general accomplishment even among educated people. The subject is rich in anomalies, and the national waste in acquiring such a system is beyond computation. In company with our cumbrous system of compound rules in Arithmetic, it handicaps our youth heavily in the educational race, and prevents very valuable time being spent in a much more productive manner. In a language so arbitrary as ours, spelling must always be a difficulty, hence the teacher needs to study the best ways and means of teaching the subject.

II. SOME CAUSES OF THESE DIFFICULTIES

a. There has never been a fixed and uniform system of spelling, and to this day there is no authoritative body like the French Academy of Letters to regulate and control spelling. In the early days each scribe spelt as he liked.

b. The English language is a mixture of several dialects, and originally each dialect had its own pronunciation, with its consequent independent scribe-fashioned spelling.

c. Large foreign additions have been and are still being made to our tongue, Latin, Greek, French, and many other tongues being liberal subscribers, and each language brings its own method of spelling.

d. Our anomalous and defective alphabet is the chief source of these difficulties, the chief trouble being with the vowels. It is asserted that there are 104 ways of writing down our vowel sounds ;

e.g. ō has 14, as is seen in such words as b*oa*t, f*o*ld, d*ough*, t*oe*, b*eau*, r*ow*, b*ou*lder, &c. ; ĭ has 12 ; ē has 10 ; ŭ 13; ū 11 ; ā 5 ; and so on.

III. SOME WAYS OF TEACHING SPELLING

a. **By means of the Reading Lesson and Literature generally.**

(1) Spelling is a matter for the *eye.* Reading gives plenty of practice to the eye, and the recurrence of word-pictures (*i.e.* printed or written words) fixes them in the memory through the eye. We appeal to the eye when we write down, in one or more ways, a word the spelling of which we are doubtful. The eye generally recognises the right one.

(2) *Formal spelling* sometimes forms a preliminary or final part to a Reading Lesson. In such cases the *eye*, the *ear*, and the *voice* all unite to fix word impressions.

b. **As Home Work.** — Lists of words are carefully prepared, generally from the school reading-books ; and this method has practically supplanted the use of the old spelling-book. If the *meaning* be given, it brings *intelligence* and *interest* to bear upon the work. The words should be *grouped.* This could be done in several ways, so that *variety* would be introduced — another essential for interest ; *e.g.*—

(1) Easy monosyllables could be arranged according to their vowel sounds. Difficult monosyllables could be treated likewise.

(2) Monosyllables, with silent consonants, could be arranged according to their silent letters.

(3) Dissyllables could be arranged according to the vowel sound of the accented syllable.

(4) Lists of words spelt alike, but differing in pronunciation and meaning, could be given ; *e.g. grease,* melted fat ; *grease,* to smear with grease.

(5) Irregular words could be grouped into—

(*a*) Like combinations and unlike sounds.
(*b*) Like sounds and unlike combinations.

(6) Regular or phonetic words could be grouped into like sounds and like combinations.

As an example, take the words *rough*, *should*, *which*, *many*, *sour*, *had*, *heard.*

Word.	Compared with	Contrasted with
Rough	tough, ruff, puff, &c.	cough, bough, though, hiccough, through
Should	could, would, wood, &c.	boulder, ghoul, soul, &c.
Which	witch, ditch, rich	Greenwich, Woolwich, &c.
Many	any, penny, Jennie	company, manifold, manly
Sour	hour, tower, our, flower	your, honour, soul, pious
Had	bad, plaid, glad	father, soda, water, cane
Heard	gird, bird, surd	heat, head

c. **By Transcription.**—The primary function of Transcription is to teach spelling, and it does this in a natural way—through the

eye. If followed by oral spelling and dictation, the words become permanently fixed.

But the advantages of Transcription as a school exercise are by no means confined to *spelling*. Care and attention can be given to the *writing* also. Furthermore, if the pieces are well chosen, some of the pupils may be gradually leavened with the *style* of the author, although, as a rule, the exercise becomes too mechanical to have much influence of that kind. But *grammar* and *punctuation* are aided by the frequent transcription of correct forms of speech, whilst the *discipline* of the lesson is not unimportant. The lesson engenders *a habit of carefulness*, for it demands minute inspection for accuracy. It also tends to impress the sentiments expressed in the subject-matter; for these, being slowly transcribed, have better opportunities (from their brevity, and from the comparative leisure offered for their comprehension) of fixing themselves in the minds of the scholars.

Certain conditions are essential if the lesson is to be a success.

(1) The *subject-matter* must be understood by the children.
(2) All *errors* must be carefully corrected, and the corrections learned.
(3) The *time* for the lesson will vary. In the lower classes it should follow a reading lesson, in which the subject-matter has been read and explained. In the higher classes it can be fixed with more freedom. Its best use will be as a preparation for dictation.

The *subject-matter* should be chosen carefully. In the early stages the piece will be chosen principally with a view to the maximum advantages in spelling, and with a due regard to the handwriting. Later on the attention can be concentrated on any one or more of the following :—

(1) The difficulties of orthography or derivation.
(2) The difficulties of style.
(3) Difficulties of grammar.

d. **By Dictation.**—This is one of the methods of teaching spelling and composition. *It teaches spelling indirectly and composition directly.* The chief aim of a dictation lesson should be to *prevent*, not to *correct* errors. For this reason it is necessary that it should usually be preceded by some kind of preparation, so that its real office becomes a *testing* rather than a *teaching* one.

The methods of correction will generally depend upon the quantity and quality of the subject-matter and the staff. Long pieces may be a test of physical endurance, or of juvenile hard-headedness; but they can scarcely claim to be safe tests either of knowledge or intelligence, for the strain is too great for some. *It is not the quantity dictated, but the amount corrected, which has educational value.* The amount will grow with the growing power of retaining phrases in the mind.

The words should be dictated once only, otherwise the disciplinary effect of the exercise is wasted. The passage should, however, have previously been read in a clear, deliberate voice,

especially if the piece is a test; but it must never be forgotten that distinct speech is no substitute for preparation.

There are four principal **methods of correction** in use.

(1) *Individual Correction by the Teacher.*—This is the best method, but certain objections are alleged against it.

(*a*) It is too expensive in time to be done *in* school hours.
(*b*) As a rule it is unjust to expect a teacher to do it *out* of school hours.

(2) *Correction by Young Teachers.*—This is a branch of school work which official opinion has allocated to pupil-teachers or student-teachers. It is perhaps as satisfactory a method as any in use.

(3) *Inter-Correction.*—This used to be the most common method, but with improved staff and reduced classes it is fast disappearing. As the method was open to serious objections its decay need not be mourned.

(4) *Self-Correction.*—The children correct their own work either from reading-books, a written copy on the B.B., or from the teacher's dictation. The teacher then rapidly revises the books. This checks the tendency to carelessness or moral weakness shown by some children. The method provides a revision of the lesson with a different mental attitude—the critical and corrective, and it is economical in time. Thus far it is good. But it throws a great strain upon the moral strength of some of the pupils, and the primary object of correction is often defeated—the *throwing up boldly* of all errors. As a rule, there is too much self-tenderness with this method; nevertheless, it is widely used.

The moral side of Correction must not be overlooked. All correction should be done with the greatest care, and in a reasonable period of time. The careless correction of errors produces a whole crop of evils. A habit of *carelessness* is bred in the pupils, who may become untidy in their methods, their lessons, and sometimes in their habits generally. *Laziness* and *indifference* are other possible results, for where a lack of care, and by inference, a lack of interest are shown by the teacher, the infection may spread to the scholars and develop into laziness. It is also *unjust to the pupils.* Each error is like a sign-post, pointing out the direction of the teaching. If these errors are carelessly treated the child is deprived of that attention and training which he has a right to expect, and which it is just as rightly expected the teacher will give him. Obviously it is *wasteful*, for much time, interest, power, and zeal are lost. Speaking generally, *its effect is to make the tone of the school deteriorate. Deceit* is engendered, the pupil being induced to cheat, because there is less probability of detection. The difficulties of school work are increased, because the pupil will cease to respect the teacher, and so discipline and teaching will become harder.

NOTES OF A DICTATION LESSON

I. CLASS ARRANGEMENT.

1. See that the ink-wells have been properly filled.
2. Arrange the class as widely apart as the desk space will allow.
3. Have the dictation-books and pens orderly distributed.

II. CLASS PREPARATION.—If the piece has not been previously prepared (and this is the preferable method) then write the following words on the B.B., and have them learnt :—

Curfew, Tolls, Knell, Lowing, Lea, Ploughman, Weary, Glimmering, Landscape, Drowsy, &c.

Have them spelt *simultaneously;* then *individually.* Then reverse the B.B.

III. DICTATION.—Stand in such a position that every child can see you and you can see every child. Read the passage through slowly and distinctly *once;* then dictate in phrases, samples of which are marked below :—

The curfew tolls | the knell of parting day; |
The lowing herd | winds slowly | o'er the lea; |
The ploughman homeward plods | his weary way, |
And leaves the world | to darkness and to me. |

IV. CORRECTION.—If the method of *Inter-Correction* (see p. 63) be chosen, then—

1. Change books.
2. Spell the passage through distinctly, and have each misspelt word *marked through* in each book, the total number of errors to be put at the end of the exercise.
3. Books to be changed back to their owners.
4. Reverse the B.B. again. Add any words necessary to the list, so as to give a complete list of errors.
5. Have the errors carefully written under the exercise, learned and repeated to the teacher.

V. CONCLUSION.—Dictation-books and pens (if not required again) should be passed to the ends of the desks and put away orderly.

The dictation-books and pens are best distributed by having the required number placed at the end of each row, and then passed upon the sign or command of the teacher.

Dictation-books should be used—not pieces of paper. The book then becomes *a register of progress both in handwriting and spelling.* When filled these books should be preserved, for they allow a collection and classification of all the commonest spelling errors, so that the teacher can make arrangements to meet these recurring errors.

An alternative method of preparation is to have the piece previously written on the B.B. This is a good method, as the teacher cannot successfully anticipate the difficulties of every boy, whilst this plan allows each pupil to run through and select his own difficulties.

In changing the books for correction the method should be varied; sometimes with the boy in front, sometimes with the one behind; to the right, to the left, and so on.

In correcting errors it is best to *mark through* the word. An underlined word allows more chance of alteration and consequent dispute. The correction might also be done from their reading-books, if the piece has been taken from a reading-book. In this case the right number of books should have been previously placed at the end of each row. When the dictation-books have been exchanged, upon a sign from the teacher the reading-books should then be passed and the page announced.

Whilst hearing errors the teacher should be moving quietly about the class, inspecting books, and marking the exercises. If the class is a very large one

several of the best pupils might be called upon to assist. Such distinctions act as a good stimulus to the class.

e. **By Formal Spelling Lessons.**—These are still given in some schools. They are profitable, for they admit of *graded* systematic teaching. Generally, however, they are preliminaries to some other lesson, like Reading or Dictation. The teacher's chief task in such lessons is to make them interesting, and this must be done by classification, suitable explanation, mark-giving or place-taking, and by a bright, sympathetic manner in questioning.

f. **By Composition.**—This affords a good test of spelling, which is generally worse in this lesson than in others. The divided attention demanded by the subject, or the absorbing influence of the subject-matter, probably accounts for this.

g. **By Spelling Contests.**—These were in great fashion once as "Spelling Bees," and although they have dropped out of public favour, there is no reason why they should not be held in the school. They stimulate effort and emulation, and that desire for success which can be obtained only by constant preparation.

h. **WORD-BUILDING.**

(1) **Definition.**—Word-building is a system of teaching by means of a course of progressive lessons leading up from the formation of simple sounds to the composition of words by means of affixes and suffixes.

(2) **Divisions.**—It consists of two distinct divisions.

(*a*) **Syllable Synthesis,** or the building up of a single syllable, by assigning to it that combination of letters which usage has determined to be the conventional representation of its sound. This is the true inductive method of teaching spelling.

(1) *Words of Regular Notation.*—The teaching will have to deal primarily with words of regular spelling, and this synthetic process would lead to correct spelling in the languages of countries, like Italy, which possess comparatively few cases of exceptional spelling.

The method of teaching should be to speak the words before they are written, to give the sound and then the symbol. The object is to connect more firmly the sound with its ordinary combination of letters.

The classes of words proposed to be taught should be plainly set out in progressive order; *i.e.* words that can be taught both through the eye and the ear. In this way, groups of words connected by a common spelling (in each case) of the same sound can be reduced to certain visible and intelligible principles.

(2) *Words of Anomalous Notation.*—Owing to our imperfect alphabet it might almost be said that we virtually possess two separate languages, a spoken language appealing to the ear and a written language appealing to the eye. Then since our system of spelling is not purely phonetic, some arrangement must be made for dealing with anomalous words. For convenience they might be classified into—

(1) Words of similar sounds but dissimilar letter combinations.
(2) Words of similar letter combinations but of dissimilar sounds.

Anomalous words should be written on the B.B. before they are spoken, so that the teacher may be able to disconnect the same combination from its ordinary pronunciation ; *e.g. one* should be disconnected from *l-one*, *b-one*, *st-one*. Since anomalous words can be taught by the eye only, for the purpose of teaching they should be limited to words in common use, and these should eventually be set out in lists.

Such instruction, although included in the teaching, lies right outside the progressive course of lessons on word-building. Such lessons are subordinate to word-building, and are no real test of a good series of word-building lessons.

The *Word-Building lessons in Infant Schools* may be usefully restricted to the simple phonic teaching of the more common of the different sounds represented by the letters of the alphabet. It should be possible in Infant Schools to teach simple combinations which might include, for example, all the simpler closed syllables, while relegating to the schools for older scholars such difficult varieties of sound as are conveyed, for instance, by the three sounds of the combination *ch* in *chin*, *charade*, and *chasm*.

(*b*) **Verbal Synthesis**, or the combination of one or more syllables, of which the root word (*i.e.* a word which cannot be reduced to a simpler form) is composed, with suffixes and affixes, such as the formation of nouns from adjectives, as *heavy*, *heaviness*, thus giving a training in the use of language.

Verbal synthesis is the work of the upper schools, and forms the chief part of word-building. It consists of the combination of root words with suffixes and affixes. These should be progressive in difficulty, rising from such simple forms as the more common terminations of nouns and adjectives, and the suffixes denoting gender, to the formation of adverbs from adjectives or prepositions, or other difficult combinations.

There is no better exercise of the inductive method of reasoning, nor one more intelligible and interesting to young children. The addition, for example, of the suffixes *en*, *er*, *est*, *ly*, *ish*, and *ness* to the word sweet, and the use of words so found in short sentences, will lead the scholars by simple induction from these and other similar words to determine for themselves the exact meaning of each suffix.

Some freedom may be permitted as regards different modes of spelling the same word, as *inflexion* and *inflection*, *by-law* and *bye-law*, *judgment* and *judgement*.

i. **By the General Work of the School.**—Spelling enters into most of the general work of the school. It is a chronic difficulty and requires continuous teaching and practice. Whenever and wherever a spelling error occurs, as a rule, then and there it should be corrected, and a record of these mis-spelt words should be kept and revised. Childish curiosity and activity should also be utilised. Public advertisements, &c., offer plenty of practice to the curious. Such reading is a good aid.

IV. HOW TO TEACH THE RULES OF SPELLING

If the teacher should decide to give formal spelling lessons in school, or to supply lists of words for home-work, he should avail himself of some well-formed rules of spelling. The plan of such lessons would be to *learn each rule inductively*. Plenty of examples should be supplied, and from an examination of these the rule should be discovered and given. Then the lists of words might be committed to memory. Two typical lessons are given; one on the formation of the plural, the other on the doubling of the consonant.

Notes of a Lesson on one Method of Spelling the Plural in certain Nouns.

(1) Write on the B.B.: *lady, boy, baby, toy, alloy, cry, buoy, belfry.*

(2) Arrange the words in columns according to the formation of the plurals.

(*a*)	(*b*)	(*c*)	(*d*)
lady.	ladies.	boy.	boys.
cry.	cries.	alloy.	alloys.
belfry.	belfries.	buoy.	buoys.

(3) The class looks for similarities in spelling in the singular in each case, and notes that—

(*a*) Each word in (*a*) and (*c*) ends in *y*.

(*b*) The plurals in (*b*) are all alike; also the plurals in (*d*) are all alike; but that (*b*) differs from (*d*).

(4) Further similarities are looked for—

(*a*) In (*a*) *y* is always preceded by a consonant.

(*b*) In (*c*) *y* is always preceded by a vowel.

(5) **Rules Deduced.**

(*a*) **Words ending in y after a consonant form their plurals by changing y into ies; as baby, babies.**

(*b*) **But if y is preceded by a vowel they follow the general rule; as toy, toys.**

Other rules of spelling could be dealt with in a similar way; *e.g.* words ending in *e* generally drop the *e* before *able*, but not always. A classification and examination of such words as *blam|able, change|able, mov|able, peace|able*, &c., would lead to the discovery that the *e* is sometimes retained for euphonic reasons—to soften the preceding consonant—but omitted in all other cases. None of these facts should be told. They should always be discovered from the study of selected examples.

Notes of a Lesson on the Doubling of the Consonant.

(1) Write on B.B.: *bar, bear, chat, clown, dim, deem, flit, float, groan, grin, heat, hit, jeer, jar.*

(2) Convert the words into Adjectives or Particles: e.g. *barring, bearing, chatting, clownish, dimming, deeming, flitting, floating, groaning, grinning, heating, hitting, jeering, jarring.* Call attention to the position of the accent by asking selected pupils to read the words.

(3) Classify the words according to that position, noting that in some cases the accent is on the consonant and in others on the vowel.

Consonant Accented.		*Vowel Accented.*	
(*a*)	(*c*)	(*b*)	(*d*)
bar	barring	bear	bearing
chat	chatting	clown	clownish
dim	dimming	deem	deeming
flit	flitting	float	floating
grin	grinning	groan	groaning
hit	hitting	heat	heating
jar	jarring	jeer	jeering

(4) Let the class read down the column (*a*), and note that each word ends in a single accented consonant; down column (*b*), and note that the vowel is long or accented.

(5) Then call attention to the suffix in each case, and have each suffix underlined. Each begins with a vowel.

(6) The class should now note that in column (*c*) the accented consonant is doubled, but not in (*d*).

(7) **Deduce the Rule.**

Words ending in a single accented consonant double the consonant before an English vowel suffix whenever this is necessary to preserve the vowel sound of the accented syllable unaltered.

Or more briefly—

The accent on a single final consonant doubles it.

(8) *Verification of the Rule.* Deduce necessity for Rule. Compare *baring* and *barring*. The first word is—

(*a*) Pronounced differently from the second.
(*b*) A different word from the second.
(*c*) Of different meaning from the second.

Other cases should be given; *e.g.*,

bat	batting	bating	Similar differences appear to those between *baring* and *barring*.
mat	matting	mating	
slop	sloppy	slopy	

The Value of Classification in the Teaching of Spelling.—Much time and labour may be saved by good classifications. The following classification, prepared by Mr. Mitchell, amply demonstrates this fact.

1. *Tendency to* **omit** *letters:* begin*n*ing, wool*l*en, fou*r*th.
2. *Tendency to* **insert** *letters not required:* until(), al()most.
3. *Tendency to mistake* **vowels**: sep*a*rate, p*u*rsue, b*u*siness.
4. *Tendency to mistake* **consonants**: monar*ch*, clo*th*es, *ph*ysic.
5. *Tendency to reverse order* (*ei*, *ie*, *oi*): bel*ie*ve, rec*ei*ve, n*ie*ce.
6. *Silent letters:* i*s*le, *k*nitting, answ*e*r, kil*n*, solem*n*.
7. *Miscellaneous:* currant, current; course, coarse; fatigue; plateau; scythe, colonel, &c.

Faults in the Teaching of Spelling.

(1) The *ear* and the *tongue* are appealed to rather than the *eye*. Both should be used, but there should be *observation* as well as *repetition*. The deaf and dumb generally spell correctly, and this is some evidence as to the value of the eye. Then the *visual or pictorial memory* is stronger in most people than the *verbal*, hence the eye should be used more than the tongue and the ear.

Spelling is essentially a matter for the eye, for, after all, it is nothing more nor less than the mastery of form; but the tongue and the ear can be brought in as aids to strengthen the associative links.

(2) *Lists of disconnected isolated words are given* to be learnt, whereas they should be chosen from lessons done or to be done.

(3) The number of syllables is generally the only basis of *classification*. This is not scientific. The words should be grouped, and plenty of use made of contrast and comparison.

(4) The *meanings* of words should be given, not in set definitions, but in suitable explanation, so that each word may as far as possible become notional to the class. The meanings, when required, are too often overlooked or neglected.

(5) Dictation should always be prepared in the lower classes, so that the right form may be first learned, and then there will be nothing to unlearn. *Teachers are often too anxious to test by dictation before they have prepared by spelling or transcription.*

(6) More use should be made of *composition* exercises. It has already been pointed out that spelling is often worse in composition than in other spelling exercises, and it generally reveals many of the special weaknesses of each pupil. The teacher then knows where to concentrate his work.

(7) There should be lessons in *word-building*. It is a good phonetic and synthetic exercise, and it gives confidence to the children, and so helps to check that demoralisation which often attacks young scholars when they are undergoing repeated shocks of spelling anomalies.

(8) There is often an absence of *incidental aids* like phrase spelling, classified spellings, and spelling bees. All of these have their use and their value, and they should not be neglected.

(9) Spellings are sometimes taught at the *wrong time*, although such times must be very rare. But to obtrude the spelling of a word when the class is deeply interested in some experiment, illustration, or description, is to attempt the right thing at the wrong time.

CHAPTER V

WRITING

I. GENERAL REMARKS

THE practical advantages of Writing are so obvious that no enumeration of them is needed. For the purposes of civilised life, the person who cannot write is more or less dumb.

Writing and Reading are two parts of the same study, hence Writing is an aid to Reading. Both involve the recognition of symbols or characters, whether as letters or words; but Writing makes the extra demand of reproduction by the hand. Writing, like Drawing, is thus a form of Hand and Eye Training. The mechanical act in Writing is joined to the intellectual act in Reading. Thus, if a child is shown a letter, then taught its sound, and afterwards made to write the letter, he will never forget it. "Children forget easily what they have said or what is said to them; but not what they have done or what has been done to them."

Professionally, Writing may be taken to indicate the character of the school and its work. It appeals easily and readily to the parents as an index of the progress of their children; a just pride is bred, which reacts favourably on the school reputation, and consequently upon its attendance.

Without being what is understood as an intellectual subject, Writing nevertheless affords some mental training. Careful *attention* is required for its correct imitation. The young writer is taught to *observe* form and proportion closely, and to note those small details which give quality and style to the Writing. But observation implies *perception*. Writing is an imitative art, and there must be perception before there can be imitation. Imperfect observation means faulty imitation, hence the necessity for training observation by Object Lessons and Kindergarten Exercises. The *memory* is exercised in the earlier stages in remembering form, proportion, spacing, &c., although little memory training, perhaps,

can be claimed for what is purely an imitative exercise. But the art once acquired, Writing then becomes a distinct aid to memory. Furthermore, the *judgment* is cultivated by the study of form, spacing, and proportion, and by that process of analysing letters which the art of Writing involves.

MORAL VALUE.—On the border line between the mental and moral value is the *artistic* gain in the observation and study of form, beauty, and proportion ; and this is what might have been expected, since Writing is correlated with Drawing, and is believed to have been originally the outcome of pictures. Writing also induces *habits of neatness, care, and exactitude;* and it should show in its legibility and style some consideration for other people.

"It should be remembered that there is a moral view, and that the man who writes in such a way as to cause the greatest possible trouble to the person who is expected to decipher it manifests an undesirable amount of inconsiderate disregard for the comfort and convenience of others."—(*Dr. Stewart, H.M.I.*)

Since Writing, then, has a threefold value, *its teaching should begin early.* The older educationists recommended that it should follow Reading, but as a rule it now commences *with* Reading, and where there is any preference in time that preference should be given to Writing.

II. MECHANICAL AIDS TO WRITING

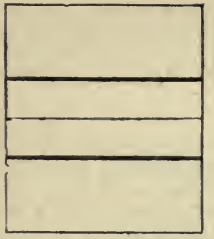
The necessary apparatus and mechanical aids will include:—

1. **DESKS.**—These should be kept free from stains, cuts, &c. The height, slope, dimensions, and general architecture of the desks need not trouble the young teacher at this stage, as these are beyond his control.

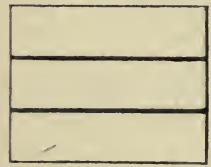
2. **INK.**—Here the young teacher's function will be to train the children to shake their pens into the ink-well, and not on to the desk or floor. The moral effect of the Writing Lessons depends largely upon the formation of proper habits.

3. **PAPER.**—This will include both writing and blotting paper. In the first case, the paper or copy-book must be placed in a hygienic position (see p. 82) ; in the second case, the proper use of the paper should be taught.

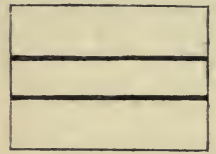
The writing-paper will be ruled, and generally the style of ruling adopted will depend upon the class. The younger the class, up to a certain limit, the more help the pupils require. As a rule, these aids should be removed when the children can form letters correctly, and join and space properly.



For Infants.—As a rule five lines are now used in ruling, and this arrangement allows for both heights and joins. The object is to avoid confusing the children whilst helping them, and this is easily done by a judicious mixture of faint and thick lines. The size of the writing is $\frac{3}{8}$ of an inch, and it is known as **Large Hand.**



For Junior Classes.—(*a*) The lines are now reduced to four, the line for the joins disappearing. The size of the writing is reduced to $\frac{1}{4}$ of an inch, and it is known as **Half-Text Hand.**



(*b*) Four lines are still used, the heights remaining at $\frac{1}{4}$ of an inch, but the ordinary letters are reduced to $\frac{3}{16}$ of an inch. Such ruling is generally described as **Double Small Hand.**

Other Classes.—A further reduction of the size to $\frac{1}{8}$ of an inch is subsequently made, the writing still being known as Double Small Hand, the final transition being to single lines. Recurrence to the double lines may be necessary in special cases for correction, but from the Junior Classes and upwards such mechanical aids should be dropped.

4. **CUPBOARDS OR CABINETS.**—These will be required for storing the copy-books, which should always be packed away neatly. Small cabinets, in which the number of shelves in each case correspond to the number of desks in the class, are conducive to orderly storing and rapidity of distribution.

5. **TRACING.**—Tracing is some aid to the beginner.

a. The muscles are trained.
b. The eye and the judgment are simultaneously cultivated with the muscles.
c. The proportion of the letters is given.
d. The spacing is regulated.
e. The joins and uniformity of thickness are taught.
f. The style of writing is fixed and the class all acquire the same hand.

The chief thing for the teacher to decide is how much tracing can be allowed with the greatest profit. Writing is an imitative art, and is commenced when the imitative faculty is strong in children, and the muscles are plastic. But it is doubtful whether

tracing teaches much in the way of imitation. It is certainly good hand training ; it is not so certain that it is good eye training. The children often trace or mark over the letters mechanically, with little or no thought of form.

All new elements should be traced as they are introduced. The amount of tracing requisite really depends upon the individual capacity of each child. Some such grading as the following should be adopted :—

(*a*) An *element* should be introduced, followed by a copy or two of tracing. The first element will be the straight line.

(*b*) Copies should then follow in which the *tracing is intermitted with independent effort*, the opportunities for the latter gradually becoming more frequent.

(*c*) A copy of *independent effort* should then follow.

(*d*) The *next element* should then be introduced, and the same order should be observed.

(*e*) *Combination exercises* should then be given.

(*f*) This order should be continued until a letter or letters can be made. The tracing should still be graded, but the *quantity should be reduced.*

(*g*) *Tracing should not be practised beyond the letter stage.* When a pupil can make "letters," he should be thrown on his own resources, so far as tracing is concerned.

There are, however, certain **disadvantages** associated with the practice of Tracing. Unless carefully watched and regulated, it may make the children dependent, careless, and lazy. Letters may be commenced anywhere, and so bad habits of writing generated. Then if the teacher uses blank books, or gives tracing assistance in any books, he must be a good writer, or the class will repeat his defects. Again, the printed copies for tracing, with their copperplate perfection, often discourage the scholar, who thinks such excellence unattainable. Hence the teacher must often supply the trace in blacklead, and in large classes this can rarely be done thoroughly

6. **THE POSITION OF THE BODY.**—The physical side of the subject must receive proper attention, so that no habits injurious to health may be formed.

(*a*) The pupil should sit erect. The erect position in writing is the natural and easy one, for it avoids those tendencies to curvature of the spine, obliquity of vision, and indigestion, which are sometimes charged to the leaning or sloping position. There should be no leaning either one way or the other, otherwise the weight of the body will not be evenly distributed on the seat.

(*b*) The copy-book or paper should be parallel with the desk, but placed slightly to the right, so that the handle of the pen should point over the right shoulder. The left hand should be placed on the paper to steady it.

(*c*) The light should come from a point on either side, preferably the *left*, especially for class-rooms.

7. **THE MANAGEMENT OF THE PEN.**—Blacklead pencils should precede the use of pens, for they are both cleaner and easier of manipulation. Besides, the children should have already

learned the use of the pencil in the preliminary drawing-lessons. The pencils should give way to pens at or near the top part of the Infant School.

(*a*) The pen should be held between the first two fingers on the one side, and the thumb on the other.
(*b*) The two fingers and the thumb should all be bent—the thumb most so.
(*c*) The forefinger should rest upon the top of the pen.
(*d*) The hand should rest upon the last two fingers.
(*e*) The pen should be held lightly, and should point towards the shoulder. Both sides should be equally pressed, but not clutched.
(*f*) The pen should not be held too near the nib. The fingers should be about an inch, or a little more, from the end of the nib. If too near, the action is cramped, the writing often stiff, and the work more often dirty.
(*g*) The arm should rest on the desk a little below the elbow.
(*h*) The hand should not be supported by the wrist, or rapidity and quality will suffer.

8. **THE BLACKBOARD.**—(See p. 79.)

III. HOW TO TEACH WRITING

A proper and adequate supply of apparatus is not of itself sufficient to secure good writing. Good writing is a product of many factors, of which the method of teaching adopted is perhaps the largest. Methods may be either Analytic (as in Mulhauser's method), or Synthetic (as in John Locke's), but all modern methods are both Analytic and Synthetic. Details may differ, but the general principles, which are practically the general principles of Mulhauser's method, are the same in all cases.

1. **ANALYSIS.**—The letters should be analysed into their elements by the teacher; *e.g.* they might be resolved into four elements—

(1) The **right line** down and up, as | /. The right line has four different heights, and it is *the first principal element.*

(1) One height, as in *i*.

(2) One and a half heights, as in *t*.

(3) Two heights, as in *h*.

(4) Two and a half heights, as in *p*.

(2) The **curve**, down and up, as ( ). This is *the second principal element*, and it is found in the letters *o*, *c*, and *e*.

(3) The **loop**, down and up, as *j*, *f*. This is *the third principal element*, and it is found in *e*, *y*, *j*, *g*, *f*.

(4) The **crotchet**, as *i*. This is *the fourth principal element*, and it is found in *r*, *b*, *v*, *w*.

In addition to these there are *two connective elements*—

(5) The **link**, which forms the latter part of the letters *i*, *e*, *t*, *m*, *n*, *u*, &c.

(6) The **hook**, which forms the first part of the letters *n*, *m*, *v*, &c. There is also the **bar**, as in the *t*, and the **dot**, as in *i* and *j*.

2. **SYNTHESIS.**—Letters are built up out of these elements, and this is the real process in learning to write. Analysis is thus the teacher's work; synthesis the child's.

3. **CLASSIFICATION.**—The letters are then classified according to their difficulty of combination, and words are built up for practice upon the same principle. The early lessons should be divided into stages—say, ten or twelve—each of which might occupy one or more lessons. These stages might be arranged as follows:—

(1) The *straight line* should be dealt with in all its necessary variety. The lengths differ, but the slope should be uniform.

(2) The *link* should then be introduced and the synthesis begun; *e.g.* *m*, *n*, *i*, *u*, *t*, *f*.

(3) The hook should appear next, and the elements of the previous stages should be synthetically treated. The teaching and practice now admit of such combinations as *in*, *tin*, *pin*; *ill*, *mill*, *hill*, *pill*.

(4) The *curves*, single and double, come next, and introduce the letters *c*, *e*, *o*, *a*, *d*. Further combinations now become possible; *e.g.* *ell*, *nell*; *nat*, *cat*, *pat*, *hat*; *den*, *men*; *doll*, *poll*; and this constitutes the sixth stage, all the elements now being available except the loop and crotchet.

(5) The *loop* is seen in the letters *l*, *h*, *y*, *g*, *f*, *j*. Synthesis now admits of such words as *jug*, *young*, *jam*, &c.

(6) The *crotchet* is a species of curve lying above the half height and being one space broad. It is seen in the letters *r*, *v*, *w*, *b*.

(7) This stage should deal with the exceptional letters *k*, *q*, *s*, *x*, *z*, and the remaining stages should be devoted to progressive synthesis.

4. **THE METHOD OF TEACHING.**—Each lesson should consist of *class instruction* and *practice* until the children can write all the letters. The instruction will provide the memory work for the children, and illustrative work on the part of the teacher. The terminology, heights, spaces, joins, &c., could be

thus memorised during the *instruction*, whilst the *practice* might proceed as follows :—

(*a*) The teacher writes on the B.B. and names each element.
(*b*) The teacher then writes letters and words on the B.B., the elements of which should be dictated by the children.
(*c*) The children might then write elements and letters from the teacher's dictation.

The Heights of the Letters might be as follow :—
One height.—a, c, e, i, m, n, o, r, s, u, v, w, x, (z).
One height and a half.—t.
Two heights.—b, d, h, l, q, k.
Two heights and a half.—g, j, p, y, (z). (Two heights are now very general.)
Three heights.—f.
But obviously the heights, like the spaces, will depend somewhat upon the style of writing adopted.

The Spacing of the Letters.—Whatever space be taken as a unit the following proportions should be observed :—
One space.—i, t, l.
One and a half spaces.—c, e, s.
Two spaces.—u, h, o, k, b, a, d, q, j, g, z, p, f.
Two and a half spaces.—r, x.
Three spaces.—y, w, n, v.
Four spaces.—m.

Speaking generally, whatever method of teaching is adopted, it should conform to several essential principles. For instance, the system should be *well-graded*, beginning with the simplest forms, which would be well within the child's power. If mechanical aids are used they should not be confusing, as is alleged by some against the rhomboids of the Mulhauser System.

The method should also be *scientific ; i.e.* it should proceed from the simple to the complex ; *e.g.* graded elements, graded letters, graded words, graded copies.

It should not be too *technical*, nor should it involve perplexing rules. Mulhauser's System is said to be weak in this respect.

It should produce an easy, legible, and graceful "hand," and roughly speaking, the "hand" should be the same for the whole school.

IV. THE TEACHING OF THE CAPITAL LETTERS

The small letters should be taught first, but whatever method of writing is adopted the capital letters will have to be taught

at some stage of the process. They should be classified according to their similarity of form, and should be taught for writing in the groups thus formed. Any system of ruling by which the forms and proportions of letters are duly shown, and which produces a bold and legible style, may be accounted a good one. But whatever system of ruling is adopted, generally speaking, each capital letter should be twice the height of a small letter, and this is true of all letters except *I, Y, G,* and *Z,* which are one-third higher.

The grouping of the capital letters for teaching purposes will naturally depend upon their method of formation, which varies considerably in some cases. Hence the grouping given here is suggestive rather than dogmatic.

The pupils will have been gradually prepared for the introduction of the capitals through the medium of text hand. But even then the advance is an appreciable one, owing to the size and relative complexity of the letters involved. The *curve of double flexure*, as seen in the *J, T, I, D,* &c., is a new element and an added difficulty, and altogether the work is more difficult both intellectually and mechanically.

Group 1.—*The common element is the down-stroke of the J.* The base of the letters should not be made too small, as they then look top-heavy and inartistic. A common fault is to make the left-hand portion of the *P, B,* and *R* too small. The right-hand loop of the *P* is often too large, whilst the up-curves of the *J* is sometimes written as a down-curve. The *T* is the easiest letter and should be taught first. The others should follow in this order: *F, J, J, I, L, P, B, R.* But it must always be remembered that *a change of formation will mean a change of grouping; e.g.* *V* (*U*) can be classed with Group 2 or Group 5.

Group 2.—The common element is *the down-stroke with the hook head,* as seen in the letters *H, K, V, W, Z.* These letters are difficult and require plenty of practice. In the *W* the down-strokes should be a parallel pair, and similarly the up-strokes should be parallel.

Group 3.—The common element here is *the upward curve,* which forms the first part of each letter, viz. :—*A, M, N.* In the *M* and the *N* the teacher must see that the up-curves are parallel. The neglect of this rule causes some very distorted-looking letters.

Group 4.—The *downward curve* is the common element of this class, which includes the letters *O, E, E, K, G.* These letters will require plenty of practice to give that free sweep of the pen which is so requisite for the proper production of such curves as these.

Group 5.—The *reverse curve* is the common element of this class, which includes the letters *D, V, W, Y, D.* In this group the common curve falls to the right; in Group 4 it goes to the left. It is a down-curve in each letter except *D*, where it is an up-curve. *D* is a difficult letter, and probably will require extra practice.

V. THE RELATIVE VALUES OF COPIES IN WRITING

There is a great difference of opinion among teachers as to the relative value of the differing methods of presenting a copy to a child. Four forms are known, but perhaps three only now are in use—

(1) Individual copy-setting.
(2) Blackboard copy-setting.
(3) Engraved Headlines in Copy-books.
(4) Copy-slips.

1. **INDIVIDUAL COPY-SETTING.**—Blank books are used by some teachers who set their own copies. It is an old method, and, where possible, it is still considered by some to be the best; but it is impracticable in the large classes of modern schools.

The Board of Education has ruled that "no system of copy-book exercises which does not produce a bold and legible style, and in which the forms and proportions of letters are not duly shown, will be accepted as satisfactory."

Most of the copy-books now in use supply good models, which are *well-graded, uniform in style,* and embody *properly formed letters. The same letter, whether capital or small, ought always to be formed in the same way.* The scheme adopted should be definite. Variety, if required, will come of itself in the later stages, or after school days are over.

The length and formation of the copy should be decided by the stage of progress reached. For early lessons several short words are better than one long one; but for later lessons the long and difficult word is good mechanical training, and is neither to be condemned nor despised. Most examiners recognise this fact by setting such words as examination tests in text hand, even if those words are sometimes unfamiliar. The familiarity or unfamiliarity of the word is not the essential point; but whether the word offers facilities for practising difficult letters and junctions combined with more sustained effort.

Some advantages of the method are—

(*a*) It admits of *perfect grading.* The copy can be exactly suited to the child's capacity.

(*b*) It admits of *thorough correction.* Faults can be dealt with individually.

(*c*) It is a *stimulating method.* The pupil is encouraged to do what he has seen done, and done furthermore under the same conditions that he will have to do it.

(*d*) It is an *aid to discipline.* Children appreciate good writing more than excellence in any other subject. The teacher who writes fine copy-heads wins the admiration of the class.

2. **BLACKBOARD COPY-SETTING.**—This is really another form of the previous method, and all that can be said in favour of that method can also be said of this. It lends itself well to class instruction, and for the earlier lessons it is decidedly advantageous. When setting the copy attention should be called to the formation of the letters, their joins, heights, spaces, slope, and proportion.

There are certain objections urged against this system, and the objections are equally applicable whether the copy-heads are written in the books or the copy is set on the B.B.

(1) *B.B. copies are inferior and defective*, and inferior copies produce defective writing. The teacher requires to write a good hand to teach properly from B.B. copies; but many teachers cannot write well, and therefore for many teachers the system is not an efficient one.

(2) *B.B. copies are irregular and varying.* Change of class, or change of teacher, will change not only the style of writing, but the mode or method of instruction also.

(3) *B.B. copies are often ungraded or badly graded.* This weakness is likely to be found in rural and very large schools. It is asserted that it is not possible to obtain properly graded copies from haphazard sentences extemporised for the occasion. The teacher's labours will thus be heavily handicapped and the progress proportionately retarded.

(4) *Individual grading is impossible with B.B. copies*, and this is one of the most serious flaws of the system; 40 to 60 boys, however classified, must require distinct and separate treatment, and they cannot get it from B.B. copies.

(5) *B.B. copies waste time*—the time the teacher takes in setting the copy, the time the quick, the gifted, and the facile lose in going the same pace as the slowest members of the class.

(6) *B.B. copies are more difficult.* It is much easier to *fac-simile* the same size, than to *reduce* and *fac-simile.* It is easier to imitate a copy on paper than a copy on a B.B. often many feet distant from the paper.

(7) *B.B. copies make no provision for short-sighted children*, and this may prove another serious objection.

(8) *Generally*, the use of blank books is an attempt to elevate an art by the removal of its highest and most perfect models, and by the substitution of inferior standards.

3. **ENGRAVED HEADLINES.**—This is the copy-book system, with its printed or engraved copies. It is the system generally in use, and the large classes of our modern primary schools make it almost a necessity. It is an easy plan and it economises the time of the teacher, but nevertheless by some it is not considered a good plan until the child has mastered the ordinary elementary difficulties of writing, and an abuse of this system has been responsible for much bad writing.

A common weakness of the system is the ready way in which it lends itself to abuse. The same error may be repeated all the way down a page. The chief remedy for this is *careful and constant supervision*, but this is difficult with a large class; hence

mechanical means have to be devised. The following have been suggested :—

(1) *The use of an oblong book* opening longwise. The number of lines on a page will then be few.

(2) *The repetition of the copy* once or twice in the ordinary copy-book, which almost invariably opens "short-wise."

(3) *The use of movable headlines* in books, where the copy is printed separately and fastened round a thread. This method is not recommended. At the best, it is but a modified form of the copy-slip system, and for its proper use it would need more supervision than for the ordinary fixed headline. There is also a risk to the moral effect of the writing lesson. The life of a peripatetic copy-head would sometimes be short, and it would often get damaged and dirty on its travels.

(4) *The practice of commencing at the bottom of the page instead of the top.*— The advantage is that it compels the pupil to look at the copy. The objection to this method is that it overlooks the truism that the near is more effective than the remote, and that the first effort is made at the greatest distance from the copy.

(5) A combination of headlines and B.B. copy, in which all write the same copy.

4. **COPY-SLIPS.**—A copy-slip is an engraved headline. Blank copy-books are used and the copy-slips are distributed. The plan was much in vogue a generation ago, but it ought not now to possess anything more than a historic interest. Like the Alphabetic method of teaching English reading, it is now in the museum stage—at least, it is hoped so.

VI. THE CHARACTERISTICS OF GOOD WRITING

The recognised marks of good writing are legibility, beauty, and rapidity.

1. Legibility.—This depends somewhat upon the style of writing; that is, *it depends upon the degree of slope used;* the heights and thickness of the letters; the nature of the curves, spacings, and joins. Legibility, though *aided by the proper joining of letters*, is often spoiled by the unnecessary joining of words. The ideal is that script characters should approximate print; hence there will be *no flourishes*. If the characters of "Old English" or "German Text" be compared with modern script characters, it will be observed that the greater the ornament the greater the illegibility. Modern print recognises this by the rejection of all ornament and the adoption of simple outlines. Again, *legibility is marred by angularity*. The so-called ladies' Italian "hand" was angular and rela-

tively illegible, and as a consequence it has succumbed to better methods. Print characters are curved, and as a result a "hand" that is more or less round is now taught. The question of slope is also important. Print characters are upright, and *upright writing claims to be more legible than sloping.* The slight slope now commonly practised is a concession to pace. Finally, *a definite proportion must be preserved* between the letters as regards height, width, and thickness, for uniformity aids legibility. *Faulty thickness is a fertile source of illegibility.* Mr. Currie enumerates the following classes of errors :—

(1) The lines may be too light for the size of the letter, the result being a *scratchy hand.*
(2) The lines may be too thick for the size of the letter, the result being a *heavy hand.*
(3) There may be a strong and irregular contrast between light and heavy in the same line, the result being a *jerky hand*, the most indistinct of the three.

2. Grace or Beauty.—By grace or symmetry of style is meant that the forms of the letters should be pleasing to the eye. Many of the elements of legibility are also elements of beauty, especially parallelism, finish, and uniformity.

3. Ease and Rapidity.—These are the results mainly of a good style and plenty of practice. The position of the body, the manner of holding the pen, the style of writing adopted, the kind of training the pupil has received in the subject, the absence of flourishes, and personal endowment, are all factors requiring attention. As a rule, the pupil should not be allowed to take the pen off the paper whilst writing a word, or the writing may be neither free nor flowing; nor should the shape of the characters be varied as the pupil advances in age and practice. Again, under no circumstances must legibility be sacrificed to pace, for the test of rapidity is not applicable during the early stages of learning to write, although it affects the later stages, and is a determining factor in the selection of a "style." The requisite conditions are mainly those of legibility and beauty, for—

(1) The round hand is quicker than the angular.
(2) The less sloping than the more sloping.
(3) The simple in outline than the more complicated or ornamental.
(4) The regular and uniform than the irregular and jerking.
(5) The well-joined than the disjointed.—(*H. Grant.*)

The rule for school life should be to *write slowly*. Speed should not be sought; it will come with practice. With a good style of writing it soon presents itself. Besides, speed in itself is not necessarily a good quality of writing. It all depends upon the company it keeps. Speed should be accompanied by *grace, ease, legibility*, and *uniformity*. Speed is then an acquisition. Under any other circumstances it is an affliction to the writer and an infliction to the reader.

VII. THE CHIEF STYLES IN WRITING

Good writing is so dependent upon style that it is incumbent upon the young teacher to know something of the chief styles now in use. These are known as—

1. The Vertical.
2. The Semi-Vertical, Semi-Upright, or Civil Service.
3. The Sloping.

1. The Vertical Style.—The advocates of this system offer the following arguments in support of it:—

a. It is the *most scientific, hygienic, consistent, and comprehensive.*

Three of these claims are debatable, but there is no doubt about the other. The system is undoubtedly hygienic. The body is straight and the shoulders are level. The two arms are placed equally, and as a result there is no twisting of the back, and no risk of curvature of the spine. Obliquity of vision is also guarded against, for the eyes are at equal distances from the writing. And furthermore, the writing, being upright, makes less strain on the eyes, for they are already used to the upright style in printing. It is also claimed for it that it prevents writer's cramp, and *adapts itself equally to both hands.*

b. It is the *most simple and natural.*

This claim must rest upon the fact that the base of the system is the circle, which is the simplest curved figure known.

c. It is the *easiest to teach, learn, and write.*

This claim probably rests upon its hygienic position, its simple base (the circle), and the absence of a slope, which has not only to be learned, but maintained.

d. It is the *most rapid, legible, fluent, and elegant.*

It is claimed to be the most rapid because the strokes, being shorter through the circular base, take less time in the making. Its approximation to printing, so far as direction is concerned, and its rounder base, make it the most legible, whilst the present writer notes that the older pupils admitted to his school, who have been taught this style, are almost invariably elegant writers.

e. It is the *most educative* and the *most carefully graded.*

It is doubtful whether either of these special claims could be maintained against the other two well-known styles.

f. It is *free from all empirical disfigurements.*

This claim is based, and justly so too, upon the simple nature of its capital letters and its short loops due to its circular base.

g. It secures the *greatest freedom in junction.*

h. It presents *a minimum of shading in the down strokes.*

This claim also depends upon its short loops and its circular base.

2. The Semi-Vertical Style.—This is a form of what is generally described as the Civil Service Style.

(*a*) The advocates of this system claim that *the natural movement of the hand is undoubtedly oblique ;* that to make a series of upright strokes rapidly and continuously, while at the same time endeavouring to space those strokes equally, will be found both more difficult and more fatiguing than when a similar series of oblique strokes is made (but the value of such a test undoubtedly depends upon the system under which the experimenter has been trained); that in the upright style there is an alarming tendency to looped *d*'s and *t*'s; that it is not only easier of acquirement than the vertical style, but more speedy in execution; that while yielding little or nothing to the sloping style in speed, it excels that system in legibility; and that generally, in grace and beauty, it yields to none.

(*b*) It is a compromise between the vertical and the sloping, and so avoids the tendency to "backhand," which is alleged against the vertical style. The slope varies from 10° to 15°. "It is the *most popular*, keeping a medium course between straight and angular, and is probably *the best adapted for laying the foundation of a clear, easy hand*, to be modified in after life by occupation and individuality."—(*Dr. Smith, H.M.I.*)

(*c*) Two of its characteristics are *the shortening of the long lines* and *the continuous join.* The joins are made nearer to the tops of the letters, but the junctions are neither artificial nor abrupt. Each word is written without lifting the pen, and these facts *facilitate a current hand.* How to write a line without stoppages or breaks is a problem that is not solved merely by making the writing continuous. Continuity is essential, but everything should not be subordinated to it, or the result would be a number of sprawling curves which simply disfigure the writing. The spacing between words and letters must be open and free, but not exaggerated. Each letter must be simply and neatly formed. The quality of the headline must be bold and natural, and such as can be exactly imitated in ordinary writing. These are further characteristics of this style, and none of them militate against a good current hand. On the contrary, the style "combines uniformity with legibility and speed, and brings a bad writer up to a passable level with comparatively little trouble."—(*Dr. Ogilvie, H.M.I.*)

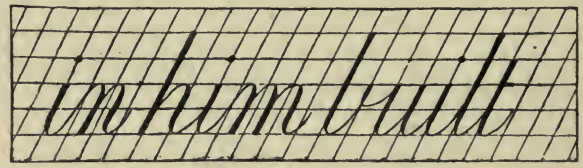
(*d*) In this style there is *a downward parallelism only.* Some of the upstrokes are parallel, but not all. This is one of the chief secrets of the distinctive legibility of this style, and with other things it contributes to that *grace, beauty,* and *finish* which are claimed for it. The general appearance of the writing is firm, forcible, and elegant, the style being perfectly free from fantastic forms or flourishes.

(*e*) It produces sufficient uniformity to allow of *class-teaching* without destroying the individuality of the pupil.

(*f*) It is *hygienic*, both as regards the position of the pupil and the holding of the pen.

3. The Sloping Style.—Mulhauser's system is the type of this class. Mulhauser belonged to Geneva, and he prepared his system of writing at the request of the French Government. It was introduced into this country in 1840.

Any sloping method requires more mechanical aids perhaps than either of the other systems. This is exemplified in Mulhauser's system by the liberal use of rhomboids, which were furnished as a standard, by which the pupil could determine for himself the height, the breadth, the inclination, and the points of combination of the letters. The rhomboids thus become a great aid for preserving the parallelism of slope, and they offer some aid in spacing, as well as securing uniformity



and proportion. But the variation of rules for the spacing of different combinations of letters is very perplexing to young pupils, and the whole method generally is too technical for speedy progress. Its beauty and rapidity are indisputable, but in the later stages there is a strong tendency for the "current hand" to sacrifice legibility to rapidity. Nevertheless, the system has stood the test of experience, and proved itself a good one, and up to the present no better system, on the whole, has yet arisen to take its place.

VIII. THE CHIEF ERRORS IN WRITING

No style of writing will be free from errors, and most of these have been pointed out by the Board of Education itself. The most common are given, and methods of dealing with them are suggested.

(1) *Want of Uniformity in the Thickness of the Straight Lines.*—There should be demonstration on the B.B. and explanation of rules of formation, followed by pattern-writing in the books of the offenders against uniformity of thickness (see p. 79).

(2) *Roughness of Stroke.*—This is generally due to uneven pressure on the two sides of the nib of the pen. It may also arise from a too heavy hand. The child should be made to hold the pen properly, and to write with a lighter

hand. Practice in the "right line" of different heights and in the formation of "pothooks" might be aided by explanation, and pattern-writing in the offender's copy-book.

(3) *Letters too Tall or too Short.*—The size of the letters should be given and committed to memory. The relative sizes of the letters should be demonstrated on the B.B., which should be ruled to match the ruling of the copy-books. The error should be placed side by side on the B.B. with the corrected copy, so as to make use of comparison and contrast.

(4) *Links and Hooks too Thick or too Fine.*—These elements should be analysed on the B.B. Comparison and contrast should be followed by pattern-writing, and the child should be practised in these elements until he has obtained sufficient muscular control of the hand to strike the happy medium between a heavy and light hand.

(5) *Curves wrongly Formed.*—The position of the body should be corrected (if necessary), and the pen should be held properly. The curves are often badly made through physical faults. They are also often wrongly formed through bad teaching, no teaching, bad supervision, absence of correction, and an abuse of rhomboids.

(6) *Letters not properly Formed.*—The same remarks are equally true here. Both faults have the same origin, and require the same treatment. The incorrect and the correct should be pointed out on the B.B., side by side; the letters should be analysed and slowly formed in the presence of the class. Plenty of practice should then be given, supported by close supervision and careful correction.

(7) *Unsuitable Slope.*—This will embrace "backhand," and the writing which is an abuse of Mulhauser's system. Mechanical aids should be used, copy-books being ruled to suit the slope desired. The slope will depend upon the style of writing adopted. For Mulhauser's style the rhomboids can be used. In all cases plenty of practice should be given, accompanied by necessary supervision and correction.

(8) *Too Small and Indistinct.*—Practice in text-hand, round-hand, and a large small-hand should be given. The indistinctness will be partly the result of the small writing and the bad formation of letters. The remedy will be regulated by the stage of the disease. It may be necessary to practise elements as well as letters individually, then words for the spacing, heights and joins, and then copies set in a large small-hand.

IX. PLAN OF A WRITING LESSON

(1) *Preparation.*—The class should be properly seated, the materials orderly distributed, and the B.B. rightly placed.

(2) *Observation.*—The teacher writes on the B.B. the element or letter which the children have to imitate.

The observation must be real; *i.e.* the child must understand what he sees. Hence formation should be explained.

(3) *Imitation.*—Class copies element or letter, the teacher noting the position of each child and the method of holding the pen or pencil.

(4) *Examination and Demonstration.*—Every paper must be examined and all errors noted. These should be corrected on the B.B. The incorrect forms should be contrasted with the correct forms, and the inaccuracies pointed out in each case. Many of the errors will probably fall into groups, and demonstration will thus be shortened.

(5) *Class Correction.*—The children should then form the element or letter again, correcting the errors of the first attempt. Further examination will follow, and further demonstration if necessary. Each element or letter should be treated in this way.

Experience may enable the teacher to anticipate the chief classes of errors so that they may be dealt with before the writing begins; but the wisdom of this is debatable.

(*a*) Anticipation may err. Absent errors may be explained; present ones overlooked.

(*b*) Teaching should never be negative where it can be positive. "How not to do a thing" is not a sound method for the first step in a lesson.

(*c*) The process is apt to be confusing. The memory is taxed to remember many fine shades of difference in form. These differences are best dealt with as they arise.

(6) *Practice.*—The class should then be allowed to write the whole copy several times, the teacher supervising and correcting where necessary.

(7) *Conclusion.*—If marks are awarded the books should be shown and examined at the end of the lesson for that purpose. The material should then be collected and put away in an orderly manner.

X. SOME ESSENTIALS FOR SUCCESS

No scheme of writing will be successful that does not make full allowance for the following points:—

1. *The Work must be Constantly Supervised and Corrected.*—In small classes every line should be examined before the next is attempted; but in the large classes of the modern elementary school this is hardly possible. Hence some other means should be devised. But in every school the *method* of writing should always be thoroughly supervised by the Head Teacher.

2. *Thorough Demonstration must be Given.*—For this purpose all the class should write the same copy, and for young scholars the copy-book practice should be preceded by B.B. demonstration. If the demonstration has been thorough, the crop of writing errors will be shortened, and this will aid efficient correction.

3. *The Lesson should never be too Long.*—The necessary muscular control and plasticity are not readily acquired by young pupils, hence writing lessons should rarely last more than half-an-hour. Otherwise, muscular fatigue and waning interest set in, and the writing then shows signs of deterioration.

4. *The Teacher should be a Good Penman.*—Few teachers can teach writing well unless they are good writers themselves, both on the B.B. and on paper. "The capacity of teaching handwriting is an essential qualification of any teacher; but a teacher who is a bad writer can never, by the most skilful teaching, entirely destroy the bad effects of his own example."

5. *Physical and Material Aids must be Proper and Suitable* (see p. 71).

6. *The Style of Writing for each Department of a School should be Uniform.*—For this purpose each class teacher should be supplied with the same written instructions, giving full details of the system. Such an arrangement would prevent a waste of energy in both teachers and scholars, and would secure good writing in a minimum of time. Some good authorities go so far as to recommend a

uniform system of writing for a town, or even for the whole country, and considering the migratory nature of a portion of the population, there is much to be said in favour of such a recommendation.

It should be remembered that the Copy-book is not the best test for a system or "hand" in writing. Dictation is a better test, and Composition is still better. It is in the Composition exercise that the faults of the system will be revealed, because the mind is then concentrated on the subject-matter rather than the writing itself. The Board of Education has stated that "the best writing is characterised by the fact that the dictation exercise bears out the style and character of the copy-setting."

CHAPTER VI

ARITHMETIC

ARITHMETIC is both a science and an art. It is a science because it investigates the properties of numbers and establishes general principles based on those investigations. It is an art insomuch as it deals with various methods of using numbers.

In our schools Arithmetic should be taught both as an art and as a science: as an art on account of its practical utility, and as a science on account of its value as a means of mental training.

In the past, Arithmetic was too frequently taught solely from the point of view of making the children "good at figures." Now, while it is hoped mechanical accuracy is not sacrificed, increasing attention is given to the valuable means which Arithmetic affords of developing the reasoning powers, of concentrating the attention, of inculcating habits of accuracy, of instilling a love of truth, and of fostering self-reliance.

Formerly the child was taught addition first, then subtraction, afterwards multiplication, and lastly division, but now "many experienced teachers believe that true progression in Arithmetic is not to be found in advancing from addition and subtraction to multiplication and division with the large numbers often given in sums, but by graduated exercises beginning with small numbers and exhausting all their combinations."

"Such teachers will take, for example, the number 20, and after helping the scholars to count cubes and other objects, will dissect the number, find out in how many ways it is made up, learn its fractions and aliquot parts, apply

it to money, length, hours, and minutes, and perform all the arithmetical processes, both orally and in writing, which can be dealt with within that limit, higher numbers being reserved for a later stage."

Under this scheme, attention is for a long period directed to small numbers, and the children, by direct observation of concrete instances, learn to elaborate rules for themselves. The only danger is that perhaps too much attention may be given to *principles* and not enough to *practice*, and the fact that arithmetic is an art as well as a science may be overlooked.

THE IMPORTANCE OF CONCRETE ARITHMETIC IN THE EARLY STAGES

A child has first (*a*) concrete ideas: as brother, sister; next (*b*) composite ideas, as *two* brothers, *three* sisters; and lastly (*c*) abstract ideas, as *two*, *three*.

All arithmetical operations in the early stages should be concrete; *i.e.* should deal with actual objects.

There is much loose talk about concrete arithmetic in our schools. Often such a sum as the following is taken as an example in concrete arithmetic: "In an orchard there are 183 trees and there are 73 apples on each tree; how many apples are there altogether?" It would be well to confine the term concrete arithmetic to examples which the child works with actual objects, or at any rate to examples containing easy numbers which the child can visualise or which are within his comprehension and daily experience.

Objects that can be Used in Teaching Concrete Arithmetic

1. *The Ball Frame or Abacus.*—This consists of a wooden frame across which are 10 wires, and on each wire are 10 variously coloured balls. Manipulation of numbers to 100 is thus possible. One half of the Abacus should consist of a small blackboard upon which figures may be written and which may serve as a screen for the balls not required in any calculation.

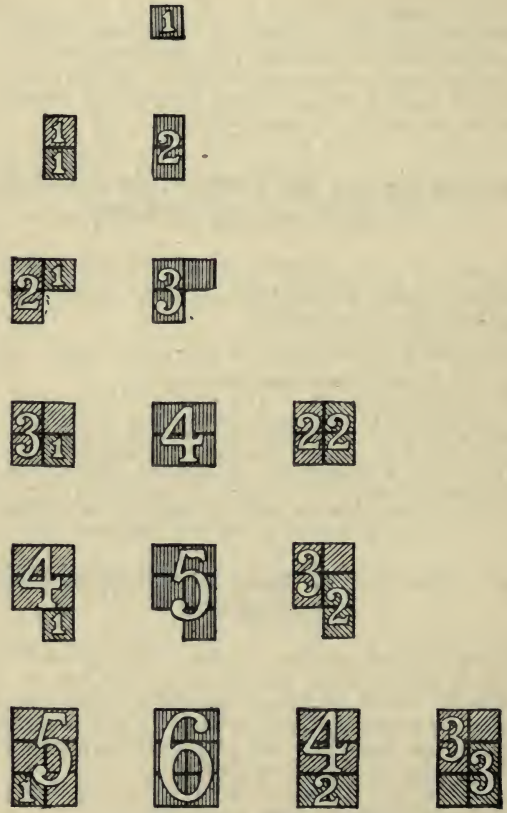
There should be a large Abacus for the teacher and a smaller one (without the blackboard) for each child.

2. *Number Pictures.*—The distinctive feature of this device is that each number is represented in the concrete by a definite shape. Numbers up to 20 may be taught by means of these pictures,*

* "Hand and Eye Arithmetic for Infants and the Vivid Concrete and Abstract Sheets for Number Laying." (Blackie & Sons, London.)

a few of which (printed in colours in the originals) are given below.

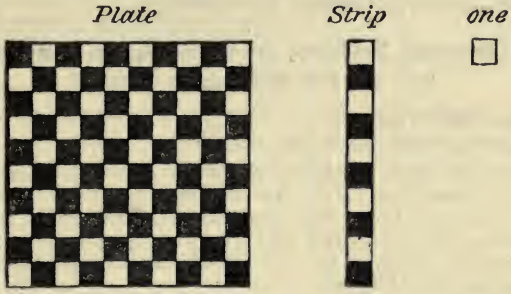
Among the advantages claimed for these Number Pictures are :—
(1) They are printed in three bright colours and are thus attractive to the children.



(2) A distinct mental picture is formed of each number and of its sign.
(3) The relative value of each number is shown by the coloured spaces it occupies.
(4) The equality of the components of the number to the number itself is at once seen.

3. *Number Plates.*—The small square represents a *unit,* the strip (containing ten squares) a *ten,* and the plate (containing one hundred squares) a *hundred.*

Ten "plates," twenty "strips," and some forty or fifty squares are needed, and then this mechanical device can be usefully employed in teaching numbers as far as 1000.



4. *Miscellaneous Apparatus,* of which there is an abundant choice for the skilful teacher. Kindergarten cubes, pieces of cardboard, sticks (matches with the "heads" cut off answer the purpose well), buttons, cardboard coins, metal tokens, marbles (open to objection, however, because they are apt to roll off the desks), are among the many devices that will suggest themselves.

Other mechanical devices will be mentioned as necessity arises in this chapter.

Danger of the too Prolonged Use of Concrete Objects

The use of concrete examples is but a means to an end—the mastery of the science and art of arithmetic. Now in all departments of human thought and action there is always a tendency to "mistake means for ends," *i.e.* to pay so much attention to "means" that the "end" is often lost sight of, and the too prolonged use of objects in the teaching of arithmetic affords a striking illustration of this failing.

After the child has mastered the more elementary processes in Arithmetic, the continued use of objects is rather a hindrance than a help. Wise teachers will therefore at a suitable stage *gradually* withdraw the objects used in counting.

The children have hitherto been accustomed to see and to

touch the objects counted. The teacher may now cease distributing objects for the children to count, but he may still allow the children to count large objects placed in some conspicuous position in the class-room. Next, these objects should be withdrawn, and the children permitted to count strokes, circles, or crosses *placed upon the B.B.* Lastly, these aids should be discontinued, for the children should by this time be able to perform simple arithmetical processes automatically.

Two Common Devices in Counting which should not be Permitted in School

1. Counting on fingers.
2. Making strokes on slates or paper.

Our decimal system is based on human anatomy. Man learned to count in tens because he has ten fingers. On the assumption that the child in his development passes through the ancestral experience of the race, there seems at first sight much to be said for permitting children to gain acquaintance with numbers by counting upon their fingers.

But as we have seen, the too long continued use of objects is rather a hindrance than a help in the child's progress in Arithmetic. Hence any objects which assist the child in the early stages should be of such a nature as to allow of easy removal at a subsequent period. The fingers do not fall under this category, for they are necessarily always with the children. In moments of anxiety and excitement they are likely to be called into requisition, and loss of speed and dexterity will certainly result. Similarly, because strokes on slates or paper are so easily available, their use should never be countenanced in the school.

The Teaching of Arithmetic in the Early Stages may be divided into the following sections :—

I. The numbers 1 to 9.
II. The numbers 10 and 11.
III. The numbers 12 to 19.
IV. The numbers 20, 30, 40, 50, &c.
V. The numbers from 21 to 99.
VI. The numbers 100 and above.

The great object of the teacher in these early lessons should be :—

1. In the first place, to associate the number-name with the object or objects—thus the number *one* should be associated with one *stick*, *two* with two *sticks*.

2. In the second place, to accumulate instances, so that the child after constant references to five *sticks*, five *balls*, five *pictures*, &c., gradually begins to *abstract* the number *five* from the associated things.

The number and variety of the instances will do much to lighten the tedium of this stage.

3. Lastly, to get the child to perform simple exercises in the four rules and thus lay the foundation for ease and accuracy in the manipulation of higher numbers.

I. The following lesson is given as illustrative of the earliest stage :—

Outlines of a Lesson on the Number 6

Apparatus.—*For the Teacher.* — Vivid arithmetic sheets for Number Laying, tablets corresponding to numbers on sheets, B.B., &c.

For Children.—6 tablets for each child.

1. Revision of Previous Lessons.

Have *five* of the tablets counted by children. Ask a few questions involving a knowledge of the manipulation of numbers up to and including 5, *e.g.*—

(*a*) If you have two tablets in one hand and one in the other, how many have you altogether?

(*b*) If 4 tablets are red and one is blue, how many more red tablets are there than blue ones?

(*c*) You have 5 oranges and you give 2 to a girl and 2 to a boy, how many have you for yourself? &c. &c.

2. Introduction of the Number 6.

Count out the 6 tablets; let the children imitate; draw attention to the number sheet; write symbol 6 on B.B.

3. Manipulation of the Number 6.

To teach (*a*)

$$\left.\begin{aligned} 5+1&=6\\ 6-1&=5\\ 6-5&=1 \end{aligned}\right\}$$

The children have counted out five tablets *and* 1 *more* which made 6 (see 1 and 2 above).

Let them now count out 6 tablets and take 1 away; then 6 tablets and take 5 away.

Constant and frequent reference should be made to the number sheet.

In a similar manner proceed to teach—

(*b*)

$$\left.\begin{aligned} 4+2&=6\\ 2+2+2&=6\\ 6-4&=2\\ 6-2&=4 \end{aligned}\right\}$$

and (*c*) $3+3=6$
half of $6=3$
twice $3=6$
three times $2=6$

These results should not be obtained by abstract arithmetic, but in every case by direct manipulation of the tablets.

4. **Introduction of Easy Exercises based on the foregoing,** *e.g.*—

(1) A boy has 4 marbles and wins 2 more. How many has he altogether?

(2) There are 3 desks and 2 children in each desk. How many children are there?

(3) If a cake weighs 6 lbs. and I give half of it away, how many lbs. have I left? and so on.

These examples should be worked—

(*a*) With actual or representative objects.
(*b*) By reference to the number sheets.
(*c*) By mental arithmetic.
(*d*) On the blackboard.
(*e*) If deemed advisable, by the children on their slates.

5. **Revision of the Lesson,** directing attention more especially to the backward and inattentive children in the class.

Note that in this lesson and in the lesson on the number 12, exercises are given in all the four simple rules.

II. The Numbers 10 and 11.

1. To Teach the Number 10.

The children, in imitation of the teacher, pick up their ten sticks, one at a time, and count them. Vary the instances by having other things counted. Write the symbol (10) on the blackboard. Do not analyse it at this stage, but treat it as *one* symbol. Let the children count out other objects and copy the symbol (10) on their slates or paper.

2. To Teach the Number 11.

Let each child take up a *bundle* containing *ten single sticks*. Then *one* bundle is equal to *ten* single sticks.

Take one bundle in one hand and a single stick in the other. Let the children imitate. Give the new name—*eleven*. Vary the instances, employing cubes, dots, the ball frame, as well as the bundle and the single stick. Make a large figure 1 to represent one bundle, and beside it place a smaller one to represent the single stick. Illustrate with number sheets. Lastly, write them the same size as shown below—

Bundle *Stick* *Ten* *One*

III. The Numbers 12 to 19. An illustrative lesson is given.

Outlines of a Lesson on the Number 12

Apparatus.—(*a*) *For Children.*—Twelve sticks and a piece of string ; paper or slate ; pencil *for each child.*

(*b*) *For Teacher.*—Blackboard, &c. ; twelve larger sticks and string.

Previous Knowledge of Class.—Ability to perform simple manipulation of numbers up to and including 11.

1. Numeration and Notation.

Have twelve sticks counted. Divide them into two "sets," one containing *ten* sticks, the other *two.* Have the *ten* sticks tied up into one bundle.

Write on blackboard—

Bundles.	Sticks.	or	Tens.	Units.
1	2		1	2

Contrast with the notation of 11.

2. Manipulation of the Number 12 with Use of Actual Objects.

a. Have the bundle of ten sticks untied, and the twelve sticks once more counted.

b. Have the sticks divided into—

(i.) Two sets of six each.
(ii.) Three sets of four each.
(iii.) Four sets of three each.
(iv.) Six sets of two each.

c. Get class to find by use of actual objects what twice six, three times four, four times three, and six times two are. Compare and contrast with the operations above.

d. From 2. *b*, still using the sticks, get children to perform such simple exercises as—

$6+4$; $4+3$; $6+4+2$; $12-6$; $12-4-4$; half of 12; half of 6.

3. Exercises in Mental Arithmetic with Use of Concrete Examples.

Give a number of examples in Mental Arithmetic, of which the following may be regarded as types:—

(*a*) Divide 12 marbles equally among 6 boys, 4 boys, 3 boys.
(*b*) If two (or three) boys have 4d. each, how much will they have altogether?
(*c*) There are 5 pints of milk in a large can which can hold 12 pints. How many more pints of milk can I add before the can is full?
(*d*) There are 12 pence in a shilling. How many pence are there in half a shilling, a quarter of a shilling?

4. Exercises Worked on Blackboard.

Some of those that have been worked mentally should be taken.

[The efforts of some Teachers to make their work "concrete" at this stage lead to some fallacious results. Such a statement as—

Boys 6) 12 marbles
2 marbles

is ridiculous, for 6 boys are not contained in 12 marbles, 2 marbles times.]

5. Exercises Worked by Class on Slates or Paper.

Similar to those already worked on blackboard.

IV. The Numbers 20, 30, 40, 50.

These should be taught in a similar way to the number 10, and the class should be made familiar with the use of the cypher.

V. The Numbers from 21 to 99.

The process is practically the same, and there should be no real difficulty in dealing with them. Abundant exercises should be given on the four rules, and on the decomposition of numbers; thus 25 should be readily decomposed into 2 tens and 5 units, or 1 ten and 15 units, or 25 units.

It will be necessary to distinguish between :
thir*teen* (13) and thir*ty* (30)
four*teen* (14) and for*ty* (40), &c.
and this can best be done by decomposition of the numbers concerned.

VI. The Numbers 100 and above.

Ten bundles of sticks may be taken and tied up into one large bundle, or the number plates (p. 91) may be usefully employed.
The following nomenclature may be employed at this stage :—

	B(ig) B(undle)	B(undle)	O(ne)
	1	2	5
or	P(late)	S(trip)	O(ne)
	1	2	5
or	H(undreds)	T(ens)	U(nits)
	1	2	5

In teaching the higher numbers, the following mechanical device will be found useful :—

Millions.			Thousands.			Units.		
H.	T.	U.	H.	T.	U.	H.	T.	U.

THE CYPHER.—If numerous exercises have been given in the decomposition of numbers, this difficulty will be easily overcome. Thus 709 is analysed into 7 hundreds, 0 tens, and 9 units, &c.

When the children can manipulate numbers up to 20, it will be time to commence more systematic instruction in the four rules.

ADDITION

The early formal lessons which should consist of the addition of units might be divided into the following stages :—

1. Concrete addition, *i.e.* addition performed with actual objects.

2. Method of representing addition sums demonstrated on the B.B. The sign + should be taught.

3. Sums copied from B.B. by children in order that they may become acquainted with the conventional form.

4. Sums dictated by the teacher and worked by the children.

It should not be forgotten that addition should become an automatic process, and so the use of actual objects should not be unduly prolonged. (See p. 91.) Many mechanical devices calculated to ensure rapidity and accuracy may be legitimately employed :—

(*a*) The children may be required to count up to 100 by 2's, 3's, 4's, 5's, &c.

(*b*) They should be taught in their additions to "work through the tens." Thus 7 + 8 may be solved thus : 7 and 3 more make 10 ; 10 and 5 more (8 − 3) make 15. Or 7 + 8 may be dealt with thus : 7 + 7 = 14 ; 14 + 1 = 15. To add 14 and 9, they should be taught as follows : 14 + 10 = 24 and one less (10 − 9) = 23.

The teaching of the rest of addition may be facilitated by division into the following well-defined stages :—

I. Addition of Tens and Units—

(*a*) Without "carrying."
(*b*) With "carrying" from the units.
(*c*) With "carrying" from the tens and units.

II. Addition of Hundreds.

III. Addition of Thousands.

"Carrying" in Addition.—This is the only real difficulty in the teaching of addition, and it is easily solved if the children have had good practice in the decomposition of numbers.

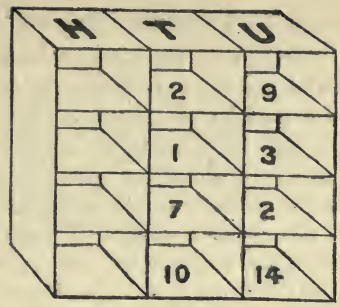
H.	T.	U.
	2	9
	3	2
	6	5
	1	
1	2	6

The sum of the units column is 16. But 16 cannot appear in the units column, hence decompose 16 into 1 ten and 6 units. Place the 6 units in their proper place—the units column—as part of the sum-total, and put the 1 ten in *its* proper place, viz. the tens column, ready to be reckoned with the other addends.

The sum of the tens column is 12 tens. Resolve into 1 hundred and 2 tens. Place the 2 tens in the tens column and the 1 hundred in the hundreds column.

Thus "carrying" is taught as an application of the principle of decomposition, and the old and meaningless formula : "Put down the right-hand figure and 'carry' the left," is not mentioned.

The Numerical Box is an ingenious device for teaching "Carrying," but it is really hardly necessary if the children have been well grounded in the principle of Decomposition.



SUBTRACTION

I. PREPARATORY EXERCISES

1. Recapitulation of work already done in the manipulation of numbers from 1 to 20.

Problems requiring **subtraction for their solution** admit of a great variety of methods of expression, *e.g.* take the statement: "Tom is 6 and John is 8 years of age;" we may ask—

(*a*) How much **older** is John than Tom?
(*b*) What is the **difference** in their ages?
(*c*) How many years is Tom younger than John?
(*d*) How many years must be added to Tom's age in order to get John's age?
(*e*) From John's age in years take Tom's age.
(*f*) How many years will remain if the age of the younger is taken from that of the older? &c. &c.

As much variety as possible should be introduced into the questioning. A dull, stereotyped plan of questioning dulls interest and gives little scope for the cultivation of the reasoning powers.

2. More formal exercises in which the digits of the subtrahend are less than those of the minuend; *e.g.*—

28	37	46	
13	15	24	&c.

The subtraction sign − should now be taught.

II. FURTHER STAGES IN TEACHING SUBTRACTION.

1. With "borrowing" in the units; *e.g.* 33 − 19.
2. With "borrowing" in the tens; *e.g.* 123 − 81.
3. With "borrowing" in the tens and units; *e.g.* 135 − 78.
4. More difficult examples.

Methods of Teaching Subtraction

The particular method to be adopted in the teaching of Subtraction should have been decided long before this stage is reached. If the method of Decomposition has been previously decided upon, then the class should have had, for several months previous, abundant exercises in the decomposition of numbers. If the method of Equal Additions is to be the plan, then the class, by means of numerous examples, should have thoroughly grasped the principle that the difference between two unequal quantities is unaltered if equal quantities are added to each.

I. Method of Decomposition

Numerous easy exercises (such as $33 - 17$) should be first given; but in order to illustrate the principle somewhat more fully, a slightly more advanced exercise will be taken.

Example.—$757 - 289$.

6 14 17	9 cannot be taken from 7. Decompose 57 into 4 tens and 17 units. 9 units from 17 units leave 8 units.
7 5 7	
2 8 9	
4 6 8	8 tens cannot be taken from 4 tens. Decompose 7 hundreds and 4 tens into 6 hundreds and 14 tens. 8 tens from 14 tens leave 6 tens. 2 hundreds from 6 hundreds leave 4 hundreds.

Or we may write thus—

$$757 = 700 + 50 + 7 = 600 + 140 + 17$$
$$289 = 200 + 80 + 9 = 200 + 80 + 9$$
$$468 = 400 + 60 + 8$$

Note that the minuend only is decomposed.

II. Method of Equal Additions

This method, as has been already noted, depends on the following truth:—*The difference between two unequal quantities is unaltered if equal quantities are added to each;* thus—

8	10 (8+2)	18 (8+10)	28 (8+20)
6	8 (6+2)	16 (6+10)	26 (6+20)
2	2	2	2

To illustrate the working of the method, we will take the same sum as that given in the method of Decomposition.

$7^{1}5^{1}7$
$2_{1}8_{1}9$
$4\ 6\ 8$

9 cannot be taken from 7. Add 10 *as ten units* to the 7 of the minuend, and 10 *as 1 ten* to the 8 tens of the subtrahend. 9 units from 17 units leave 8 units. 9 tens cannot be taken from 5 tens. Add 100 *as 10 tens* to the minuend, and *as 1 hundred* to the subtrahend. 9 tens from 15 tens leave 6 tens. 3 hundreds from 7 hundreds leave 4 hundreds.

Or the method may be represented thus—

$$757 = 700 + 50 + 7 = 700 + 150 + 17 \text{ (110 added)}$$
$$289 = 200 + 80 + 9 = 300 + 90 + 9 \text{ (110 added)}$$
$$468 = 400 + 60 + 8$$

The terms top-line and bottom-line would of course be used in teaching and not the terms minuend and subtrahend, as given above.

The "Method of Borrowing and Paying Back" is a perverted form of the method of equal additions. The 10 "borrowed" from the tens column is really 10 *added* to the minuend, and the 1 "paid back" to the tens column in the subtrahend is really 1 ten *added* to the subtrahend.

There is a third legitimate method of teaching Subtraction, viz. the Method of **Complementary Additions.** Many claim that it has considerable advantages over any other method insomuch as it reduces subtraction to addition.

III. Method of Complementary Additions

This method can be taught without the introduction of the term Complementary.

"The difference between a number and a unit of the next higher order of that number is called the complement of that number."

Thus 3 is the complement of 7 because $10 - 7 = 3$.
" 28 " " " 72 " $100 - 72 = 28$.

In working Subtraction by the method of Complementary Additions, the minuend is regarded as the result, and the object is to find a complementary number which, when added to the subtrahend, will equal the minuend.

A purchaser goes into a shop, buys an article worth 9d., and presents a shilling. If the shopman in giving the change counts thus: "ten pence, eleven pence, one shilling," he is performing subtraction by the method of complementary additions.

The work in this method (like that in the other methods) may be divided into two well-defined stages—

1. *Cases in which each digit in the minuend is greater than the digit below it.*

987	3 and 4	(put down)	are	7
123	2 and 6	„	„	8
864	1 and 8	„	„	9

2. *Cases in which some digits in the subtrahend are greater than the corresponding digits in the minuend.*

It is advisable first to work a two-lined Addition sum, and then compare it with a Subtraction sum.

187	334
147	147
334	187

Point out that the whole answer, 334, is the sum of the two addends, 187 and 147, but that each digit in the answer does not represent the sum of the digits above. The sum of 7 and 7 is 14, not 4.

Likewise in the Subtraction sum, if 334 is the sum of 147 and something else, the 4, which is less than 7, cannot be the sum of 7 and something else, *but only the units digit* of the sum, the whole sum being the next number above 7 which ends in 4; *i.e.* 14.

Method of Working.—7 and 7 (put down) are 14; carry 1. 4 and 1 are 5; 5 and 8 (put down) are 13; carry 1. 1 and 1 are 2; 2 and 1 (put down) are 3.

The two Chief Methods compared.

Decomposition.	*Equal Additions.*
(1) It involves no new principle, and is merely a case of the decomposition of numbers.	(1) It involves a new principle—that if equal quantities be added to two numbers, their difference remains unaltered.
(2) Though easier in principle, it is harder in practice, particularly when cyphers occur in the minuend.	(2) Though more difficult in principle, it is much easier in practice, and in consequence is the method more generally favoured.

MULTIPLICATION TABLES

Before giving details concerning the methods of teaching Multiplication, it is necessary to examine the question of teaching the Multiplication Tables, but it would be well to remark that the consideration of the Multiplication Tables is put before Multiplication for convenience of exposition only. It

must not be inferred that all Multiplication Tables are to be mastered before Multiplication is attempted. It is a golden rule of teaching that as soon as a principle is acquired, that principle should be applied, and the truths of the Multiplication Tables as soon as they are learned should be applied to Multiplication.

If the child has been well taught the manipulation of numbers up to 20, he will know at any rate the following parts of the Multiplication Table.

"Twice Times" as far as $2 \times 10 = 20$.	*Three Times* as far as $3 \times 6 = 18$.	*Four Times* as far as $4 \times 5 = 20$.
Five Times as far as $5 \times 4 = 20$.	*Six Times* as far as $6 \times 3 = 18$.	*Seven Times* as far as $7 \times 2 = 14$.
Eight Times as far as $8 \times 2 = 16$.	*Nine Times* as far as $9 \times 2 = 18$.	*Ten Times* as far as $10 \times 2 = 20$.

The Building up of the Tables

The old method was to write the Table on the B.B., and insist upon its repetition *ad nauseam* until the Table was known.

The new method comprises three distinct stages—

1. The building up of the Table.
2. The learning of the Table, "bit by bit."
3. The application of any part of the Table as soon as it has been learned.

Thus a series of **Lessons on Three Times** would comprise the following :—

1. Recapitulation of the part (as far as $3 \times 6 = 18$) already learned.
2. Building up of the new part.

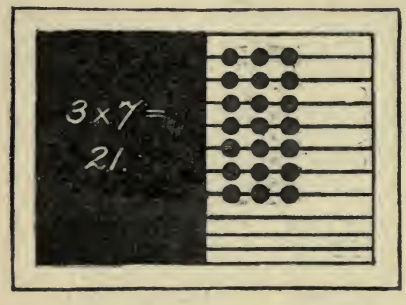
(*a*) The children count out 3 sticks at a time, and put each set of 3 by itself until 7 sets have been counted—

III III III III III III III

They then count the number of sticks, and find that there are 21.

The teacher counts out 7 groups of 3 each on the Ball frame.

He also counts out 7 groups (each containing 3) of cardboard coins, &c. &c. The object is to vary the instances, to introduce variety, and to impress the fact that seven threes are twenty-one.



$3 \times 8 = 24$ should be taught in a similar way.

Show also that $7 \times 3 = 21$ and $8 \times 3 = 24$.

3. The two new products are learned, and the whole Table from $3 \times 1 = 3$ to $3 \times 8 = 24$, is repeated collectively and individually.

4. Mental Arithmetic is next given ; *e.g.*—

(*a*) There are 3 pockets in a coat. How many pockets are there in 3 such coats?
(*b*) How many days are there in a week? How many in 2 weeks, 3 weeks?
(*c*) Show a yard measure marked in feet. How many feet will there be in 4, 7, 8 such measures?

5. Additional Exercises should be worked—

(*a*) By the teacher on the B.B.
(*b*) By the children in their books.

The Easy Tables should be dealt with first. They are 2, 3, 4, 5, 10, and 11 times.

The children should be taught to count in 2's, 3's, &c. The results should be compared with the products in the Multiplication Tables, and the connection between Addition and Multiplication thereby established.

The More Difficult Tables include 6, 7, 8, 9, and 12 times.

Six Times will be taken as a type.

Seven-twelfths of the Table are already known ; *e.g.*—

$6 \times 1 = 6$	is the same as	$1 \times 6 = 6$
$6 \times 2 = 12$	,,	$2 \times 6 = 12$
$6 \times 3 = 18$	,,	$3 \times 6 = 18$
$6 \times 4 = 24$	,,	$4 \times 6 = 24$
$6 \times 5 = 30$	,,	$5 \times 6 = 30$
$6 \times 10 = 60$	,,	$10 \times 6 = 60$
$6 \times 11 = 66$	,,	$11 \times 6 = 66$

Now divide the remaining products into two classes—

(1) $6 \times 6 = 36$
$6 \times 8 = 48$
$6 \times 12 = 72$

(2) $6 \times 7 = 42$
$6 \times 9 = 54$

In the first class, point to the typed coincidences. A square 6 inches in the side may be drawn, and the lines drawn through the inch markings to illustrate $6 \times 6 = 36$. Repetition is the best method for the acquirement of class 2.

The whole table should then be constructed by the children and copied in a transcription lesson.

MULTIPLICATION

I. Recapitulation.—(*a*) Multiplication of units by units.
(*b*) Multiplication shown to be a shortened form of Addition.
(*c*) The sign ×.

II. Multiplication of tens and units by units.

(*a*) *No "carrying" involved; e.g.* 24 × 2; 13 × 3, &c.
(*b*) *"Carrying" involved; e.g.* 25 × 2; 14 × 3, &c.

"Carrying" in Multiplication is taught in the same way as carrying in Addition, *i.e.* as an application of the principle of Decomposition.

T.	U.
1	3
1	4
5	2

3 × 4 = 12. Resolve 12 into 1 ten and 2 units. Place the 2 units in their proper place, the units column, and place the 1 ten in its proper place, the tens column, but as an addend to be considered at the next stage—1 × 4 = 4; 4 + 1 (the addend referred to above) = 5.

III. Multiplication by 10, 20, 30, &c.

(*a*) Work several simple sums on B.B., using 10 as a multiplier.
(*b*) Compare products and the "top lines," and thus deduce rule —to multiply by 10, repeat the "top line" and add a cypher at the right-hand end of the line for the answer.
(*c*) Since 20 is twice 10, infer that to multiply by 20, we should multiply by 2 and add a cypher to the answer.
(*d*) Similarly for 30, 40, &c.

IV. Multiplication by two digits.

Example, 27 × 23.

(*a*) Decompose 23 into 20 + 3.
(*b*) Find 3 times 27, and then 20 times 27

27 × 3	= 81
27 × 20	= 540
27 × 23	= 621

(*c*) Next show the usual method.

27		
23		
81	= 3 times	27
540	= 20 „	
621	= 23 „	

V. Multiplication by three or more digits.

Example, 384×283.

This should proceed on the same lines as above.

$$\begin{array}{r} 384 \\ 283 \\ \hline 1{,}152 = 3 \text{ times} \\ 30{,}720 = 80 \text{ „} \\ 76{,}800 = 200 \text{ „} \\ \hline 108{,}673 = 283 \text{ „} \end{array} \Big\} 384$$

The cyphers should be inserted for some time, and should be omitted only when the children understand the *reason* of the common *rule of thumb*—"place the first figure of the line under the figure by which you are multiplying."

DIVISION

There are really two kinds of Division :—

1. *Quotition*, in which the number of times one quantity is contained in another is sought; *e.g.* How many times is 6 contained in 24?

2. *Partition*, in which a number is separated into a certain number of equal parts; *e.g.* If a piece of string 20 inches long be divided into 5 equal parts, what is the length of each part?

It would be well to bear both sides of Division in mind in teaching the subject. Division by partition is easier for the child to grasp, because it lends itself better to concrete arithmetic.

I. Division without a Remainder

1. REVISION EXERCISES.

The child should have learned :—

(*a*) That Division is a shortened method of Subtraction.

(*b*) That Division is the reverse of Multiplication.

Useful "drill" may be given here as follows :—

$6 \times 3 = 18$; $18 \div 3 = 6$; $18 \div 6 = 3$.

2. The Conventional Method of expression should now be introduced.

$6 \div 2 = 3$ $\qquad$ $2 \overline{)6}$ $\quad 3$

II. Division with Remainder

Perhaps at no stage in elementary arithmetic does the pupil encounter more difficulty than at this one. The infrequent

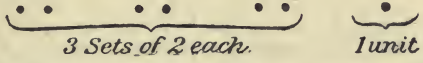
use of concrete arithmetic and the faulty methods of expressing results would seem to be responsible for much of the difficulty.

Taught on the still too-usual plan, the pupil learns that 2 into 7 goes 3 and 1 over, and is told to express the result thus—

$$2 \mid \underline{7}$$
$$\underline{\underline{3+1}}$$

He is not taught to see that there is an essential difference between the 3 and the 1. Indeed why should he see any difference? He has been taught that the sign + adds quantities together, and if he thinks at all, he will come to the conclusion that $3+1=4$, and therefore that 2 "goes into" 7, 4 times.

It is necessary to show that the 3 stands for 3 groups of 2 each, and that the 1 stands for 1 unit. This can be done only by the previous use of actual objects.



A *large* number of exercises should be given in separating numbers of objects into groups of equal size (Division by Partition, see p. 106), so that the child clearly distinguishes between the number of groups and the number of units too small to make a group.

$$2 \mid \underline{7}$$
$$\underline{\underline{\text{3 sets and 1 over.}}}$$

The remainder should be expressed as above, or preferably as a fraction—

$$2 \mid \underline{7}$$
$$\underline{\underline{3\tfrac{1}{2}}}$$

The sign + should not be used, for, as we have seen, the expression $2 \mid \underline{7} \over 3+1$ is not permissible.

THE EXERCISES SHOULD BE GRADED AS FOLLOW:—

(*a*) *Division of a digit by a digit; e.g.* $5 \div 2$; $7 \div 3$, &c.
All these exercises should first be worked concretely.

(*b*) *Division of two digits by one digit—*

1. Cases in which the divisor is contained in the dividend a *unit* number of times; *e.g.* $17 \div 2$; $24 \div 7$.

2. Cases in which the divisor is contained in the dividend ten or more times.

(i) With no "carrying" from the tens ; *e.g.* $25 \div 2$; $7 \div 4$.
(ii) With "carrying" from the tens ; *e.g.* $35 \div 2$; $97 \div 4$.
(*c*) *Division of more than two digits by one digit ; e.g.*
$364 \div 3$; $489 \div 4$; $499 \div 4$; $667 \div 5$.
(*d*) *Division of two or more digits by* 10, 11, 12.
(*e*) *Division of two or more digits by numbers greater than* 12.

Since the Multiplication Table is not generally learned beyond 12 times, Long Division now becomes necessary.

LONG DIVISION

Perhaps the best way of approaching this admittedly difficult exercise is to work a few Short Division exercises by Long Division ; *e.g.*—

$$6 \mid 287$$
$$47\tfrac{5}{6}$$

$$\begin{array}{r|l} 6 & 287 \\ \hline 240 & 40 \\ 47 & 7 \\ 42 & 47 \\ \hline 5 & \end{array}$$

After one or two examples the noughts may be omitted.

Instead of placing the quotient in its conventional place, put it above the dividend and contrast with Short Division, in which it is placed below.

$$\begin{array}{r} 1095 \\ 43 \overline{)47123} \\ 43 \\ \hline 412 \\ 387 \\ \hline 253 \\ 215 \\ \hline 38 \end{array}$$

43 divides into 47 thousands 1 thousand times. The digit 1 is accordingly put in the thousands place, &c.

The real difficulty of Long Division consists in divining the right digit to put into the quotient, especially if the second digit of the divisor is a high one. It is easier for a child to divide by 91 than to divide by 19 : hence it is necessary to graduate carefully exercises in Long Division.

Division by two digits falls easily into the following stages :—

1. By divisor in which the second digit is 0, 1, 2, 3, 4, or 5 ; *e.g.*—
   $47123 \div 12$, 23, 34, 45, &c.
2. By divisor in which the second digit is 6 or 7 ; *e.g.*—
   $47123 \div 16$, 27, 36, 47, &c.
3. By divisor in which the second digit is 8 or 9 ; *e.g.*—
   $47123 \div 18$, 19, 28, 39, &c.

To obtain the trial divisor in cases 2 and 3, where the second

digit is over 5, the children should be taught to disregard the units digit and to add 1 to the tens' digit : thus 47123÷18 should be *for purposes of the trial divisor* treated as 47123÷20.

DIVISION BY FACTORS, besides being a device necessary in exercises in Weights and Measures, furnishes a valuable means of training children to appreciate the meaning of Division.

The first examples should be worked by concrete objects ; consequently small numbers are desirable.

Example.—Divide 17 by 6, using factors.

(*a*) Ask for the factors of 6—3 and 2 ; consequently 17 has to be divided first by 3.

(*b*) Have 17 objects counted out in sets of 3. There are 5 sets and 2 objects over.

(*c*) Represent on B.B. thus—

3 | 17

5 sets of 3 and 2 things over.

(*d*) But the 5 sets have to be divided by 2, *i.e.* each set is to be paired with another set.

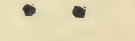
(*e*) Put string round the paired sets, or make a drawing on the B.B., as shown in the diagram.

(*f*) Further represent on B.B. thus—

3 | 17

2 | 5 sets of 3 and 2 things over

2 sets of 6 and 1 set of 3 over.



(*g*) Count *from the objects* and from the sketch on the B.B. the number over, which is in this case 5. Note that it is made up of one set of 3 and 2 units over.

(*h*) Take other examples ; *e.g.* 28÷12 by factors, &c., and after several exercises infer that *the true remainder can always be obtained by multiplying the last remainder by the first divisor and adding in the first remainder.*

THE COMPOUND RULES

Meaning of the Term.—The simple or ordinary system of notation has one base—10. In "Money Sums" we have 4, 12, and 20 as bases ; in Avoirdupois Weight, 16, 28, 4, 20. In sums dealing with these and other weights and measures there is a *combination* of bases—hence the term *Compound Rules.*

Money

I. PRELIMINARY EXERCISES.

1. *Concrete Examples.*—The children should be provided with cardboard coins, and numerous exercises should be given on the following points:—

(*a*) Recognition at sight of the common coins.

(*b*) Exercises in the relative values of the coins; *e.g.* number of farthings that should be given in exchange for a penny, pence for a shilling, shillings for a pound; the number of sixpences in a shilling, in two shillings, in half-a-crown, &c. &c.

By numerous examples impress upon children that in all these changes the *value* of the money is not altered, but what is altered is the *number of coins* in which that value is expressed.

2. *Construction of the "Money Table."*—This will now be an easy matter. The table should be committed to memory.

To facilitate speed and accuracy the children should be exercised in counting in *fours*, *twelves*, and *twenties*.

II. MORE FORMAL EXERCISES.

Reduction.—It is advisable to teach Reduction *before* dealing with the four rules, because this branch of the work follows naturally from the preliminary exercises, and also because the chief difficulty of the Compound Rules lies in the question of Reduction. Ascending and Descending Reduction should be taught concurrently, and the work may be conveniently divided into the following stages:—

(*a*) Pence and farthings.
(*b*) Shillings, pence and farthings.
(*c*) Pounds, shillings, pence and farthings.

Addition.—This rule should be dealt with as follows:—

(*a*) Addition of pence.
(*b*) Addition of pence and farthings.
(*c*) Addition of shillings, pence and farthings.
(*d*) Addition of pounds, shillings, pence and farthings.

Comparison and contrast with the Simple Rules should be employed, and by carefully framed examples the class may be led to discover the method of work. The previous lessons in Reduction will be found of considerable assistance:—

	10	10
H.	T.	U.
4	2	6
3	4	7
5	6	2
13	3	5

	20	12
£	s.	d.
4	9	6
3	4	7
5	9	4
13	3	5

Subtraction should be taught in the following stages :—

(*a*) Exercises not involving changing ("borrowing"); *e.g.* 15s. $9\frac{1}{2}$d. − 12s. $6\frac{1}{2}$d.

(*b*) Exercises involving "changing" in the pence only, in the shillings only, in the pounds only.

(*c*) Exercises involving two or more "changings."

As much space was given to the consideration of Subtraction under the Simple Rules, two illustrative examples merely will be given here :—

METHOD OF DECOMPOSITION

£	s. (20)	d. (12)
8	13	3 4
~~9~~	~~14~~	~~4 1~~
4	16	$8\frac{3}{4}$
4	17	$7\frac{1}{2}$

$\frac{3}{4}$d. cannot be taken from $\frac{1}{4}$d.; decompose 4d. into 3d. and 4 farthings; $\frac{3}{4}$d. from $\frac{1}{4}$d. = $\frac{1}{2}$d.
8d. cannot be taken from 3d.; decompose 14s. into 13s. and 12d.; 12d. + 3d. = 15d.; 15d. − 8d. = 7d., and so on.

METHOD OF EQUAL ADDITIONS

£	s. (20)	d. (12) (4)
9	14	4 $\frac{1}{4}$
4_1	16_1	8_1 $\frac{3}{4}$
4	17	$7\frac{1}{2}$

$\frac{3}{4}$d. cannot be taken from $\frac{1}{4}$d.; add 1d. as 4 farthings to the minuend, and 1d. as 1d. to the subtrahend; $\frac{1}{4}$d. − $\frac{3}{4}$d. = $\frac{1}{2}$d.
8d. + 1d. = 9d.; 9d. cannot be taken from 4d.; add 1s. as 12d. to the minuend and as 1s. to the subtrahend, and so on.

Multiplication

1. By one digit.—Compare with Simple Multiplication in the same way as Compound Addition has been compared with Simple Addition. There is no new difficulty here.

2. By two or more digits.—The methods that can be employed are—

(*a*) *Decomposition of the multiplier; e.g.* in £13 2s. 6½d. × 63, the 63 can be decomposed into 60 + 3.

£	s.	d.	× 3			
			10			
131	5	5	=10 times			
		6				
787	12	6	=60	„	£13	2 6½
39	7	7½	= 3	„		
£827	0	1½	=63	„	£13	2 6½

(*b*) *Factors.* 63 can be factorised into 9 × 7.

£	s.	d.			
			9		
118	2	10½	= 9 times		
			7		
£827	0	1½	=63	„	£13 2 6½.

(*c*) *Separate multiplication of each quantity.*

£13 2s. 6½d. × 63 = (£13 × 63) + (2s. × 63) + (6d. × 63) + (½d. × 63).

(*d*) *Special methods; e.g.* in multiplication by 99, we can multiply by 100, and then subtract once the sum multiplied.

(*e*) *Practice* (see p. 131).

Remarks on the Methods.

1. The Method of Decomposition being applicable to all cases should be taught first.
2. The Method of Factors and the Special Methods should be encouraged whenever the use of these methods leads to more expeditious results.
3. Eventually all methods should be taught.

The mental training is better, mental resource is encouraged, and rule of thumb work discouraged.

Division.—Compound Division is merely simple division and reduction, and if these two rules have been thoroughly mastered, this stage should present no difficulty.

It will be of assistance to the pupils' subsequent progress to direct attention to the following points :—

$\frac{20}{5}=4$, or $\frac{\text{Abstract Number}}{\text{Abstract Number}}=\text{Abstract Number.}$

$\frac{20\text{d.}}{5}=4\text{d.}$, or $\frac{\text{Concrete Quantity}}{\text{Abstract Number}}=\text{Concrete Quantity.}$

$\frac{20\text{d.}}{5\text{d.}}=4$, or $\frac{\text{Concrete Quantity}}{\text{Concrete Quantity}}=\text{Abstract Number.}$

$\frac{20}{5\text{d.}}$ gives no result, or $\frac{\text{Abstract Number}}{\text{Concrete Quantity}}$ gives no result.

WEIGHTS AND MEASURES

The use of *actual* weights and measures is a *sine quâ non* of successful teaching.

AVOIRDUPOIS WEIGHT.—Scales and Weights are absolutely necessary. Begin with the pound. Each child should be provided with a bag of sand weighing a *pound* and a smaller bag an *ounce* in weight. Let the children raise each in their hands (*i.e.* appeal to their muscular sense); let them weigh other objects in their hands, and estimate whether they are more or less than a pound (or an ounce) in weight. Thus the *pound* and the *ounce* will become something real and tangible to the children.

Put 1 lb. in one scale pan and 16 ounce bags in the other scale pan, and thus demonstrate that 16 ozs. = 1 lb. Similarly, 28 lbs. may be shown to be a quarter (of a cwt.).

LONG MEASURE.—See the First Lesson on Long Measure, p. 114.

A yard divided into feet may be measured on the class-room wall. Teach that 22 yards make 1 chain, and thus avoid, in the early stages at any rate, the difficulty of $5\frac{1}{2}$ yards = 1 pole. Have a chain measured in the playground. Boys will recognise it as the length of a cricket pitch.

Name places a *furlong* and a *mile* distant from the school.

Estimate other distances by the time required to walk there.

MEASURE OF CAPACITY.—Pint, quart, gallon, and peck measures are easily obtainable, and water or sand can be used to demonstrate the relationship existing between the various denominations.

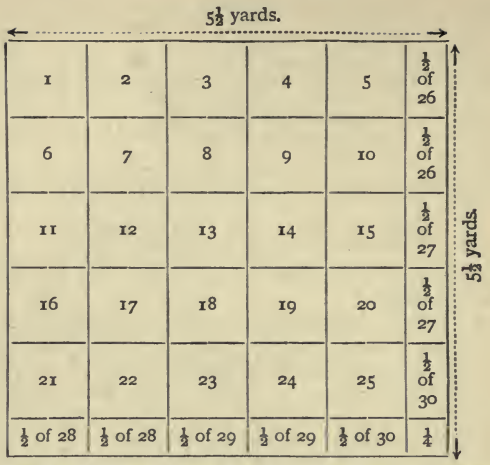
SQUARE MEASURE.—The *square inch* can be drawn by the children on paper; the *square foot* and the *square yard* can be drawn on the class-room floor; the *square pole* can be measured in the playground.

The connection between the pole and the square pole can be shown graphically thus—

Diagram showing the connection between—

$5\frac{1}{2}$ yds. = 1 rod, pole, or perch (long measure),

and $30\frac{1}{4}$ sq. yds. = 1 sq. rod, pole, or perch (square measure).



Notes.—The practical uses to which the various weights and measures are put should be demonstrated.

Great attention should be given to ascending and descending reduction, which should be taught as soon as any part of a table has been acquired by *direct* observation. See the lesson on Long Measure which follows.

NOTES OF A FIRST LESSON ON LONG MEASURE

Apparatus.—*Foot-ruler for each child; B.B., &c.; yard measure.*

STEPS.	METHOD.	MATTER.
I. To teach 12 inches make 1 foot.	Ask children for length of ruler before them. Let them measure length of desk with ruler. The ruler measures it (say) three times, *and there is a piece of the desk over.* Hence deduce the necessity of a smaller measure than a foot. Then proceed to teach what is in the matter column.	**A foot-ruler is divided into 12 equal parts, each called an inch.** **12 inches = 1 foot.**

STEPS.	METHOD.	MATTER.
II. To teach the reduction of feet to inches.	(*a*) **By Actual Measurement.**—Place two foot-rulers end to end. Let child *count* number of inches. Repeat with three and four rulers. Ask how we can find the number of inches in two, three, or four feet *without counting*. Compare with reduction of shillings to pence. (*b*) **By Mental Examples.**—Give five or six examples. (*c*) **By Examples worked on B.B.**—Let these be a little more difficult than the mental examples; *e.g.*— Piece of string is 7 ft. long (*A*) 12 — ,, ,, 84 ins. long.	**To reduce feet to inches, multiply by 12.**
III. To teach reduction of inches to feet.	(*a*) **By Mental Examples.**—Ask questions. Deduce rule. Compare with reduction of shillings to pence. (*b*) **By Examples worked on B.B.** (*See B.B. sketch* (*B*).)	**To reduce inches to feet, divide by 12.**

STEPS.	METHOD.	MATTER.
IV. To teach that 3 feet make 1 yard.	Let child measure length of room with foot-rule. Ask how some of the stooping and measuring could be prevented. Introduce and name *yard* measure. See how many foot-rulers placed end to end make one yard.	**3 feet = 1 yard.**
V. To teach reduction of yards to feet.	Proceed as in Step II., using, of course, 3 in place of 12. (*See B.B. sketch* (*C*).)	**To reduce yards to feet, multiply by 3.**
VI. To teach reduction of feet to yards.	Proceed as in Step III., using, of course, 3 in place of 12. (*See B.B. sketch* (*D*).)	**To reduce feet to yards, divide by 3.**
VII. To teach more difficult examples in descending reduction.	(*a*) **By Actual Counting.**—Draw line 1 ft. 9 ins. on B.B. Let child step it off into inches (*E*). (*b*) **By Mental Examples.**—Give three or four examples. Then proceed to get rule from class. (*c*) **By Examples worked on B.B.**—(*See B.B. sketches* (*F*) *and* (*G*).) Show the superiority of (*G*) over (*F*). Be careful to name each quantity.	**To reduce yards, feet, and inches to inches, multiply the yards by 3 and add in any feet, then multiply the result by 12, and add in any inches.**

STEPS.	METHOD.	MATTER.
VIII. To teach more difficult examples in ascending reduction.	Take an example already dealt with in descending reduction (*H*), and reduce the inches back to yards, &c. (*I*). Obtain reasons, as in Step III. Again insist on the importance of naming each quantity.	**To reduce inches to yards, divide by 12 to reduce to feet; then by 3 to reduce to yards.**
IX. Practice by class.	Give examples for the class to work. *e.g.* A boy is 3 feet 10 inches high. How many inches is that?	

B.B. Sketch.

12 inches make 1 foot.
3 feet ,, 1 yard.

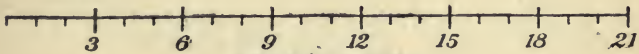
(*A*) Piece of string, 7 ft. long.
12
84 inches long.
,, ,,

(*B*) 12)96 inches.
8 feet.

(*C*) 5 yards.
3
15 feet.

(*D*) 3)24 feet.
8 yards.

(*E*)



1 ft. 9 in. = 21 in.

(*F*) 6 ft. 4 ins.
12
72 ins.
4 ins.
76 ins.

(*G*) 6 ft. 4 ins.
12
76 ins.

(*H*) 2 yds. 2 ft. 6 ins.
3
8 ft.
12
102 ins.

(*I*) 12)102 ins.
3)8 ft. 6 ins.
2 yds. 2 ft. 6 ins.

Factors.—A knowledge of factors is a necessary preliminary to facility in working Vulgar Fractions. The terms Factor and Product should already be familiar to the children (see p. 93). Examples may be sought from the Multiplication Tables.

Take as an example, $3 \times 5 = 15$. The numbers 3 and 5, when multiplied together, *make* a result or product 15. Hence the numbers 3 and 5 are called **factors**, and the result, 15, is termed the **product**. Compare the term factor with manu-*fact*-ure.

A Factor is a number which when multiplied by another number yields a product.

MEASURES.—Examine the following :—

$$(a)\ 3 \times 5 = 15. \qquad (b)\ \frac{15}{3} = 5. \qquad (c)\ \frac{15}{5} = 3.$$

The explanation of (*a*) has been already given. From (*b*) lead the class to see that as 3 is contained exactly 5 times in 15, it *measures* 15 exactly 5 times. Deal similarly with (*c*).

For an experimental demonstration, see the Lessons on the Greatest Common Measure (p. 120).

A Measure is a number contained in another number an exact number of times.

The terms Factor and Measure are practically synonymous, and it is a great pity that the term Greatest Common Measure was ever introduced into arithmetic. The term Highest Common Factor would have been a better one, as it is more self-explanatory and is applicable both to Algebra and Arithmetic.

Resolution into Factors.—This is a good exercise unfortunately too often omitted in teaching Arithmetic.

1. Resolve the numbers from 1 to 12 into factors. Write results on B.B., thus—

$1 = 1 \times 1.$
$2 = 1 \times 2.$
$3 = 1 \times 3.$
$4 = 1 \times 4$ *or* $2 \times 2.$
$5 = 1 \times 5.$
$6 = 1 \times 6$ *or* $2 \times 3.$
$7 = 1 \times 7.$
$8 = 1 \times 8$ *or* 2×4 *or* $2 \times 2 \times 2.$
$9 = 1 \times 9$ *or* $3 \times 3.$
$10 = 1 \times 10$ *or* $2 \times 5.$
$11 = 1 \times 11.$
$12 = 1 \times 12$ *or* 2×6 *or* 3×4 *or* $2 \times 2 \times 3.$

2. Get class to examine and to make the following deductions :—

(*a*) That each number has at least two factors—itself and unity.

(*b*) That some numbers have these two factors only. Tell that these are termed **Prime Numbers.**

(*c*) That other numbers have other factors besides the two mentioned in (*a*), and are termed **Composite Numbers.**

3. Encourage children to draw up definitions.

A Prime Number has no Factor except itself and Unity. A Composite Number has other Factors besides itself and Unity.

Avoid the common definition that a Prime Number has *no* factors; every number has at least *two* factors—itself and unity.

Tests of Divisibility.

1. The easier should be discovered by actual trial, and the results may be summarised as follows :—

A number is divisible by—
- 2, if the last digit is divisible by 2.
- 4, if the two last digits are divisible by 4.
- 8, if the three last digits are divisible by 8.
- 5, if the last digit is 5 or 0.
- 10, if the last digit is 0.
- 3, if the sum of the digits is divisible by 3.
- 9, if the sum of the digits is divisible by 9.

2. If thought advisable, rules to test divisibility by 6, 11, 12, 25, &c., may also be taught.

3. An interesting lesson may be given on finding the Prime Numbers between 1 and 100.

The Highest Common Factor.—This is an easier term for what is commonly known as the Greatest Common Measure, which is really a superfluous term in arithmetic.

1. Take as an example : *Find the highest common factor of 60 and 84.*

2. Resolve 60 and 84 into prime factors.

$$60 = 2 \times 2 \times 3 \times 5.$$
$$84 = 2 \times 2 \times 3 \times 7.$$

3. Examine and discover the factors belonging to each number, *i.e.* the *common* factors. They are—

$$2$$
$$3$$
$$2 \times 2$$
$$2 \times 3$$
$$2 \times 2 \times 3.$$

4. Of these the *highest* is $2 \times 2 \times 3$, so it is termed the *Highest Common Factor.*

For those who prefer the term Greatest Common Measure, the outlines of a series of lessons are now given.

Greatest Common Measure.—This, if taught at all, should be taught experimentally. Each child should have strips of paper 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and 12 inches long.

1. Separate the strips into—

(*a*) Those that will *measure* into the piece 12 inches long an exact number of times—viz. the 1, 2, 3, 4, 6, and 12 inch strips.

(*b*) Those that will *not* measure into the piece 12 inches long—viz. the 5, 7, 8, 9, 10, and 11 inch pieces.

Write on B.B.

Measures of 12.	*Not Measures of 12.*
1, 2, 3, 4, 6, 12.	5, 7, 8, 9, 10, 11.

2. Now give out another slip 18 inches long, and in a similar way obtain—

Measures of 18.	*Not Measures of 18.*
1, 2, 3, 6, 9, 18.	4, 5, 7, 8, 10, 11, 12, &c.

3. Draw attention to the fact that the strips 1, 2, 3, and 6 inches long measure the strip 12 inches, and also the strip 18 inches long. These strips *belong to* both measures, and are hence called *Common Measures.*

4. Take the strips 1, 2, 3, and 6 inches long, and place one on top of the other. The 6 inch strip is the *greatest;* hence the term *Greatest Common Measure.*

5. Review, and obtain some such definition as the following :—

A Measure of a given number is a number contained in that given number an exact number of times.

A Common Measure of two or more numbers is a number which is contained in two or more given numbers an exact number of times.

The Greatest Common Measure of two or more numbers is the greatest number which is contained in the two or more numbers an exact number of times.

The teacher should strive after the formation of *clear ideas;* the exact form of words is a matter of less importance.

6. Draw attention to the fact that 1, 2, 3, and 6 are *factors* of 12 and 18 ; hence infer that to find the G.C.M. of two numbers we must find the factors, and the *highest factor* will be the G.C.M.

7. Take as an example : Find the G.C.M. (or H.C.F.) of 68 and 80.

Resolve into factors : $68 = 2 \times 2 \times 17$.

$80 = 2 \times 2 \times 2 \times 2 \times 5$.

The Common Factors of 68 and 80 are 2, and 2×2, and the Highest Common Factor or the G.C.M. is 2×2 or 4.

Note.—For some time, at any rate, the G.C.M. should be found by the Method of Factors. After a time the Method of Division might be taught, but it is doubtful whether the explanation of the process is not beyond the comprehension of children.

The following device may be used to connect the two methods :—

Example.—Find the G.C.M. of 68 and 80.

17 fours) 20 fours (1
17 fours

3 fours) 17 fours (5
15 fours

2 fours) 3 fours (1
2 fours

1 four) 2 fours (2
2 fours

68) 80 (1
68

12) 68 (5
60

8) 12 (1
8

4) 8 (2
8

This arrangement will help the pupils to understand that all the operations are performed on groups of fours, but it is not an *explanation* of the method of finding the G.C.M. by the method of Division.

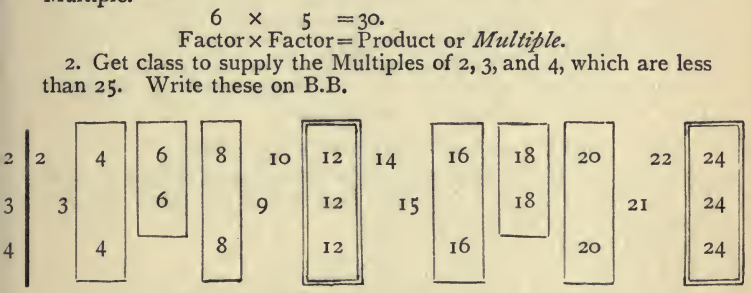
The Least Common Multiple.—This may be taught by the use of strips of paper in much the same way as the G.C.M. just given. It might be well at this stage, however, to give the children some training in reasoning with abstract numbers.

1. Refer to the Multiplication Tables: introduce the term Multiple.

$$6 \times 5 = 30.$$

Factor × Factor = Product or *Multiple.*

2. Get class to supply the Multiples of 2, 3, and 4, which are less than 25. Write these on B.B.



3. Get children to examine the table. 4 is seen to be a multiple of 2 and 4—hence it is termed a Common Multiple. Have other common multiples found. 12 and 24 are common multiples of 2, 3, and 4, and since 12 is the least, 12 is termed the *Least Common Multiple* of 2, 3, 4.

4. Then approach the question from the point of view of division (2, 3, and 4 will divide into 12 and 24, &c.), and thus get class to draw up some such definition as the following :—

The Least Common Multiple of two or more given numbers is the least number which is divisible by each of the two or more given numbers.

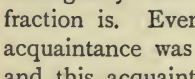
5. The method of finding the L.C.M. by factors should be next taught, and, for purposes of comparison and contrast, the G.C.M. and L.C.M. of pairs of numbers should be found by the method of prime factors.

6. Afterwards the method of division by prime factors should be shown.

VULGAR FRACTIONS

By the time the child commences the detailed study of fractions he should, if the instructions in this book have been intelligently followed, have gained a very fair idea of what a fraction is. Even in the earliest lessons (see p. 96) some acquaintance was made with the more elementary fractions, and this acquaintance has been extended in the study of the compound rules.

What a Fraction is.—A formal definition of a fraction may now be sought.



Because the whole line A D is divided into three *equal* parts, we say that A B is one-third of the whole line. But insomuch as E H is broken up into three *unequal* parts, we cannot say that E F, F G, or G H is one-third of the whole line. Hence deduce that a Fraction is a quantity which consists of one or more *equal* parts of a unit or whole. *Unequal* parts are simply pieces, parts, or fragments.

THE PARTS OF A VULGAR FRACTION.

Taking a simple fraction (*e.g.* $\frac{3}{4}$) the children should be able to tell (*a*) that the unit is divided into four *equal* parts; (*b*) that *three* of those equal parts are taken.

Further explain—

$\frac{3}{4} = \frac{\text{Numerator}}{\text{Denominator}} = \frac{\textit{Number} \text{ of parts taken.}}{\textit{Name} \text{ of the parts into which the whole is divided.}}$

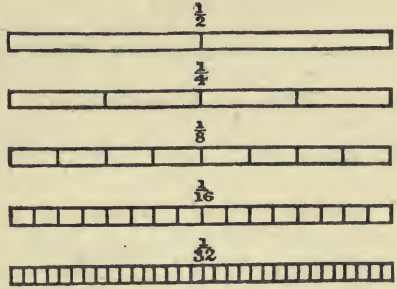
Insist upon the distinction that the numerator is a *number*, whereas the denominator is a *name*.

CANCELLING OF FRACTIONS.

1. Provide each child with five strips of paper of equal lengths. Have the first strip folded into two equal parts, the second into four, and so on. Have the value of each fraction marked on each strip, as shown in the sketch.

2. Have the strips placed one over the other, and lead class to discover that—

$$\frac{1}{2}=\frac{2}{4}=\frac{4}{8}=\frac{8}{16}=\frac{16}{32}.$$



3. Draw attention to these fractions, and show that—

$$\frac{2}{4}=\frac{1\times 2}{2\times 2};\ \frac{4}{8}=\frac{1\times 4}{2\times 4},\ \&c.$$

4. Hence infer that: the numerator and denominator of a fraction may be multiplied by the same number without altering its value.

5. By similar reasoning, get class to see that the numerator and the denominator of the fraction may be *divided* by the same number without altering its value.

6. Tell class that the process of *dividing* numerator and denominator by the same number is termed **Cancelling.**

7. Give exercises in cancelling.

COMPARISON OF FRACTIONS.

1. **With the same Denominator,** *e.g.* compare $\frac{2}{8}$ and $\frac{6}{8}$. Writing this in another form we have—

Compare *two*-eighths and *six*-eighths, and recollecting that the denominator is merely the *name* of the fraction, we might compare this expression to: compare two yards and six yards. Six yards is three times two yards, and similarly six-eighths is three times two-eighths. Infer from this that to compare fractions with the same denominator, we must compare their *numerators.*

2. **With different Denominators,** *e.g.* compare $\frac{1}{4}$ and $\frac{6}{8}$, which may be rendered in another form: compare one *quarter* and six-*eighths*, which again may be likened to asking us to compare one *yard* with six *feet*. To do this we should have to reduce the yards to feet or the feet to yards; *i.e.* we should have to bring them to the same *name.*

Similarly, we must bring our $\frac{1}{4}$ and $\frac{6}{8}$ to the same *name* or denominator.

$\frac{1}{4}$ and $\frac{6}{8}$ are the same as $\frac{2}{8}$ and $\frac{6}{8}$, or as $\frac{1}{4}$ and $\frac{3}{4}$, and the comparison is now easy.

Take more difficult examples, such as, compare $\frac{5}{6}$ and $\frac{7}{8}$. These fractions may be written as $\frac{20}{24}$ and $\frac{21}{24}$.

After a number of examples, draw attention to the fact that the new denominator is in every case the L.C.M. of the denominators, and hence infer that—

(i.) To compare fractions we must convert them into equivalent fractions with a common denominator.

(ii.) This common denominator will be the L.C.M. of all the denominators.

Effects of altering the Numerator or Denominator of a Fraction.—These investigations are important for an intelligent appreciation of Multiplication and Division of Fractions. Numerous examples should be taken, and the results summarised on the B.B., as shown below.

I. EFFECTS OF ALTERING THE NUMERATOR.

Examples.	Denominator.	Numerator.	Effect on Value of Fraction.
$\frac{1}{7}$; $\frac{2}{7}$; $\frac{3}{7}$.	Unchanged.	Increased.	Increased.
$\frac{3}{5}$; $\frac{2}{5}$; $\frac{1}{5}$.		Decreased.	Decreased.

Infer that—

{Increasing / Decreasing} the numerator means taking {more / less} of the equal parts named by the denominator, and this means {increasing / decreasing} the value of the fraction.

II. EFFECTS OF ALTERING THE DENOMINATOR.

Examples.	Numerator.	Denominator.	Effect on Value of Fraction.
$\frac{2}{7}$; $\frac{2}{9}$; $\frac{2}{11}$.	Unchanged.	Increased.	Decreased.
$\frac{2}{7}$; $\frac{2}{5}$; $\frac{2}{3}$.		Decreased.	Increased.

Infer that—

{Increasing / Decreasing} the denominator means {decreasing / increasing} the magnitude of each of the equal parts into which the whole is divided, and consequently means {decreasing / increasing} the value of the fraction.

From these considerations deduce—

Principle 1.—If the denominator of a fraction be unaltered, the greater the value of the numerator, the greater the value of the fraction.

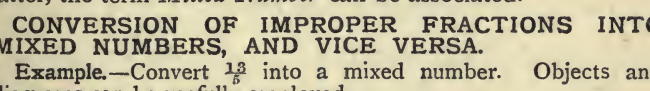
Principle 2.—If the numerator of a fraction be unaltered, the greater the value of the denominator, the less the value of the fraction.

Kinds of Fractions.—There is much confusion and cross-classification here: it will be well to classify fractions according to the relative values of their numerators and denominators into *Proper and Improper Fractions.* With the latter, the term *Mixed Number* can be associated.

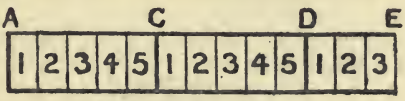
CONVERSION OF IMPROPER FRACTIONS INTO MIXED NUMBERS, AND VICE VERSA.

Example.—Convert $\frac{13}{5}$ into a mixed number. Objects and diagrams can be usefully employed.

1. *By Cubes.*—The unit is divided into 5 equal parts, and 13 such parts are taken to form the improper fraction. Take 13 cubes and divide into units each containing 5 cubes. There are 2 units and 3 cubes left, *i.e.* 2 units and $\frac{3}{5}$ of a unit, which may be expressed as $2+\frac{3}{5}$ or as $2\frac{3}{5}$.



2. *By Diagram.*—Draw a rectangle and divide it into 13 equal parts—



AC = 1 unit = 5 parts.
CD = 1 unit = 5 parts.
∴ AD = 2 units = 10 parts.
and DE = $\frac{3}{5}$ units.
∴ AE = $2\frac{3}{5}$ units.
but AE = 13 parts, or $\frac{13}{5}$ units.
∴ $\frac{13}{5} = 2\frac{3}{5}$.

The Rule for the Conversion of an Improper Fraction into a Mixed Number and *vice versa* can be easily deduced.

Addition and Subtraction of Fractions.—The work may be divided into the following stages:—

(*a*) Addition and Subtraction of Fractions with the *same* denominators.

(*b*) Addition and Subtraction of Fractions with *different* denominators.

Stage (*a*) presents no difficulty. In grappling with Stage (*b*), the emphasis that has been already put upon the fact that the denominator is the *naming* part of the fraction should be re-emphasised.

Just as in the addition of 13s. and 13d. we have to reduce to a common denominator (shillings), so in the addition of $\frac{1}{8}$ and $\frac{3}{4}$ we have to reduce to a common denominator—48ths.

Concrete illustrations may be given as follows:—

Examples.—Add $\frac{2}{3}$ and $\frac{3}{4}$. Subtract $\frac{2}{3}$ from $\frac{3}{4}$.

1. Take 12 kindergarten cubes of equal size and build up into a unit. Divide these into 3 equal parts as A, B, and C (Fig. 1). Then separate 2 of these parts, as in Fig. 2.

Fig. 1.

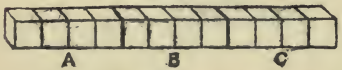
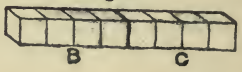


Fig. 2.



The class will perceive that Fig. 2 comprises 2 parts out of 3, or 8 parts out of 12:

i.e. there are $\frac{2}{3}$ or $\frac{8}{12}$.

2. Now take 12 similar cubes, and divide them into 4 equal parts, as D, E, F, and G (Fig. 3). Now separate 3 of those parts, as in Fig. 4.

Fig. 3.

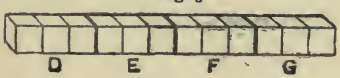
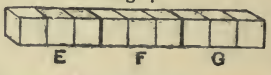


Fig. 4.



The class will perceive that here 3 parts out of 4 have been removed, or 9 parts out of 12:

i.e. there are $\frac{3}{4}$ or $\frac{9}{12}$.

Addition.—Let the class count the cubes (Figs. 2 and 4). There are 8 in one group and 9 in the other, and $8 + 9 = 17$:

i.e. $\frac{2}{3} + \frac{3}{4} = \frac{8}{12} + \frac{9}{12} = \frac{17}{12} = \frac{12}{12} + \frac{5}{12} = 1\frac{5}{12}$.

Subtraction.—There are 9 cubes in one group and 8 in the other:

i.e. $\frac{3}{4} - \frac{2}{3} = \frac{9}{12} - \frac{8}{12} = \frac{1}{12}$.

The ordinary arithmetic process of addition and subtraction of fractions may be now further exemplified on the B.B.

The chief point to avoid in Addition and Subtraction is the tendency to bring Mixed Numbers to Improper Fractions.

Explain as follows :—If $11\frac{3}{4}$d. is to be added to $2\frac{1}{2}$d. we should not think of reducing the quantities to farthings, yet the reduction of mixed numbers to improper fractions for the purposes of addition and subtraction is just as unnecessary and absurd. Proceed to work an illustrative example—

$$\begin{aligned} 7\tfrac{3}{11} + 3\tfrac{5}{8} + 3\tfrac{5}{8} &= 7 + 3 + 3 + \tfrac{3}{11} + \tfrac{5}{8} + \tfrac{5}{8} \\ &= 13 + \frac{72 + 165 + 220}{264} \\ &= 13 + \tfrac{457}{264} \\ &= 13 + 1\tfrac{193}{264} \\ &= 14\tfrac{193}{264}. \end{aligned}$$

Even in subtraction, where it sometimes happens that the fractional part to be subtracted is greater than the fractional part of the mixed number from which it is to be taken, reduction to improper fractions is unnecessary.

$$\begin{aligned} \text{Example—}13\tfrac{39}{50} - 8\tfrac{74}{75} &= 5 + \frac{117 - 148}{150} \\ &= 4 + \frac{150 + 117 - 148}{150} \\ &= 4 + \frac{267 - 148}{150} \\ &= 4\tfrac{119}{150}. \end{aligned}$$

Since the subtrahend 148 is greater than the minuend 117, we decompose the whole number 5 into $4 + \frac{150}{150}$.

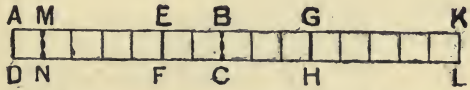
Multiplication of Fractions

1. Multiplication of a Vulgar Fraction by an Integer.

Example—$\frac{5}{7} \times 3$.

(*a*) *By Addition.*—$\frac{5}{7} \times 3 = \frac{5}{7} + \frac{5}{7} + \frac{5}{7} = \frac{15}{7} = 2\frac{1}{7}$.

(*b*) *By Diagram.*—Draw on B.B. the figure A K L D containing 15 divisions.



Then A B C D containing 7 divisions will represent unity.

And A M N D = $\frac{1}{7}$ of a unit.

„ A E F D = $5 \times$ A M N D = $\frac{5}{7}$ of a unit.

„ $3 \times$ A E F D = $3 \times \frac{5}{7}$ = A K L D = $\frac{15}{7} = 2\frac{1}{7}$.

(*c*) *By Money.*—Use a guinea as a unit.

Then $\frac{1}{7}$ of a guinea = 3s.
And $\frac{5}{7}$ „ „ = 3s. × 5 = 15s.
„ $\frac{5}{7} \times 3$ „ „ = 15s. × 3 = 45s.
= 2 guineas + 3s. = $2\frac{1}{7}$ guineas.

Take other examples and deduce :

To multiply a Vulgar Fraction by an integer, multiply the numerator of the Vulgar Fraction by that integer.

In a subsequent lesson it may be shown (p. 130) that the same result may be obtained in certain cases by dividing the denominator.

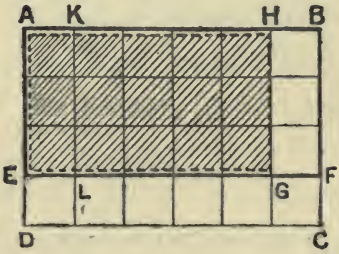
2. Multiplication of a Vulgar Fraction by a Vulgar Fraction.

Example—$\frac{5}{6} \times \frac{3}{4}$.

(*a*) *By Diagram.*—Get class to notice that the sum is a question of sixths and quarters.

Divide the line A B into 6 equal parts. Draw A D at right angles, and make A D = 4 parts of A B.

Complete the rectangle, and draw parallels as shown in the diagram.



The whole rectangle, A B C D = unity.

Then A E F B = $\frac{3}{4}$ of A B C D.
And A E L K = $\frac{1}{6}$ of A E F B, *i.e.* $\frac{1}{6}$ of $\frac{3}{4}$.
And A E G H = $\frac{5}{6}$ of A E F B, *i.e.* $\frac{5}{6}$ of $\frac{3}{4}$.

But A E G H contains 15 squares, and the total number of squares in A B C D = 24.

∴ A E G H = $\frac{15}{24} = \frac{5}{6}$ of $\frac{3}{4}$, *i.e.* $\frac{5}{6} \times \frac{3}{4} = \frac{15}{24} = \frac{5}{8}$.

(*b*) *By Money.*—$\frac{1}{4}$ of £1 = 5s.
$\frac{3}{4}$ of £1 = 5s. × 3 = 15s.
$\frac{1}{6}$ of $\frac{3}{4}$ = $\frac{1}{6}$ of 15s. = 2s. 6d.
$\frac{5}{6}$ of $\frac{3}{4}$ = 2s. 6d. × 5 = 12s. 6d. = $\frac{5}{8}$.
i.e. $\frac{5}{6} \times \frac{3}{4} = \frac{5}{8}$.

After a number of similar examples, deduce the rule.

Rule.—*To find the product of two or more fractions—*

(*a*) *For a new numerator, multiply the two or more numerators.*

(*b*) *For a new denominator, multiply the two or more denominators.*

A characteristic difficulty of Multiplication of Fractions is that the product is often less than either of the factors.

The general idea of multiplication is that of *increase*, but this holds good only in the case of multiplication of numbers greater than unity. In multiplication by unity the product is the *same* as the multiplicand, and, arguing by analogy, we should expect that in the multiplication of quantities less than unity the product should be *less* than the multiplicand. A reference to the diagram on p. 128 will help the child to *see* that in the multiplication of fractions a product is obtained less than the factors; but it does not explain *why* this should be.

The fact is that the ordinary conception of multiplication applies only to the case of an integral multiplier.

"Multiplication" of a fraction includes *division* as well as multiplication. The multiplication of $\frac{2}{3}$ by $\frac{1}{2}$ is equivalent to *dividing* $\frac{2}{3}$ into two equal parts. A quantity "multiplied" in this way is consequently *decreased* when the multiplier is a proper fraction. It is increased only when the multiplier is an improper fraction, and improper fractions are really not fractions at all.

Division of Fractions

This is a difficult subject, and all the teacher's art will be taxed in making it intelligible to the children. The following will furnish materials for several lessons:—

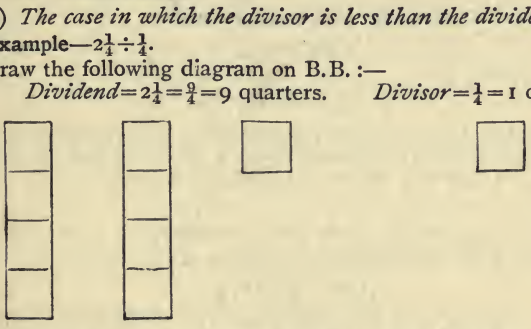
1. BY DIAGRAM.

(*a*) *The case in which the divisor is less than the dividend.*

Example—$2\frac{1}{4} \div \frac{1}{4}$.

Draw the following diagram on B.B.:—

Dividend $= 2\frac{1}{4} = \frac{9}{4} = 9$ quarters. *Divisor* $= \frac{1}{4} = 1$ quarter.



Get class to see that as the dividend is represented by 9 squares, and the divisor by 1, it is evident that the divisor must be repeated nine times to make up the dividend. Hence 9 must be the required quotient.

$$\therefore 2\tfrac{1}{4} \div \tfrac{1}{4} = \tfrac{9}{4} \div \tfrac{1}{4} = 9.$$

(*b*) *The case in which the divisor is greater than the dividend.*

Example—$\frac{1}{4} \div 2\frac{1}{4}$.

Dividend $=\frac{1}{4}=1$ quarter. *Divisor* $=2\frac{1}{4}=\frac{9}{4}=9$ quarters.

Ask how much of the divisor must be taken to equal the dividend. The answer will be $\frac{1}{9}$; the $\frac{1}{9}$ must be the quotient.

$$\therefore \frac{1}{4}\div 2\frac{1}{4}=\frac{1}{4}\div\frac{9}{4}=\frac{1}{9}.$$

The question now remains: How are we to manipulate the quantities

$$\frac{9}{4}\div\frac{1}{4}=9 \text{ and } \frac{1}{4}\div\frac{9}{4}=\frac{1}{9},$$

so as to evolve an intelligible rule? Proceed as follows:—

2. BY MANIPULATION OF EXAMPLES.

Example—$\frac{5}{8}\div\frac{3}{7}$.

Step 1.—Divide $\frac{5}{8}$ by 3.

Argue that this means: divide $\frac{5}{8}$ into 3 equal parts (so that the sum of those 3 equal parts shall be equal to $\frac{5}{8}$).

Applying Principle 2 (p. 125) we get—

$$\frac{5}{8}\div 3=\frac{5}{24},$$

which is correct, for

$$\frac{5}{24}+\frac{5}{24}+\frac{5}{24}=\frac{15}{24}=\frac{5}{8}.$$

Step 2.—But 3 is just 7 times greater than $\frac{3}{7}$; hence argue that in taking 3 as a divisor we have taken a divisor which is 7 times too large. Hence the result $(\frac{5}{24})$ obtained above must be 7 times too small.

Step 3.—To make the result 7 times larger, we must multiply the numerator by 7 (Principle 1, p. 125):—

$$\frac{5}{24}\times 7=\frac{35}{24}=1\frac{11}{24}.$$

Step 4.—Review what has been done, and get class to note that $\frac{5}{8}$ has been multiplied by 7 and divided by 3.

Therefore infer that $\frac{5}{8}\div\frac{3}{7}=\frac{5}{8}\times\frac{7}{3}=\frac{35}{24}=1\frac{11}{24}$.

Step 5.—Get class to elaborate the rule.

To divide one fraction by another, invert the divisor and proceed as in multiplication.

Note.—The fact that the quotient $1\frac{11}{24}$ is greater than the dividend $\frac{5}{8}$ may be contrasted with the results obtained in the multiplication of fractions (see p. 128).

PRACTICE

should be taught *after*, and not before Vulgar Fractions. As its name indicates, it is a convenient method of calculation frequently adopted in *practice* by business men.

Practice is of two kinds—

1. *Simple—e.g.* Find the cost of 220 articles @ 15s. 6d. each, in which the price of a *simple* quantity is required.
2. *Compound—e.g.* Find the cost of 15 acres 3 roods 36 poles @ £9 4s. 6d. per acre, in which the cost of a *compound* quantity is required.

SIMPLE PRACTICE

1. **Preliminary Exercises.**—Revision of the chief fractional parts of a pound; introduction of the term *Aliquot Part*, which may be explained as a measure of a *concrete* quantity.

2. **Introduction to Practice.**

(*a*) *Mental Arithmetic.*—Give easy examples, such as: Value of 20 articles at 10s. each, of 45 at 5s., &c. Ask how the answers are most easily obtained.

(*b*) *Demonstration on B.B.*—Show the conventional method.

		£					
10s. =	½ of £1	20	= value of 20 articles @ £1 each.				
		£10	= „	20	„	10s.	„

After a number of easy examples, proceed to more difficult ones—

Value of 995 articles at £1, 6s. 8d. each.

		£	s.	d.				Each.		
6s. 8d. =	⅓ of £1	995	0	0	= value of 995 articles @			£1	0	0
		331	13	4	= „	995	„	0	6	8
		£1326	13	4	= „	995	„	£1	6	8

To secure interest in the new rule, compare the above with the labour involved in multiplying £1, 6s. 8d. by 995.

3. **Gradation of Work.**—The work may be graded in the following stages:—

(*a*) Sums of money involving only *one* aliquot part; *e.g.* so many things @ 10s., 6s. 8d., 5s. each.

(*b*) Sums of money requiring *two* aliquot parts; *e.g.* so many articles @ 15s., 12s. 6d., &c., each.

(*c*) Sums of money requiring *more than two* aliquot parts; *e.g.* so many articles @ 17s. 3d., £2 6s. 10d., &c., each.

(*d*) Sums of money requiring shortened methods for expeditious working; *e.g.* 48 articles @ 9s. 11½d. each. The price of 48 articles @ 10s. each may be found, and 48 halfpence subtracted from the result.

DECIMAL FRACTIONS

Too often Decimals are taught as "another rule" without any direct reference to previous work. The true method of approaching decimals is to regard them as a part of the ordinary system of notation. Our whole notation is *decimal*, and may be divided into two sections: that part expressing unity and numbers greater than unity, and that part expressing quantities less than unity. Digits in the former part we term *whole numbers;* digits in the latter part, *decimals.*

INTRODUCTION TO DECIMALS

H T U

1. Put a number like 8 8 8 upon the B.B.

Recapitulate that each digit has—

(*a*) A value *in itself* (called its *intrinsic* value); *e.g.* 8, which represents 8 units.

(*b*) A value *due to its position* (called its *place* value); *e.g.* 8 in 8 7, where the 8 stands for 8 tens.

2. Get class to tell you that if the 8 in the hundreds column

H	T	U
8		
	8	
		8

is moved one place to the *right*, it becomes 8 *tens*, or one tenth of its former value.

Similarly, that if the 8 in the tens column be moved one place to the *right*, it becomes 8 *units*, or one tenth of its former value.

3. Now put the question to the class: If we move the 8 *one* place more to the right, as in

H	T	U	
8	8	8	8

what will be its *new* value?

The 8 units will manifestly become 8 tenths, *i.e.* one tenth of their former value.

Write on B.B.

Hundreds	Tens	Units	Tenths
8	8	8	8

4. Similarly, move the 8 to the second and third places on the right (counting from the units place). Construct the following scheme :—

Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths
8	8	8	8	8	8	8

Get the children to distinguish clearly between

tens	and	ten*ths*
hundreds	,,	hundred*ths*
thousands	,,	thousand*ths*.

5. Point out the inconvenience of writing these names above. Ask what could be done. From earlier lessons in notation (p. 95) one method suggested would probably be—

T	H	T	U	t	h	t
8	8	8	8	8	8	8

Shade in the 8 units, and get class to notice the balancing (symmetry) of the arrangement.

6. But even this would be cumbersome, and now tell class that the device adopted is a dot (called the *decimal point*), which serves to separate the whole numbers from the fractional parts,

888·888.

Note.—(1) That the decimal point is written *above* the line thus · to distinguish it from the sign . written *on* the line, and which signifies multiplication.

(2) That it would be better if it were customary to place the dot above the units digit, for the symmetrical arrangement of the digits to the left and right of the units place would be more apparent. This would, however, necessitate another convention for repeating decimals.

7. Draw up a **Definition of a Decimal Fraction.**

A Decimal Fraction is a quantity less than unity expressed in the ordinary system of notation.

8. Give exercises in reading a decimal fraction, *e.g.* ·123.

Correct Methods.

(*a*) One tenths, 2 hundredths, 3 thousandths.

(*b*) One hundred and twenty-three thousandths, or more shortly,

(*c*) Point or decimal one, two, three.

Incorrect method.

Point or decimal one hundred and twenty-three. This would mean 123 units; it would be correct only if it meant 123 thousandths.

9. **Effects of Cyphers on Decimals.**

(*a*) Compare the value of ·34 and ·340.

$\cdot 34 = \frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.

$\cdot 340 = \frac{3}{10} + \frac{4}{100} + \frac{0}{1000} = \frac{34}{100}$; the same as ·34 above.

Hence infer that cyphers placed to the *right* of a completed decimal do not affect its value.

(*b*) Compare the values of ·34 and ·034.

$\cdot 34 = \frac{3}{10} + \frac{4}{100} = \frac{34}{100}$.

$\cdot 034 = \frac{0}{10} + \frac{3}{100} + \frac{4}{1000} = \frac{34}{1000}$, which is $\frac{1}{10}$ of $\frac{34}{100}$ (or ·34) above.

Hence infer that *one* cypher placed to the *left* of a decimal decreases the value of the decimal to *one-tenth* of its former value. Similarly *two* cyphers would decrease the value to *one-hundredth* of the former value.

10. **Effect of moving the Decimal Point.**

Take as an example 25·34.

(*a*) Move the decimal point to the *right*, and we have—

253·4—a quantity 10 times the value of 25·34.

2534— „ 100 „ „ „ 25·34.

(*b*) Move the decimal point to the *left*, and we have—

2·534—a quantity $\frac{1}{10}$ of the value of 25·34.

·2534— „ $\frac{1}{100}$ „ „ 25·34.

Hence infer that movement of the point one place to the right increases the value of the decimal ten times, movement one place to the left decreases the value to one-tenth of the original value.

It would really be better if we regarded the decimal point as a fixture, and moved the digits.

Addition and Subtraction of Decimals

Remind class that only quantities of *like* denomination can be added or subtracted, and show that just as in Simple Addition and Subtraction we place units under units, tens under tens, so in decimals we must place tenths under tenths, hundredths under hundredths, &c.

1. Put down Addition and Subtraction sums in accordance with these directions, and get class to observe that *the decimal points fall under one another.*

2. Infer the following working **Rule**:—

(*a*) *Arrange the quantities so that the decimal points come in the same vertical line.*

(*b*) *Proceed as in Simple Addition, taking care to put the decimal point of the answer under the other decimal points.*

Multiplication of Decimals

1. **Multiplication by some Power of 10.**

From matter taught in paragraph 10 above, infer that—

(*a*) To multiply by 10, we move the decimal point *one* place to the *right.*

(*b*) To multiply by 100, we move the decimal point *two* places to the *right*, and so on.

2. **Multiplication by Numbers other than some Power of 10.**

A.—Cases in which cyphers do not have to be prefixed.

Example—7·23 × 2·3.

(*a*) Ignore the decimal points, and proceed as in Simple Multiplication—

723 = 100 times 7·23
23 = 10 „ 2·23

2169
1446

16629 = 100 × 10, or 1000 times the required answer.

(*b*) From reasoning shown at the side of the Simple Multiplication, infer that the "answer" is 1000 times the true answer.

Hence the "answer" must be divided by 1000. Ask how this can be done easily. Recall matter in paragraph 10, p. 134, and lead children to reason that the true answer is 16·629.

(*c*) Work other examples. Get class to count the number of decimal places in the multiplicand, multiplier, and product, and deduce the rule given below.

B.—Cases in which cyphers have to be prefixed.

Example—·0723 × ·023.

723 = 10000 times ·0723
23 = 1000 „ ·0723

2169
1446

16629 = 10,000 × 1000, or 10,000,000 the required answer.

The "answer" obtained must be divided by 10,000,000. But there are only 5 digits. Hence from paragraph 10, p. 134, argue that two noughts must be prefixed, and the true answer becomes ·0016629.

Work other examples :—

·723 × 2·3 = 1·6629
(3 dec.) × (1 dec.) = (4 decimals)
·00723 × ·023 = ·0016629
(5 dec.) × (3 dec.) = (8 decimals).

Now draw up the following working **Rule** :—

(*a*) *Ignore the decimal points, and treat the digits as though they were integers. Multiply as in Simple Multiplication.*

(*b*) *Find the total number of decimal places in the multiplicand and multiplier.*

(*c*) *Begin at the right hand digit of the product and mark off the total number of decimal places obtained in* (*b*).

(*d*) *If there are not sufficient digits in the product, prefix cyphers until the required number of digits is obtained.*

Division of Decimals

1. Division of a Decimal by a Whole Number.

Example—1·42 ÷ 5.

```
5 | 1·42
    ·284
```

5 is not contained a whole number of times in one unit. Change the one unit into ten tenths. 10 tenths + 4 tenths = 14 tenths. The fifth part of 14 tenths is 2 tenths, with a remainder of 4 tenths. The remainder 4 tenths together with 2 hundredths make 42 hundredths, &c. &c.

2. Division of a Decimal by a Whole Number and a Decimal.

Example—16·629 ÷ 7·23.

(*a*) Place in fractional form : $\frac{16\cdot629}{7\cdot23}$.

(*b*) Ask class by what number we must multiply numerator and denominator in order to get rid of the decimals altogether.

$$\frac{16\cdot629}{7\cdot23} = \frac{16\cdot629 \times 1000}{7\cdot23 \times 1000} = \frac{16629}{7230}.$$

(*c*) Proceed as in ordinary Division. When the whole numbers are exhausted, put a decimal point in the quotient.

```
7230 ) 16629 ( 2·3
       14460
       -----
        21690
        21690
```

(*d*) Give other examples, and then get class to tell the method of work.

Rule.

(*a*) *Multiply both divisor and dividend by* 10, *or* 100, *or* 1000, *&c., to get rid of all decimals.*

(*b*) *Proceed as in Simple Division.*

(*c*) *When the whole numbers in the dividend are exhausted, put a decimal point in the quotient.*

This simple rule is much preferable to the many "rule of thumb" procedures adopted in division of decimals.

INTRODUCTION TO THE DECIMAL SYSTEM OF WEIGHTS AND MEASURES

	H.	T.	U.
1. Write on B.B.	1	2	3

Decompose into 1 hundred, 2 tens, 3 units ; into 12 tens and 3 units ; and into 123 units.

Here the Reduction (hitherto called in this connection Decom-

position) of Hundreds to Tens and Tens to Units, is easily done, because—

10 units = 1 ten.
10 tens = 1 hundred.

2. Contrast as follows :—

Long Measure — Ordinary System.

$5\frac{1}{2}$ yards = 1 pole.
40 poles = 1 furlong.

Fur.	Po.	Yds.
Reduce 1	2	3 to yards.

40
—
42 po.
$5\frac{1}{2}$
—
213
21
—
234 yds.

Work done. — 18 figures; 3 multiplications — one by tens, one by units, and one by fractions.

Long Measure — Supposed Decimal System.

Suppose that—

10 yards = 1 pole.
10 poles = 1 furlong.

Fur.	Po.	Yds.
1	2	3

would be seen at a glance to be equal to 123 yards.

Work done.— 3 figures written down as shown.

3. Hence infer that the labour connected with our calculations in Weights and Measures would be much reduced if our tables "went upwards and downwards" in multiples of 10, *i.e.* if the tables were based upon the ordinary decimal system of notation.

Proceed to show how easy calculations would be if 10d. = 1s.
and 10s. = £1.

4. Further infer that under such a system our "Compound Rules" would practically disappear.

THE METRIC SYSTEM

This system should be taught *concretely*, and under the same guiding principles as the Compound Rules.

The following pieces of apparatus will be necessary—a metre measure, rulers for children marked off in centimetres and inches, 110–150 wooden cubes each 1 c.c. in volume, a litre measure, a kilogram, a gram, a pair of scales.

The following outlines of a series of lessons on the Metric

System are especially designed to show the relative interdependence of the several tables of the System, and also to render the children *practically* acquainted with the chief units employed.

General Introduction.—Refer to previous lesson, and state that there is a System of Measurement based on the Decimal System. Tell that it is called the Metric System, and is so named after the *Metre.*

LONG MEASURE

1. (*a*) Show a metre measure.

   (*b*) Compare and contrast it with a yard measure; lead class to see that the metre is nearly 40 inches long.

   The length of a metre may be remembered as 3 feet 3 inches and $\frac{1}{3}$ of an inch.

   (*c*) Arrange under one another on a wall of the class-room strips of paper each 1 yard and 1 metre long respectively. Have the term *yard* and *metre* written on the appropriate strips.

2. (*a*) Measure the length and breadth of the room with a stick a metre long. Deduce the necessity for a smaller measure than the metre (see Lesson on *Long Measure*, p. 114).

   (*b*) Let children examine the Metre Stick, and note that it is divided into 10 equal parts. Tell that each part is called a Decimetre.

   Write on the B.B. 1 Metre = 10 Decimetres. Compare *Decimetre* with *Decimal.*

   (*c*) Have rulers marked in decimetres, centimetres, and inches given out. Get class to discover that the decimetre is a little less than 4 inches; also to reason that as the metre is nearly 40 inches, so the decimetre will be nearly $\frac{1}{10}$th of that length, or nearly 4 inches.

Note.—After comparing the metre and the decimetre with the yard and the inch, it will be well to conduct all calculations in the Metric System without any reference whatever to the common system of weights and measures. Let the metre be the standard of reference; not the yard or the inch.

3. Let children draw lines a decimetre long, and thus train the eye to learn the exact length of the decimetre. Let each child find a part of his body (*e.g.* length of hand), approximately a decimetre long.

4. Have books, desks, &c., measured in decimetres, and further deduce the necessity for a still smaller measure.

5. Refer children to their rulers, and get them to see that each of the smallest divisions is $\frac{1}{10}$th of a decimetre. and hence $\frac{1}{100}$ of a metre. Introduce the term **Centimetre.**

Compare with *century*, *centurion*, &c.

6. Get class to draw up the following table—

10 centimetres (cm.) = 1 decimetre (dm.).
10 decimetres = 1 metre (m.).

Summarise thus—

1 m. = 10 dm. = 100 cm.

7. Have height of boys in class, dimensions of objects in room, &c., measured in the Metric System, and perform easy examples in the four rules and in reduction ; *e.g.*—

(*a*) A boy is 1 m. 3 dm. 30 cm. high. How many cms. is that?
(*b*) A book is 40 cm. thick. What would be the height of piles of 3, 13, 30, 300 such books?
(*c*) The class-room is 9 m. 7 dm. 50 cm. long, and 6 m. 6 dm. broad. How far is it round the room in metres, in decimetres, and in centimetres? &c. &c.

8. From the above and other examples infer that in the Metric System {ascending / descending} Reduction is performed by moving the decimal point to the {left / right}. (See also p. 134.)

9. Next proceed to teach the multiples of the metre, and then draw up the

Table of Long Measure

10 centimetres (cm.) = 1 decimetre.
10 decimetres (dm.) = 1 metre.
10 metres (m.) = 1 decametre.
10 decametres (Dm.) = 1 hectometre.
10 hectometres (Hm.) = 1 kilometre (Km.).

The Multiples and Sub-Multiples of the Unit

These should be drawn from the above table. A summary like that shown below should be made out on the B.B., copied out by the class, and committed to memory :—

Prefix . .	Kilo.	Hecto.	Deca.	Unit	Deci.	Centi.	Milli.
Value . .	1000	100	10	1	·1	·01	·001
Contraction	Km.	Hm.	Dm.	m.	dm.	cm.	mm.

Notes.—(1) That the *multiples* are of *Greek*, the *sub-multiples* of *Latin* derivation.
(2) That all the sub-multiples end in *i*.
(3) That *deca* (10) must be carefully distinguished from *deci* ($\frac{1}{10}$).
(4) That capital letters are used in the contractions for multiples, and small letters for sub-multiples.

SQUARE MEASURE

1. Get children to draw a line a decimetre long, and then construct a square upon it. A Square Decimetre will be thus obtained. Have it divided into Square Centimetres. Introduce the centimetre blocks, and construct a square centimetre. Note the number of centimetres (100) in each case.

2. Draw on class-room floor a square metre, and divide it into square decimetres. Note the number. The numbers proceed by *hundreds*, because $10^2 = 100$.

3. Consideration of the size of the playground, of the neighbouring square or adjoining field, will show the necessity for larger denominations than the square metre.
Proceed to build these up from the Long Measure Table.

4. With the aid of the class construct

Table of Square Measure

100 sq. centimetres (sq. cm. or cm.^{2}) = 1 sq. decimetre (sq. dm. or dm.^{2}).
100 sq. decimetres = 1 sq. metre (sq. m. or m.^{2}).
100 sq. metres = { 1 sq. decametre (sq. Dm. or Dm.^{2}). / 1 Are (a). }
100 sq. decametres = { 1 sq. hectometre (sq. Hm. or Hm.^{2}). / 1 Hectare (Ha.). }
100 sq. hectometres = 1 sq. kilometre (sq. Km. or Km.^{2}).
Note that the table proceeds in 100's, because $10^2 = 100$.

5. Arithmetical exercises should follow.

CUBIC MEASURE

1. Every child should be required to make a cubic decimetre and a cubic centimetre. The latter may be cut out in clay or soap. The former should be made as a cardboard box.

2. Build up part of a cubic decimetre from centimetre blocks, as shown in diagram. Calculate the number (1000) of cubic centimetres required to complete the cubic decimetre, and compare with the statement that $10 \times 10 \times 10$ or $10^3 = 1000$. Note that the denominations will proceed by *thousands*; contrast with Square and with Long Measure.

3. Proceed, with the help of the class, to build up

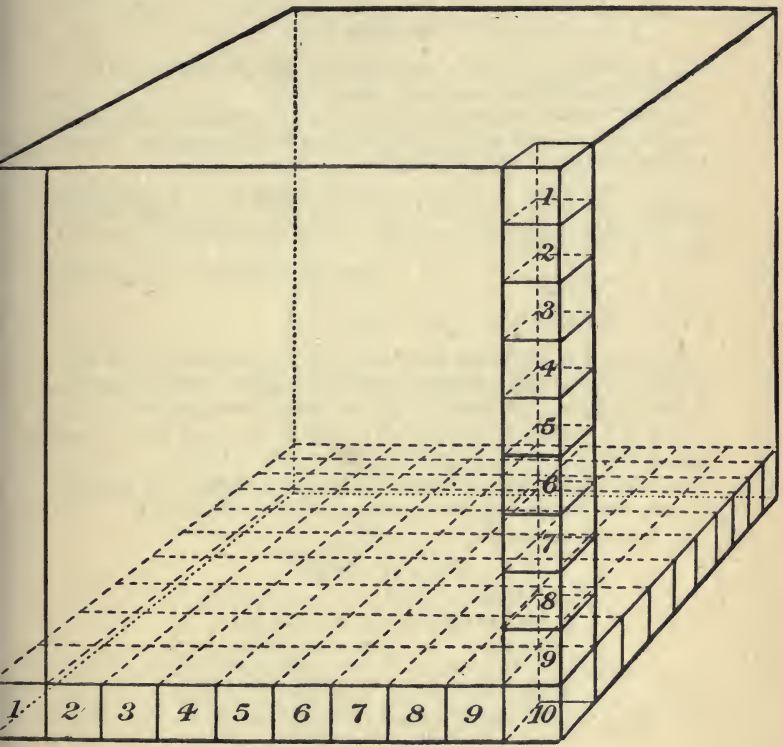
Table of Cubic Measure

1000 cubic centimetres (c. cm. or cm.^{3}) = 1 c. decimetre (c. dm. or dm.^{3}).

1000 cubic decimetres = 1 c. metre (c. cm. or m.^{3}).

Note that the table proceeds by 1000's, because $10^3 = 1000$.

4. Suitable arithmetical exercises should follow.



FLUID MEASURE

1. Take one of the best made cardboard boxes which has a capacity of 1 cubic decimetre (see above), and fill it with sand. Introduce the Litre measure, and pour the sand from the cubic decimetre into it. The sand exactly fills it. Hence *a Litre is a cubic decimetre.*

2. Construct the

Table of Fluid Measure

10 centilitres (cl.)	= 1 decilitre (dl.).
10 decilitres	= 1 litre (l.).
10 litres	= 1 decalitre (Dl.).
10 decalitres	= 1 hectolitre (Hl.).

3. Arithmetical exercises.

WEIGHT

1. Put the litre measure into the scale pan and counterpoise it.
2. Fill the litre measure with water.
3. Find which weight among the Metric weights balances the water. The kilogram is found to be the weight required. Hence *a Litre of water weighs a kilogram.*

Note.—With a pair of ordinary scales the litre of water will balance the kilogram, but with more accurate balances there would be a slight difference. The temperature, atmospheric pressure, and purity of the water have all to be considered.

The scientific statement is that a $\left\{\begin{matrix}\text{cubic centimetre}\\ \text{litre}\end{matrix}\right\}$ of distilled water at 4° C. and 760 mm. pressure weighs a $\left\{\begin{matrix}\text{gram}\\ \text{kilogram}\end{matrix}\right\}$.

4. If there is an accurate balance in the school a cubic centimetre of water may be shown to weigh a gram, and the accuracy of this result may be tested by purely arithmetical means.

5. From previous lessons, infer that a kilogram weighs 1000 grams, and hence the *gram* must be the unit of weight.

6. Let children handle gram and kilogram weights, so that they become real weights to them, and not mere empty names.

7. Proceed to construct a

Table of Weight

10 centigrams (cg.)	= 1 decigram (dg.).
10 decigrams	= 1 gram (g.).
10 grams	= 1 decagram (Dg.).
10 decagrams	= 1 hectogram (Hg.).
10 hectograms	= 1 kilogram (Kg.).

8. Suitable arithmetical exercises should follow.

THE CONNECTION BETWEEN THE VARIOUS UNITS

The simple relationship existing between the measurements of length, volume, and weight is one of the many advantages

of the Metric System, and the teacher would do well to emphasise this important point.

	Common Units.	Scientific Units.
LONG MEASURE	The METRE, $\frac{1}{10}$ of which is the DECIMETRE,	The METRE, $\frac{1}{100}$ of which is the CENTIMETRE,
SQUARE MEASURE	which, when squared, becomes the SQUARE DECIMETRE, and when cubed, the	which, when squared, becomes the SQUARE CENTIMETRE, and when cubed, the
CUBIC MEASURE	CUBIC DECIMETRE or LITRE,	CUBIC CENTIMETRE,
WEIGHT	and the weight of a litre of water is a KILOGRAM.	the weight of which is a GRAM.

In the Metric System there is a definite and close connection between the Metre, the Litre, and the Kilogram. There is no such connection between the English yard, quart, and pound.

Some English equivalents are given for the guidance of the teacher:—

1 Metre = 39·37079 inches.
1 Litre = $1\frac{7}{8}$ pints.
1 Kilogram = $2\frac{1}{5}$ lbs.

PROPORTION

Problems in proportion may be solved by two Methods—the Method of Ratios and the Method of Unity. The first method affords fine scope for the ingenuity of the teacher, but it is very difficult for the children to understand. The second method is the one generally followed, and so we shall commence with a consideration of it. Afterwards the outlines of a series of lessons on Ratio and Proportion will be given, and lastly the relative merits of the two Methods will be discussed.

Outlines of a Lesson on the Rule of Three by the Method of Unity

Previous Knowledge of Class.—The four rules, simple and compound.

I. Exercises in Mental Arithmetic.

1. *On Preceding "Rules"*—
   (*a*) If 5 knives cost 7s. 6d., how much each?
   (*b*) How much does a man earn in a working day who receives £3 a week?
   (*c*) A train travels 30 miles an hour; how far is that per minute?
2. *With Introduction of the New Idea.*

Take examples like the above over again, but this time ask—
   (*a*) If 5 knives cost 7s. 6d., how much do 2, 3, 4 knives cost?
   (*b*) If a man earns £3 a week, how much does he earn in 2, 3, 4, 5 days? &c.

II. Exercises Worked on the B.B.

1. Take Example 2(*a*) above and write—

If 5 knives cost 7s. 6d.

Then 1 knife costs $\frac{7\text{s. } 6\text{d.}}{5}$

And 3 knives cost $\frac{7\text{s. } 6\text{d.} \times 3}{5} = 4\text{s. } 6\text{d.}$

2. Work at least two other Examples.

III. Examination of the Method of Working Rule of Three by the Method of Unity.

By examination of the three examples worked on the B.B. get children to see—

(*a*) That each sum has *three* terms: two "like" in kind and one "odd."
(*b*) That the "odd" term is of the same kind as the required answer.
(*c*) That the first line of the statement is so arranged that the "odd" term comes at the end of it.
(*d*) That the second line is concerned with finding the "value" of *one* of the "like" kinds.
(*e*) And the third line with finding the "value" of the required number.

IV. Application of the Rule.

1. Allow class to copy in books the solution of at least one of the problems.
2. Work a few more difficult examples on the B.B.; *e.g.*

What will be the cost of 1½ lbs. at the rate of 2 ozs. for 3d.?

3. Give three sums in the rule to be worked by the children in their arithmetic books. Go round class, and give hints to individual children as to arrangement of sums and methods of work.

Outlines of Lessons on Ratio

I. **Introduction.**—Question on the aliquot parts in practice, and on the relationship between numerator and denominator in fractions.

II. **Development of the Idea of "Relationship" between Quantities.**

1. *By examples from the Compound Rules.*

(*a*) A halfpenny is one half of a penny.
A penny is twice as much as a halfpenny.
(*b*) A foot is a third of a yard.
A yard is three times as long as a foot, &c. &c.

2. *By diagrams.*
Draw two rectangles on B.B., and divide into equal units.

A

1
2
3

B

1	4	7
2	5	8
3	6	9

Get class to observe that B is three times the size of A; that A is one-third the size of B; that

A as compared with B is as 3 is compared with 9, or as
1 ,, ,, 3.

III. **Introduction of the term Ratio.**

Get children to see that A has been compared with B, a "relationship" has been established between them, and give the term **Ratio** as expressing this "relationship."

IV. **Provisional Definition of Ratio.**

A Ratio expresses the "relationship" between two quantities.

V. **Methods of expressing Ratio.**

1. *By fractions*—$\frac{1}{3}$ or $\frac{3}{9}$.
2. *By words*—as 1 is to 3.
3. *By symbols*—1 : 3.

(1) and (2) can be obtained by recapitulation of II. and III. Connect (3) with (1) by explaining that the two dots (:) are probably a contracted form of the division symbol (÷), so
$\frac{1}{3}$, or $1 \div 3$, or 1 : 3 have much the same meaning. Compare with the fractional form above.

VI. **Some Characteristics of Ratio.**

By reference to Vulgar Fractions infer that—

1. Ratio points out the relationship between the numerator and denominator of a fraction.

By reference to rectangles above, infer that—

2. Ratio points out the comparative sizes or magnitudes of two things.

Ask class to compare 3 boots and 9 houses, 7 marbles and 9 elephants, and so deduce that—

3. Ratio compares only quantities of the same kind.

A ratio compares two things; hence—

4. A ratio consists of two terms.

Since one term is placed before the other, the terms *might* have been called *first* term and *second* term, or the term *going before* and the term *going after* or *following*. Then introduce the technical terms, and explain them.

5. The first term of a Ratio is called the **Antecedent**, the second the **Consequent**.

Write on the B.B. thus—

3	:	9
Term going before	:	Term going after.
Antecedent	:	Consequent.

VII. Kinds of Ratio.

1. Those of Ascending Order, in which the Consequent is greater than the Antecedent; *e.g.* 3 : 9.
2. Those of Descending Order, in which the Antecedent is greater than the Consequent; *e.g.* 9 : 3.

VIII. Definition of Ratio.

Question upon the truths taught, and assist class in drawing up some such definition as the following :—

Ratio is the relation which one quantity bears to another of the same kind with respect to size or magnitude.

Outlines of Lessons on Simple Proportion

I. Equality and Inequality of Ratios.

Take two simple ratios, *e.g.* 2 : 3 and 4 : 6, and two other simple ratios, *e.g.* 2 : 3 and 3 : 4, and get class to note the difference between them.

The first two ratios are equal, for $\frac{2}{3} = \frac{4}{6}$, and the ratios may be written thus, $2:3 = 4:6$. But the second set of ratios does not present the same equality, for $\frac{2}{3}$ does not equal $\frac{3}{4}$.

II. Introduction and Definition of the term Proportion.

Tell class that two ratios like $2:3 = 4:6$ are termed a **Proportion**, but two ratios like 2 : 3, 3 : 4 are not so termed. Elicit the difference between them, and also the following definition :—

Proportion is an equality of ratios.

Develop the differences between Ratio and Proportion.

Ratio.	Proportion.
1. *Two* terms.	1. *Four* terms.
2. *Comparison* of two *terms*.	2. *Equality* of two *ratios*.

III. Various Methods of expressing Proportion.

(*a*) $\frac{6}{12} = \frac{20}{40}$.

(*b*) 6 : 12 = 20 : 40.

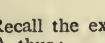
(*c*) As 6 : 12 :: 20 : 40.

1. (*a*) and (*b*) should be gained from the class; (*c*) should be told and written on B.B.

2. Give the correct method of reading (*c*),

As 6 is to 12, so is 20 to 40.

3. Tell that the four dots : : are said to represent the four ends of the two lines expressing equality—



4. Recall the explanation of the two dots (:), and re-write statement in III. (*c*), thus :—

$6 \div 12 :=: 20 \div 40$.

Compare this statement with III. (*a*).

IV. Nomenclature of Proportion.

1. Consider the proportion 6 : 12 :: 20 : 40; and draw attention of class to the following technicalities :—

(*a*) *Terms.*—Each of the four quantities in a proportion is called a *Term; e.g.* 6, 12, 20, 40 are Terms.

(*b*) *Extremes.*—The *outside* terms, 6 and 40, are called the *Extremes.*

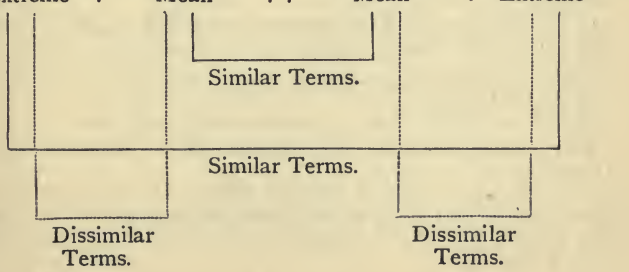
(*c*) *Means.*—The *inside* terms, 12 and 20, are called the *Means.*

(*d*) *Order of Terms.*—6 is called the *first* term, 12 the *second*, 20 the *third*, 40 the *fourth.*

(*e*) *Similar Terms.*—The two Extremes or the two Means are called *Similar Terms.*

(*f*) *Dissimilar Terms.*—Terms composed of one Mean and one Extreme are called Dissimilar Terms.

2. Represent these facts graphically, thus—



V. Investigation of the two great Truths of Proportion.

Write down a number of proportions similar to the one given on p. 147, and get class to investigate them, drawing attention especially—

(*a*) To the products of similar and dissimilar terms;

(*b*) To the ascending or descending order of the ratios (see p. 146).

Hence make the following deductions:—

1. The product of the Extremes is equal to the product of the Means.

2. If the third and fourth terms of a proportion are in $\left\{\begin{matrix}\text{descending}\\\text{ascending}\end{matrix}\right\}$ order of magnitude, then the first and second terms must be in $\left\{\begin{matrix}\text{descending}\\\text{ascending}\end{matrix}\right\}$ order of magnitude.

VI. Application of the first of these Truths.

Take "proportions" with a missing term; *e.g.*—

: 12 :: 20 : 40

6 : : : 20 : 40, &c.,

and show how by the application of V., the missing term may be found.

Having taught the class the great truths of Ratio and Proportion, it would now be well to classify "Rule of Three" sums, and to teach the various types in the order of their difficulty.

1. **Problems in Direct Proportion.**—*e.g.* If 3 acres 24 poles of land can be rented for £14, how much land can be rented for £20? (see p. 149).

Similarly—

(*a*) The rent of a house varies directly as the time it is occupied.

(*b*) The cost of carriage as the weight and distance.

(*c*) The price of bread as the price of flour; and so on.

2. **Problems in Inverse Proportion.**—*e.g.* If 12 men can perform a piece of work in 8 days, in what time will 48 men perform the same? (see p. 150).

Similarly—

(*a*) For a given piece of work *more* workmen means *less* time.

(*b*) In carpeting a room, the *greater* the breadth, the *less* the length required.

(*c*) In provisioning a garrison, the *greater* the number of men, the *less* time the provisions will last.

(*d*) In races, the *faster* the pace, the *less* the time; and so on.

These two great classes of problems will be found to be further complicated—

1. *By the inclusion of a common Term.—e.g.* If 72 men *for 13* days' work receive £119, 7s. 6d., what ought 54 men to receive?

2. *By the necessity of preparing the Terms before they can be used as Ratios.*

(*a*) *Cases in which addition or subtraction is required.—e.g.* A fort has provisions for 200 soldiers for 30 days. After 5 days *50 more men* entered the fort. How long will the food last at the same rate?

(*b*) *Cases in which multiplication or division is required.—e.g.* If 180 men in 6 days can dig a trench *200 yds. long, 3 yds. wide, and 2 yds. deep*, in how many days will 100 men dig a trench *360 yds. long, 4 yds. wide, and 3 feet deep?*

LESSONS ON THE APPLICATION OF THE TRUTHS OF RATIO AND PROPORTION TO THE SOLUTION OF PROBLEMS

I. Direct Proportion.

Example—

If 3 acres 24 poles of land can be rented for £14, how much land of the same character can be rented for £20?

Step 1. Have sum read, and the number and character of the terms apprehended. Note what is required for the answer. Have the terms classified into "like pairs," with a view to the determination of ratio. Put on B.B.—

$$\left\{\begin{matrix}£14\\£20\end{matrix}\right\} \qquad \left\{\begin{matrix}3 \text{ acres } 24 \text{ poles}\\ \text{the required number of acres}\end{matrix}\right\}$$

Step 2. (*a*) Put on B.B. the skeleton form of a proportion—

: : :

(*b*) Tell class that in accordance with custom the unknown quantity is placed in the fourth term—

: : : the required number of acres.

Note.—(1) Mere convention settles this point. It would really be more convenient to place the unknown quantity in the first term.

(2) Don't use x as the fourth term; x may mean *anything*. Use something which will establish a *likeness* between the "answer" and the "odd term."

Step 3. Question class upon the fact that the 3rd and 4th terms of a proportion form a ratio, and also that ratio exists only between quantities of *like* kinds. Hence infer that since "the required number of acres" is in the 4th term, the given number of acres must go into the 3rd term.

: : $3\frac{3}{20}$ acres : the required number of acres.

Step 4. Proceed to elaborate on the B.B. the following :—

: : $3\frac{3}{20}$ acres : the required number of acres.

$$\left\{\begin{matrix}\text{Amount of}\\ \text{land rented}\\ \text{for } £14\end{matrix}\right\} : \left\{\begin{matrix}\text{Amount of land rented}\\ \text{for } £20\end{matrix}\right\}$$

Less : Greater

An Ascending Ratio.

The amount of land ($3\frac{3}{20}$ acres) rented for £14 will be less than the amount of land rented for £20; hence the ratio is of an ascending order.

Step 5. But if the 3rd and 4th terms are in *ascending* ratio, the 1st and 2nd terms must be also in *ascending* ratio. Get class to arrange the other "pair" of terms in ascending ratio, thus—

£14 : £20.

Step 6. Now get a child to put these terms into their proper places in the proportion—

£14 : £20 :: $3\frac{3}{20}$ acres : the required number of acres.

Step 7. Question upon the method used to obtain a missing term (p. 148), also have *the* great truth of proportion repeated by the class.

Point out, however, that we cannot multiply £20 by $3\frac{3}{20}$ acres, but that since the ratio between £14 and £20 is the same as the ratio between 14 and 20, we may re-write thus—

14 : 20 :: $3\frac{3}{20}$ acres : the required number of acres.

Step 8. Proceed to find the missing term.

The required number of acres $= \frac{3\frac{3}{20} \text{ ac.} \times 20}{14} = 4\frac{1}{2}$ acres.

II. Inverse Proportion.

Example.—If 12 men can perform a piece of work in 8 days, in what time will 48 men perform the same.

Step 1. Classify the terms—

{12 men} {48 men} {8 days} {the required number of days}

Step 2. In accordance with custom, place the unknown quantity in the 4th term—

: :: : the required number of days.

Step 3. The quantity 8 days *must* go into the 3rd term to complete the ratio—

: : : 8 days : the required number of days.

Step 4. Now 8 *days* is the time 12 men take to do the piece of work, and "*the required number of days*" is the time 48 men take. More time must be taken by 12 men than by 48 men to do the work, hence 8 *days* is greater than "*the required number of days*," and the ratio is of the *descending order*—

: : : 8 days : the required number of days

{time taken by 12 men} : {time taken by 48 men}

greater time : *less* time

Descending Ratio.

Step 5. The 1st and 2nd terms must also be in descending ratio. Hence we have—

48 men : 12 men : : 8 days : the required number of days,
or, 48 : 12 : : 8 days : the required number of days.

Step 6. Proceed to obtain the missing term by the application of *the* great truth of proportion (p. 148).

COMPARISON OF THE METHODS OF UNITY AND OF PROPORTION

Improvements in our methods of teaching, and a general demand that "things taught" should be "things explained," led to the general adoption of the Method of Unity. Still, there is much to be said for both methods.

Method of Proportion.

1. Takes up and expands an arithmetical principle which the children have already recognised in Vulgar Fractions.
2. Offers one of the finest opportunities in arithmetic for the training of the reasoning powers.
3. Takes a long time to understand.
4. Is suitable only for children in the upper classes of the school.
5. Unless well taught and understood, it tends to become mechanical, and may lead to guessing.
6. Solution in difficult examples are quickly performed.

Method of Unity.

1. Involves no new principle, and merely requires an intelligent application of the simple rules.
2. Offers some training to the reasoning power.
3. The principle underlying it can be easily mastered in one lesson.
4. Is well within the comprehension of children of the middle classes of the school.
5. Its truths are easily grasped and remembered; hence it does not readily become mechanical.
6. Solutions in more difficult examples are apt to be long and cumbersome.

A generation back the following "rule of thumb" was well-nigh universally taught as the method of solving problems in proportion :—

1. Place the odd quantity in the 3rd term.
2. Arrange the other two terms in the following order :—

(*a*) If the answer is to be *greater* than the 3rd term, place the *larger* quantity in the 2nd term.

(*b*) If the answer is to be *less* than the 3rd term, place the *smaller* quantity in the 2nd term.

3. Multiply the 2nd and 3rd terms together, and divide by the 1st.

The student may well exercise his ingenuity by discovering the reasons for this "rule of thumb."

COMPOUND PROPORTION

The study of an example in Compound Proportion will show it to be composed of a certain number of simple proportions, with a common 3rd term, all combined into one operation.

Example.—If it cost £11, 5s. 0d. to provide oats for 7 horses for 20 days when oats are at 16s. 6d. per quarter, how much will it cost for 55 horses for 12 weeks when oats are 13s. 6d. per quarter?

Step 1. Get class to analyse the problem into three simple proportions.

(*a*) If it cost £11, 5s. 0d. to provide oats for 7 *horses*, how much will it cost to provide oats for 55 *horses?*

(*b*) If it cost £11, 5s. 0d. to provide oats for 20 *days*, how much will it cost to provide oats for 12 *weeks?*

(*c*) If it cost £11, 5s. 0d. to provide oats when oats are 16s. 6d. *per quarter*, how much will it cost when oats are 13s. 6d. *per quarter?*

Step 2. Have the three simple proportions expressed as follows:—

(*a*) 7 horses : 55 horses :: £11¼ : required number of pounds.
(*b*) 20 days : 84 days :: £11¼ : „ „ „
(*c*) 16½s. : 13½s. :: £11¼ : „ „ „

Step 3. Demonstrate on B.B. the conventional arrangement of a Compound Proportion.

horses 7 : 55
days 20 : 84 } :: £11¼ : required number of pounds.
shgs. 16½ : 13½

Step 4. Proceed to simplify the ratios.

$$\text{Required number of pounds} = £\frac{55 \times 84 \times 13\frac{1}{2} \times 11\frac{1}{4}}{7 \times 20 \times 16\frac{1}{2}} = £303,\ 15s.$$

Percentages, Interest, Stocks and Shares, &c., may be solved by application of the Method of Unity or the Method of Ratios. A full consideration of these rules (as well as of Square Root and Cube Root) would seem to be outside the purview of this little Manual. A Lesson showing the Method of teaching Simple Interest by the Unity Method is now given.

Notes of a Lesson on Simple Interest

I. **Introduction.**—Give a few examples, of which the following are specimens:—

(*a*) A man hires a bicycle at 5s. a day, and at the end of the day returns the bicycle and the cost of the hire. Here, money is paid for the use of the bicycle.

(*b*) One man lends another £1 for a month on the understanding that the borrower is to pay £1, 1s. at the end of the month. Here, 1s. is paid for the loan of £1 for one month.

Deduce: Men hire things (or borrow money) from other men, and pay money for the use of the thing hired (or for the use of the money).

II. **Introduction and Explanation of Terms.**

(*a*) *Principal and Interest.*—Write an example like (*b*) on B.B.; draw attention to *the sum lent* (*Principal*) and the *money paid for the use of money* (*Interest*). Write definitions on B.B.; contrast spelling and meaning of *Principal* and *Principle.*

(*b*) *Amount.*—Deal with this in a similar manner.

(*c*) Practice class in picking out the Principal, Interest, and Amount from examples given.

(*d*) *Per Cent.*—The draper sells calico by the *yard*, the grocer sugar by the *pound.* Each has his standard. *The standard of the money-lender is* £100.

From the meaning of century, centurion, &c., deduce that cent. means 100. Thus *per cent.* means by or for a hundred.

(*e*) *Per Annum.*—The man in I. (*a*) would have to pay more for the hire of the bicycle for a week than for a day. Similarly more must be paid for the loan of £100 for two years than for one year. Hence, a standard of time is necessary—*the year.* Introduce term *per annum.* Compare with "annual."

III. **Examples Worked Mentally.**

(*a*) Give easy examples, *e.g.* Interest on £100 for two years at 5 per cent. On £200 for one year at 3 per cent.

(*b*) Ask for Principal, Interest, and Amount in each case; also the method of arriving at the Answer.

IV. **Examples Worked on Blackboard.**—Take two or three examples (one is shown in B.B. Sketch) worked by Method of Unity. To give practice in style, allow children to transcribe an example in note-books.

V. **Practice by Class.**—Give two examples of about the same difficulty as those worked on B.B. (*e.g.* Find interest on £250 for 3 years at 5 per cent.). Give extra help to the slow children in the class.

VI. **Rule for Calculation of Simple Interest.**—From examination of examples worked, get class to see that in each case the principal, interest, and time have been multiplied together and the result divided by 100. Summarise as shown in B.B. Sketch.

Blackboard Sketch

Principal = money lent.
Interest = money paid for loan of principal.
Amount = Principal + Interest.
Per Cent. = for a hundred.
Per Annum = for a year.

What is the Interest on £300 for 2 years at 5 per cent. per annum?

If Interest on £100 for 1 year is £5

Then ,, £1 ,, 1 ,, $\frac{£5}{100}$

And ,, £300 ,, 1 ,, $\frac{£5 \times 300}{100}$

And ,, £300 ,, 2 years is $\frac{£5 \times 300 \times 2}{100} = £30.$

$$I = \frac{P \times R \times T}{100}.$$

MENTAL ARITHMETIC

From a perusal of the preceding pages the student will have learned that Mental Arithmetic is to be employed at all stages of the child's progress. For the sake of convenience alone a consideration of this important subject has been left till the end of the chapter.

Objects of Mental Arithmetic

1. To ensure rapidity and accuracy in arithmetic.
2. To develop dexterity in the manipulation of quantities.
3. To prepare the mind for the mastery of the next rule to be taught.
4. To recapitulate work of previous classes.
5. To develop habits of mental concentration.

How to Obtain the above Objects

1. The calculations should involve real mental work. Questions should not be confined to computations of "dozens" and "scores." Such questions have a certain practical utility, but they are "mechanical," and make little call on the mental activities of the class.

2. The examples should be varied: they should in the upper classes deal occasionally with *abstract* numbers.

3. Plenty of exercises should be given in "tots"—a necessary piece of arithmetical drudgery if speed and accuracy are to be acquired.

4. Lessons should be short, should be given early in the day, preferably for the first 5 or 10 minutes of an arithmetic lesson.

5. Questions should be well distributed over the class. They need not be of uniform difficulty. A few easy ones may occasionally be given in order to encourage the more backward children to put forth effort.

CHAPTER VII

THE TEACHING OF THE ENGLISH LANGUAGE

The English Language is held to comprise "speaking with correct pronunciation, reading aloud with intelligence and clear enunciation, writing, oral and written composition and grammar," and "at each stage recitation of pieces of literary merit should be practised."

Reading and writing have already been dealt with: it is now proposed to discuss the teaching of Composition, English Grammar and Literature, and the first matter calling for discussion is the place of Grammar and Composition in the school curriculum.

The Place of Grammar and Composition in the Curriculum

Formerly it was the custom to commence Grammar with the lower classes of the school, and to defer the teaching of formal Composition until the upper classes were reached. A few years ago it was generally agreed that Grammar and Composition should be taught concurrently, and at the present time many good teachers are beginning to be of opinion that the teaching of Composition should *precede* the study of formal Grammar.

"The present confusion and disagreement regarding language work arises from the fact that we are in a transition period from the time when language was taught as a science to that better time when it shall be taught as an art."

Reasons for teaching the Elements of Composition before Formal Grammar

1. *In accordance with the Canons of good teaching* we should proceed from the simple to the complex, from the particular to the general, from the examination of numerous individual cases to the elaboration of the general rule or law. In a word, good teaching is *Inductive.*

In Composition, the child is introduced to sentences. By the

examination and use of many sentences he observes how they are built up, and he learns to elaborate rules bearing on their structure and function. He thus commences with *particular instances* (sentences) and finishes with *general laws* (grammatical rules).

Too long Grammar has been viewed as necessary in order that Composition might be. But "Grammar is not the stepping-stone," it is "the finishing instrument." Grammar is the hand-maiden of language, not the master, and should occupy the *second*, not the first place in language teaching.

Teaching Grammar before Composition is "putting the cart before the horse." As a remedy, some have said, "Abolish Grammar from the Schools," *i.e.* do away with the "cart." But the true remedy surely is to put the "horse" and the "cart" each into its proper place.

2. *The order is in accordance with natural development.*—Composition is the *Art* of language; Grammar the *Science*. "In following the process of nature, neither individuals nor nations ever arrive at the *Science* first. A language is spoken and written many years before either a grammar or a prosody is ever thought of."—(*Wyse.*)

The child in his development passes through the same great stages as those through which the race has already passed. Man first learned to talk, next he determined what correct language was, and lastly he formulated grammatical rules.

"As Grammar was made after language, so it ought to be taught after language."—(*Spencer.*)

3. *Composition deferred until late in school life is in many cases never learned properly at all.*—The child coming from a good home learns his native language in the best of all ways—by the imitation of good models. Unfortunately, however, "for children of good parentage alone is the national language the mother tongue." The teacher has often to undo the results of home speech, and if the undoing process is deferred too late, illiterate speech has become habitual; the teacher's task is increasingly difficult, and in some cases well-nigh impossible.

Having arrived at the conclusion that Composition should be taught as early as possible, it will be well to frankly acknowledge the difficulties we have to face, and then to devise means for overcoming those difficulties.

Difficulties of Teaching Composition

1. The incorrect English acquired outside the School.
2. The limited range of the child's vocabulary.
3. The paucity of the child's ideas.

4. The lack of power to arrange those few ideas into a connected sequence.

5. The labour attending the correction of a large number of Composition exercises—no two of which are alike.

In the Infants' School the teacher will be concerned mainly with *Oral Composition;* in the Senior Department the younger scholars should be taught the "*Mechanics of Composition,*" and with the older scholars some attempt should be made to improve the *style* and to cultivate a *taste* for good English.

The Infants' School and Oral Composition

The teacher's first duty is to train the child to *speak* correctly. Before entering the schoolroom, the child has learned some English (part correct, and part, unfortunately, incorrect) *through the Ear.*

Through the Ear (and in the earlier stages through the ear alone), the child should proceed to the acquisition of more correct English, and to the correction of the worst faults in his speech. The teacher's task is here twofold: in the first place, to correct the most glaring errors in the child's speech, and in the second, to increase the child's vocabulary. *The great instrument wherewith he has to work is the force of his own example.* He should take care to avoid slang, provincialisms, and slipshod expressions: in fine, his language should be "a well of English undefiled."

The first difficulty is to get the children to discard the usual method of answering a question in a word or a monosyllable and to get them in their replies to give answers in which they express themselves clearly and accurately in complete sentences. A series of Conversational Lessons on Objects is perhaps the best method of commencing the teaching of Oral Composition.

The work here may be divided into three stages:—

(1) The *presentation* of the object.
(2) The *naming* of the object.
(3) The making of a *statement* about the object.

Thus the teacher shows a ball and asks the questions:

(*a*) What is this?
(*b*) What can you see?

And instead of accepting the answer "a ball" to each of the questions, he teaches the children to answer—

(*a*) It is a ball.
(*b*) I can see a ball.

The variety of objects presented and the number of statements made about the various objects will do much to relieve the drudgery of this part of the process.

The following points should be observed :—

(*a*) Questions should not be asked which admit of "Yes" or "No" as a correct answer (see p. 36).

(*b*) Only answers in complete sentences should be accepted.

(*c*) The end of the sentence should be marked by the falling cadence of the voice.

There is no need to give any definition of a sentence. Indeed what definition of a sentence could be given that would be within the comprehension of a child of such tender years? What a sentence is will be learned from numerous examples. The child learns what is water and what is not, what is milk and what is not, what is a book and what is not, not by being given definitions of those things, but by observing to what things those terms are applied by others, and by himself applying those terms—sometimes rightly, sometimes wrongly—to many objects. In the same way, he will learn what a sentence is and what is not, without any formal definition.

There is no need for the child to be crammed with facts about the various objects presented. Only the most salient and the most easily recognised should be asked for and discussed. The Language Lesson is not an Object-Lesson. "The ability to give voluntary expression to a few ideas is of far more educational value than the acquisition of much information without the power of expression." At this stage, the chief mistakes (the chief only, and those principally concerning faulty concords) should be corrected.

The burr of the Northerner, the vowel of the Midlander, the cadence of the Westerner hardly call for correction, and certainly not at this early stage. The use of dialect words (provided they are pure dialect) need not evoke disapproval. The usual English equivalents should be taught, and the child should be encouraged to use them, but it is well to recollect at this stage that the great desideratum is to *increase* the child's vocabulary, not to diminish it.

It is to the use of false concords and to incorrect cases that attention should be mainly directed, and by the time the child is ready to be transferred to the Senior School, such barbarities as "You was," "He ain't," "Her done it," should have been eradicated.

Incidents connected with school and home life, conversational lessons on a picture before the class, the habits of domestic animals, such natural phenomena as are well within the purview of the child, can also be used as subjects of Language Lessons.

But lessons dealing with objects and with the subjects outlined above should be given exclusively only in the earlier stages. Such lessons might result in the use of correct English, but not in the *love* of good English and of good literature, and this,

after all, is one of the main objects of language lessons. Young as the children are they are not too young for the cultivation of the æsthetic sense.

Nursery rhymes, lullabies, fairy tales, fables, can be recited, sung, or narrated. The pictures in the reading-books can be described, and the substance of the matter contained in the reading lesson narrated in the pupil's own words. And here strenuous endeavour should be made to cultivate the power of *connected narration* and thus to develop the power of connected thinking—a practice which English teachers rarely observe.

In dealing with the Fable of *The Dog and the Shadow*, the English teacher generally proceeds somewhat as follows :—

What was the dog doing?	The dog was crossing a bridge.
What had he in his mouth?	He had a piece of meat in his mouth.
What did he think he saw in the water?	He thought he saw another dog with another piece of meat.

&c. &c. &c.

Whereas the German teacher says to the child :—

"Tell me the story of the Dog and the Shadow," and the child commences his narration somewhat as follows :—"A dog with a piece of meat in his mouth was crossing a bridge. Looking into the water, he thought he saw," &c. &c.

Little John has had his connected thinking done for him; little Hans has been made to do his own.

A short *continuous* narrative by the child is worth more than a longer narration interrupted a score of times by the teacher. Any criticisms upon the matter, or the manner of narration, should be reserved till the end.

The child should be taught to speak slowly and deliberately, to measure his words and his sentences, and to mark the end of his sentences by the falling cadence of his voice.

What may be described as the *breathless narration* (in which "and he," "and now," "but then" largely predominate) should be discouraged.

New words should be sparingly, but continuously, introduced. No word, however, should be admitted to which *some* meaning (not necessarily a *complete* one) is not attached.

So far, the Composition should have been entirely oral. Towards the end of the Infants' School course, the eye may be sparingly appealed to. Sentences may be occasionally written on the B.B. and transcribed by the class. *Much* oral work should, however, precede all written work, for the "swaddling clothes" of the written work cramp the flow of the child's thoughts, and thus emphasis on written work at too early a stage retards development in language.

SENIOR DEPARTMENTS

A. Younger Scholars

The work here should be an extension and elaboration of that already commenced in the Infants' School. The short story should still continue the principal means of teaching composition. Occasionally the geography or history lesson may, for the sake of variety, be made to supply the theme. Increasing attention should be paid to the three following points—punctuation, capitalisation, and spelling—not inaptly termed the "Mechanics of Composition."

The *Outline of some Lessons* at this stage will not be inappropriate.

OUTLINE OF TWO LESSONS IN ELEMENTARY COMPOSITION

I. Preparation.

(1) A carefully selected short story is read (or, preferably, told) by the teacher.

(*a*) The "drift" or purport of the story should be well within the comprehension of the children.

(*b*) Most of the words used should be already in their vocabulary, but this does not, and should not, exclude the sparing introduction of new words. One object of language lessons, as already pointed out, is to *increase* the child's vocabulary.

(2) The story may be re-read or re-told phrase by phrase by the teacher, and the class may perhaps be called upon to repeat it phrase by phrase.

II. Composition.

(1) A series of questions following the order of the story may be asked, individual children required to answer in *whole sentences*, and the best answer to each question written on the B.B.

(2) The B.B. should be turned, and individual children required to repeat part or whole of the story in their own words.

(3) The B.B. should be again turned so that the written story is once more before the class. Attention should be drawn to punctuation marks, capitals, spelling, &c.

(4) The story should be transcribed from the B.B.

(5) The B.B. should be cleaned, and the children at the next Composition Lesson should be required to reproduce the whole story, first orally and afterwards in writing.

III. Correction of the Exercises. See p. 163.

There are, however, some very decided and strong objections to a too long continuance of this method, for—

(1) Some children have such retentive memories that these exercises become mere parrot-like *reproductions* rather than genuine composition exercises. The children should be encouraged to vary as much as possible the form and contents of their sentences.

(2) They provide too many aids for the learner and so deprive him of the power of connected thinking (see p. 160).

AN OUTLINE LESSON FOR A LATER STAGE which presents fewer of these objections.

I. Preparation.

(1) The story is told to the class.

(2) Any new or unusual words employed are written on the B.B.

II. Composition.

(1) *Oral.*—Several children are required to tell the *whole story* to the class.

Note that this lesson differs from the preceding one insomuch as the whole story is to be reproduced without interruption.

(2) *Written.*—The story is reproduced by the children in their own words in their exercise-books.

III. Correction. See p. 163.

The advantages of the above outline method (which should be the one usually followed) are that connected thinking is encouraged and stereotyped phraseology avoided.

THE COMPOUND AND COMPLEX SENTENCE

So far, most of the sentences used by the children in their composition exercises will have been simple sentences. Efforts should now be made to get the children to use Compound and Complex Sentences. The linking up of Simple Sentences into Compound Sentences by the aid of *and* and *but* presents no difficulty. In dealing with Complex Sentences some such method as the following is suggested :—

Write sentences, of which the following may be regarded as types, on the B.B. :—

(*a*) Mary had a little lamb. Mary's lamb had a fleece as white as snow.
(*b*) A man sat by the wayside. He was a cripple.
(*c*) The boy stood on the burning deck. Every one else had fled from the deck. Get the class to combine the sentences thus—
(*a*) Mary had a little lamb which had a fleece as white as snow.
(*b*) A man who was a cripple sat by the wayside.
(*c*) The boy stood on the burning deck from which every one else had fled.

Some former composition exercises might be taken and the children encouraged to link up their sentences by the use of appropriate words of conjunctive force. After several lessons the children should be able to infer the proper uses of the relative pronouns and conjunctions.

B. Older Scholars

Provided the above scheme has been carefully and consistently followed, Composition for older scholars should present few difficulties. Exercises should be given on direct and indirect narration, essays on *familiar* subjects (aided at first by a skeleton scheme supplied by the teacher) should be set, and correspondence showing the methods of commencing and terminating various forms of letters should be dealt with.

CORRECTION OF COMPOSITION EXERCISES

With the large classes still unfortunately too common in our schools the Correction of Composition Exercises presents many difficulties. *Every written Composition Exercise should be corrected.* It is really better to have too much Oral Composition than to have written Composition Exercises which remain uncorrected, or which are corrected in a perfunctory and slipshod manner. And it is decidedly better to have a little composition (say a page) *well done and well corrected* than to allow the children to write a great deal carelessly, thus increasing both the amount that has to be examined and the number of errors to be corrected.

Composition exercises often have to be corrected in the teacher's "own time," but with a little ingenuity he can materially economise this encroachment on his leisure.

Opportunities for correcting composition exercises in school.

1. During a silent reading lesson.
2. During a lesson when the class is doing memory work.
3. During the time that two or more classes are "massed" for some special subject, *e.g.* singing, drill.
4. During an arithmetical test exercise provided each child has a separate test.

COMMON MISTAKES IN COMPOSITION EXERCISES AND METHODS OF DEALING WITH THEM

I. **Errors in Spelling.**—These should be underlined by the teacher, and during a subsequent lesson should be corrected by the pupil, and repeated correctly to the teacher.

II. **Errors in Grammar.**—The teacher should note in a special book the most common errors, especially those cockneyisms and provincialisms which are grammatical errors. These may be well dealt with in the Grammar Lesson.

The most common errors are—

(1) Non-agreement of subject and predicate.
(2) Confusion of past tense with past participle.
(3) Case of pronouns.
(4) Wrong sequence of tenses.

III. **Errors in Punctuation.**—These are perhaps best corrected by inserting the appropriate stops. Punctuation is best taught by directing attention to punctuated passages during the reading lesson.

IV. **Errors in Style.**—These errors will require most attention in the Senior Classes, for it is not until the child commences to write long sentences and to use uncommon words that errors in style will arise to any appreciable degree. The teacher should note sentences faulty in style, repeat them to the class, or write them on the B.B., and ask how the sentences may be improved.

Confused arrangement, awkward repetition of words, tautology, and pleonasm are some of the more pronounced errors in style.

INTRODUCTION OF FORMAL GRAMMAR

When the children are about nine or ten years of age, a little formal Grammar (just so much as will help and illustrate their composition) may be introduced. Just as the sentence was made the starting-point of composition, so it should be the starting-point for teaching formal Grammar. For the sake of clearness the teaching of formal Grammar is considered apart from the teaching of composition, but the two should proceed concurrently.

And here it may not be out of place to answer the pertinent question: "Since children can be taught to speak and write correctly by imitation alone, why teach any formal Grammar at all?"

REASONS FOR TEACHING FORMAL GRAMMAR

1. Grammar furnishes the pupil with a *criterion* for judging the correctness or the incorrectness of the language which he uses and which he hears.

2. Grammar renders his imitation of what is correct more intelligent; he learns to know the *why* of what he does.

3. Grammar systematises the knowledge of the various forms of language. It thus economises memory and abridges labour.

4. Grammar is one of the best, perhaps the very best, aid the young scholar has to abstract thinking.

Mathematics and Logic are par excellence *the* subjects involving the necessity of abstract thinking, but these subjects fall only to the few, whereas Grammar falls to the many. Grammar has been not inaptly termed the "Logic" and the "Euclid" of the primary school.

Summarising these reasons, we can say that Grammar should be taught because of its practical connection with Composition and Language teaching, and because it provides a valuable training in abstract reasoning.

Now, when we examine what parts of formal Grammar are necessary to a correct understanding of the principles of Composition, we shall perhaps be astonished at the small amount of formal Grammar actually needed. Our first Grammarians were Latin scholars, and so treated English as though it were a synthetic language like Latin. Hence we find terms introduced which are of little utility in the explanation of an analytic language like English.

WHAT PARTS OF FORMAL GRAMMAR NEED, AND WHAT PARTS NEED NOT, BE TAUGHT

1. **What must be Taught.**—We have already noticed (p. 164) that the agreement of Subject and Predicate, the case of Pronouns, and the sequence of Tenses are the chief sources of error in early efforts at Composition. To these may be added those mistakes connected with the Comparison of Adjectives and Adverbs. Applying our observations, we see that the parts of formal Grammar that must be taught are :—

(*a*) Of Nouns . . . . *Number, Case.*
(*b*) Of Pronouns . . . . *Number, Person and Case.*
(*c*) Of Verbs . . . . *Number, Person and Tense.*
(*d*) Of Adjectives and Adverbs *Comparison.*

2. **What may be Taught.**

(*a*) *Classification of Nouns* into Proper and Common, because this knowledge helps to explain the right use of capital letters.

(*b*) *Transitive and Intransitive Verbs*, because of the aid given in the consideration of Case.

(*c*) *Voice*, because many useful exercises in Composition (*e.g.* conversion of Active into Passive Voice) may be given in this connection.

3. **What need not be Taught.**

(*a*) *Classification of each part of Speech* (with the possible exception noted in 2 (*a*)).—The terms Abstract Noun, Adjective of Quantity, Negative Adverb, &c., are grammatical luxuries, not language necessities.

(*b*) *Gender.*—A grammatical distinction hardly existing in English, and introduced by the grammarians of the dead languages.

(*c*) *Regular and Irregular* (*or Weak and Strong*) *Verbs.*—The classification here is anomalous.

If it is necessary to thus classify verbs, then we ought to similarly classify nouns, calling those that form their plural by the addition of "s" Regular, and the others Irregular.

(*d*) *Mood*, because modern English has so little variation for mood.

(*e*) *Elaborate division and subdivision of Tenses.*

THE ORDER IN WHICH THE GRAMMATICAL TERMS SHOULD BE TAUGHT

1. Analysis should be dealt with before Parsing

Broadly speaking, the difference between Parsing and Analysis may be said to be: Parsing treats of the *word* in its relation to other words; Analysis treats of the *sentence* and divides it into its component parts. To the adult a *word* seems easier than a *sentence;* hence to commence with the sentence *seems* to vitiate the principle of proceeding from the simple to the complex. But to a child a simple sentence is a simpler thing than a single word. He can grasp the idea contained in a simple sentence and can paraphrase it by another sentence, but he is often quite at a loss to explain a word by substituting another for it. Besides, his exercises in composition have taught him to regard the sentence as the unit, and so, good method would prescribe the teaching of formal Grammar through the sentence rather than through the word.

2. Logical Analysis should precede Grammatical Analysis

Sentences should be taken (preferably at first from the child's own Composition Exercises) and should be divided into two parts :—

What is spoken about.	*All that is said about it.*
The cow	gives us milk.
My home	is five minutes' walk from the school.
A stitch in time	saves nine.
The children	are playing in the garden.

The Object and Extension.—The enlargement of the Subject should first be treated as part of the Subject, the Object and Extension as parts of the Predicate.

In course of time an Analysis Scheme somewhat as follows can be elaborated :—

Full Subject.		Full Predicate.			
Simple Subject.	Enlargement.	Simple Predicate.	Completion.		Extension.
			Object.	Enlargement.	

3. The Parts of Speech should be taught through Analysis

The *Noun* can be developed from the Simple Subject, the *Verb* from the Simple Predicate, the *Adjective* from the Enlargement of the Subject or Object, the *Adverb* from the Extension of the Predicate; the *Pronoun* can be taught as the substitute for the Noun Subject or Noun Object. The *Preposition* can be viewed as a connective of *words*, the *Relative Pronoun* and the *Conjunction* as connectives of *Sentences*.

GENERAL METHOD OF GIVING ANY GRAMMAR LESSON

I. Inductive Process

1. *Preparation of Examples.*

Get together a number of examples which illustrate the point to be taught.

These examples may be prepared by the teacher or selected from the scholars' previous composition exercises, or in some cases supplied by the children themselves at the commencement of the lesson.

2. *Manipulation of Examples.*

Ask questions upon the examples so as to bring into special prominence the words, phrases, or sentences which really supply the material of the lesson.

3. *Induction from the Examples.*

Draw special attention to the form or function of the words, phrases, or sentences, and get the children to embody the results of their observations into a Statement, Rule, or Definition.

A Statement embracing the leading characteristics of the word or group of words dealt with will often be better understood by the children and of more service to them than any set or formal definition.

The definition, if any, need not be full, but should be accurate as far as it goes. In some cases the Definition or Statement should be committed to memory.

II. Deductive Process

Supply, or better still, let the class supply, other sentences which contain the point especially dealt with during the lesson, and apply the knowledge gained from the Inductive Process to these new cases.

Grammar should be learned inductively, and applied deductively.

OUTLINES OF A FEW LESSONS DEVELOPED UPON THE LINES INDICATED ABOVE ARE NOW GIVEN

Outlines of a First Lesson on the Adverb

1. **Examples.**

Have the following simple sentences written on the B.B. :—

(*a*) The man walked.	The man walked slowly.
(*b*) John rose.	John rose early.
(*c*) The girl sees the horse.	The girl often sees the horse.
(*d*) The dog served an unkind master.	The dog faithfully served an unkind master.
(*e*) The king smiled again.	The king never smiled again.
(*f*) The man spoke.	The man spoke softly, quickly, slowly, then, soon, again.

Ask class to supply a word which tells *how* the man walked, *when* John rose, that the girl sees the horse *many times*, &c. Add appropriate words so that the sentences appear as shown in the right-hand column.

2. **Manipulation of Sentence** (*a*).

Let a child read sentence (*a*) and tell what parts of speech "*The*," "*man*," and "*walked*" are, and give reasons for answers. Proceed to "*slowly*." Elicit that it is not a Verb nor a Noun nor an Adjective.

3. **First Inference from Sentence** (*a*).

The word "slowly" is a new part of speech.

4. **Manipulation of Sentences** (*b*) to (*f*).

Deal with these sentences in a manner similar to manipulation of sentence (*a*). Underline on B.B. the words which are new parts of speech.

5. **Inferences from the Sentences** (*a*) to (*f*).

The words slowly, early, often, faithfully, never, &c., are new parts of speech.

6. Further examine the new parts of speech to discover their functions in the sentence.

Ask which makes the better sense, "*man slowly*" or "*walked slowly*." Proceed with other sentences. Note the part of speech to which the new part of speech seems linked.

7. **Inference.**

Each of these words is closely connected with a Verb.

8. **Introduction of the term Adverb.**

Take the sentence, "His house adjoins ours." Draw from class that "*adjoins*" means "*joins to*," and that consequently "*ad*" means "*to*." Write "*verb*" on B.B. Ask what syllable must be prefixed to make a word meaning "*to a Verb*." An Adverb is closely connected with a Verb.

9. **Further examination of the connection between Adverbs and Verbs.**

Take the sentences in (*f*). Again pick out the Adverbs, and the Verbs with which they are connected. Ask if we have the same idea of the "speaking" in "*spoke loudly*" as in "*spoke softly*."

10. **Inference.**

Adverbs slightly change the meaning of Verbs.

11. **Introduction of the term "modify."**—The word "modify" hardly comes in a child's vocabulary, and had better be told to the class.

12. **Preliminary Definition.**

An Adverb is a word which modifies a Verb.

13. **Application of the Definition.**

(*a*) Let class supply sentences containing Adverbs. In each sentence given, ask which word is considered an Adverb, and why it is so considered.

(*b*) Ask class to supply suitable Adverbs to the sentences which you give.

14. **Conclusion.**—Let class learn definition by reading it from the board, by transcribing it, and by repeating it from memory.

Note.—The definition of the Adverb can be extended to its ordinary form in subsequent lessons, and Adverbs can then be selected from suitable passages in the reading books.

The students should write another lesson leading up to the preliminary definition: *An Adverb is a word which tells how, when, or where an action is done.*

The student will discern that the lesson starts with the examination of *particular cases* (words in sentences), and leads up to the idea of a *class* of words (Adverbs); that the method of the lesson from par. 1 to 12 is **Inductive**, and that par. 13 is **Deductive.**

Outline of Lesson on Transitive and Intransitive Verbs

I. **Manipulation of Examples.**

(*a*) Previous to lesson, write on B.B. seven or eight examples, of which the following are types:—

1. Boys make. 2. Girls skip.

(*b*) Have the phrases divided into two classes—

1. Those in which the sense is complete.
2. Those in which the sense is incomplete.

Finish the incomplete sentences, *e.g.* Boys make kites.

(*c*) Draw attention to the fact that in "Boys make kites" the action expressed by "make" seems to pass over to "kites." Contrast with "skip" in "Girls skip."

II. **Introduction of Definition.**

(*a*) From the meaning of *trans* in *trans*port, *trans*mit, &c., infer that "*trans*" means "*across*." Introduce the term Transitive, and explain its meaning. Deal with Intransitive in a similar way.

(*b*) With help of class, draw up definitions—

Transitive Verbs express actions that are carried over to objects.

Intransitive Verbs express actions that are not carried over to objects.

III. **Learning of Definition.**—Have definitions repeated collectively and individually until well known.

IV. **Application of Definition.**

(*a*) Write some more sentences on the B.B., let class select Verbs, classify them, and state reasons for classification.

(*b*) Let class furnish examples.

(*c*) Have examples selected from reading books.

V. **Examination.**—Call upon individual scholars to repeat and apply definitions.

Note.—The question of Transitive Verbs in the Passive Voice should be excluded from a First Lesson.

Notes of a Lesson on the Indirect Object

I. **Manipulation of Examples.**

1. Previous to lesson, write on B.B. six or seven sentences, of which the following may be regarded as types :—(*a*) He sent me. (*b*) He sent the book.

2. Let class analyse the sentences, and then parse the Objects (*me*, *book*, &c.).

3. As far as possible combine two objects into one sentence, *e.g.* (*c*) He sent me the book; and also write on B.B. other sentences, each containing a Direct and an Indirect Object—

(*d*) I gave him the slate.
(*e*) The girl brought her the milk.
(*f*) The tailor made the boy a coat.
(*g*) They offered him it.

4. Have these sentences analysed. Direct especial attention to the Objects; contrast the forms *me*, *him*, *her*, &c., with *I*, *he*, *she*, and show that the former must be in the Objective Case.

II. **Deductions from the Examples.**

1. From the previous considerations deduce: *After some Verbs there can be two Nouns or Pronouns each in the Objective Case.*

2. Contrast as follows: He sent *the book*, he did not send *me;* I gave *the slate*, I did not give *him;* and tabulate the Objects as shown in the B.B. sketch.

3. Re-write the sentences thus—

(*a*) He sent the book —— me.

(*f*) The tailor made a coat —— the boy.

4. Have the spaces filled up, and deduce—

(*a*) *One of these Nouns or Pronouns is governed by the Verb in the Predicate, and is called the Direct Object.*

(*b*) *The other is governed by some Preposition*, generally *to* or *for* (*which may be expressed*), *and is called the Indirect Object.*

III. **Introduction of Definition.**

1. Assist the class to draw up some such definition as the following:—*The Indirect Object is used after some Verbs to complete the sense. The words to* or *for can be generally expressed before the Indirect Object, but these words are not necessary.*

2. Write Definition on B.B. Let class repeat.

IV. **Application of Definition.**

1. Write some fresh examples on B.B.

2. Let class select others from reading books.

V. **Examination.**

Give a few sentences containing Indirect Objects for analysis in exercise books.

BLACKBOARD SKETCH.

He sent me. / He sent the book. / He sent me the book.

I gave him the slate. / The girl brought her the milk. / The tailor made the boy a coat. / They offered him it.

Closely connected with the Verb.	*Not closely connected with the Verb.*
book.	me.
slate.	him.
milk.	her.
coat.	boy.
it.	him.
Direct Objects.	**Indirect Objects.**

He sent the book TO me.
The tailor made a coat FOR the boy.

The Indirect Object is used after some Verbs to complete the sense. *To* or *for* can be often expressed before an Indirect Object.

Notes of a Lesson on Adjectives, Adjective Phrases, and Adjective Sentences

I. Introduction of Examples.

Previous to lesson, have some examples (of which the following may be regarded as types) written upon the B.B. :—

(*a*) We walked through the wet grass.
(*b*) We walked through the grass damp with dew.
(*c*) We walked through the grass which was moist with the evening dew.

(*a'*) I thrice presented him a kingly crown.
(*b'*) I ,, ,, ,, a crown fit for a king.
(*c'*) I ,, ,, ,, a crown which a king might wear.

II. Manipulation of Examples.

1. Have sentence (*a*) analysed and the word *wet* parsed.
2. Ask for words in (*b*) and (*c*) which are used instead of *wet.*

Compare and contrast (*b*) "damp with dew" with (*c*) "which was moist with dew." Each expresses an idea, but (*c*) contains a finite Verb, whereas (*b*) does not. Teach the term *Phrase.*

III. Introduction of Terms.

1. Review again—
   (α) "Wet" is an Adjective.
   (β) "Damp with dew" is a phrase doing the work of an Adjective.
   (γ) "Which was moist with the evening dew" is a sentence doing the work of an Adjective.
2. Draw some such definitions as the following from the class :—

A Phrase is a group of words which expresses an idea, but which does not contain a finite Verb.

An Adjectival Phrase is a phrase which does the work of an Adjective.

An Adjectival Sentence is a sentence which does the work of an Adjective.

IV. Practice by Class.

(*a*) Take a sentence containing an Adjective and require its expansion into an Adjective Phrase and an Adjective Sentence; *e.g.*—

(1) A traveller met a *hungry* man.
(2) ,, ,, a man *exhausted from want of food.*
(3) ,, ,, ,, *who had not tasted food for two days.*

(*b*) Similarly, compress an Adjective Phrase into an Adjective, and expand it into an Adjective Sentence—

(1) Ingratitude, *more strong than traitors' arms,* quite vanquished him.
(2) *Deep* and *base* ingratitude quite vanquished him.
(3) Ingratitude *which wounded him more than traitors' arms* quite vanquished him.

(*c*) Next compress Adjective Sentences into Adjective Phrases and into Adjectives.

Note.—In order to improve the vocabulary of the children, they should be required to give a paraphrase of the Adjective when it is expanded into an Adjective Sentence; *e.g.* something better than "The traveller met a man who was hungry" should be expected as an expansion of the adjective "hungry."

B.B. Sketch.

Sentences as shown in Notes.
Definitions ,, ,,

SOME MISTAKES IN TEACHING FORMAL GRAMMAR

1. Definitions or Principles are taught First

In this case the lesson consists of two parts—

(*a*) The learning of the Definition.

(*b*) The application of the Definition.

The whole of the Inductive Process is omitted, and a most valuable instrument of cultivating the reasoning powers of the child is thereby neglected.

2. Words are Confused with Things

(*a*) *Confusion of the Noun and the Thing.*

The classic example is :—Teacher holds up a slate and asks "What is this?" "A slate." "What part of speech is it?" "A *Noun*."

Here the *thing* slate is confused with the *word* slate. Even the youngest teacher to-day would, it is hoped, avoid such an error, but the following instances of confusing the word and the thing are more subtle :—

(*b*) *Confusion between Sex and Gender; e.g.* when women are spoken of as "the feminine gender." Gender is a grammatical distinction which corresponds with the physical distinction of sex.

(*c*) *Confusion regarding descriptive Adjectives.*

In the phrase "the large jug," the word "large" is often parsed as an Adjective describing "jug." "Now "large" may be part of the description of the *thing* jug, but it is no part of the description of the *word* "jug," which is not a "large" word at all, but a "small" one of only three letters.

(*d*) *Confusion regarding the Possessive Case.*

In the phrase "a woman's dress," woman is often parsed as possessive case possessing "dress." The *thing* woman may possess the *thing* dress, but the *word* "woman" cannot possess the *word* "dress."

3. Too much Assistance is given by the Teacher

Often the young teacher in his anxiety to "get the children on" does all the thinking, whilst the children do merely the mechanical answering.

Thus in dealing with the analysis of the sentence, "The boy stood on the burning deck," the following faulty method is adopted: "What is the Subject? Who stood on the deck?" "*The boy.*" "What is the Predicate? What did the boy do?" "*Stood on the burning deck.*" "Is there any object of the Predicate? Did the boy stand anything?" "*No.*" "What is the extension of the Predicate? Where did the boy stand?" "*On the burning deck.*"

Such questioning as this involves practically no reasoning on the part of the child.

4. The Supplying of Mechanical Aids

Lists of prepositions, conjunctions, &c., are given to the children to be committed to memory.

The child is taught to classify according to the *form* of the word rather than according to its *function*—to rely upon his memory rather than upon his reasoning powers.

5. Reasons for Answers are not insisted upon, and guessing is thereby encouraged.

6. The Use of Terms such as "qualify," "modify," are allowed before those terms are well understood.

THE STUDY OF LITERATURE, ESPECIALLY POETRY

The main objects in the study of literature should be the training of the imagination and the development of the æsthetic faculty. Subsidiary objects are the training in the right use of language and the exercise of the memory.

Young as the children are, they are not too young to appreciate good literature, for some of our most exquisite poetry owes its beauty to its simplicity, and its *general purport* is well within the comprehension of the child.

Unfortunately it must be confessed that too many of our scholars leave school with a thorough distaste for poetry and indeed for any really good prose literature. They have learned to read, it is true, but their *taste* has not been cultivated—hence the rise of "snippet literature," and the penny novelette.

CAUSES OF THE DISTASTE FOR POETRY

1. The Selection of Poetical Passages for Parsing and Analysis

A poem is looked upon as a sort of quarry from which "chunks" are dug out for parsing and analysis. Little or no attention is given to beauties of diction, and poetry is regarded as a "beastly thing" with out-of-the-way words and tiresome inversions. The archaic words apparently exist only to be explained, and the inversions seem especially inserted to serve as pitfalls in parsing and analysis.

Extracts selected for grammar exercises should as a rule be *prose* passages. Poetry should be kept for the admiration of the pupils: it should be used but sparingly for grammatical gymnastics.

2. The too great Insistence upon Verbal Accuracy in the Commission of Passages to Memory

Children are set to learn 50, 70, or 100 lines of poetry as a *year's* work in literature. The passage selected is too often torn from its context, and is committed to memory in homœopathic doses. When the whole passage is at last learned it is repeated *ad nauseam*. Poetry thus comes to be regarded as a "horrid grind," on a par with the Multiplication Tables and the aliquot parts of a pound.

If, in his repetition, the child substitutes a not inapt synonym for some word or phrase, or if he cannot "go on" at once on being given his "cue," he incurs censure of some kind or another. No wonder that the average child "hates poetry." It is not wise to allow work to be slipshod, yet it were better for a child to learn 250 lines of poetry in a year which he can repeat with *fair* accuracy than for him to be able to repeat only 50 lines, albeit those 50 be of letterpress accuracy. "The letter killeth, the *spirit* quickeneth."

3. Too much Explanation is given and required

The child is supposed to be able to explain every *phrase* and every *word* in the passage learned—"All the meanings and allusions have to be known." Now we feel that much of our

noblest poetry is grand, because there is *something* in it which we *feel* but cannot express. Indeed, if we try to express the meaning, we find our words inadequate, and we find that whereas before "Explanation," the poet was raising us to his level, after "Explanation," we have dragged the poet down to ours.

We are cultivating the æsthetic faculty when we get our children to *feel* beautiful thoughts, not when we endeavour to get them to *explain* them. Everything should not be explained—something should be left to the imagination.

If the child can give in his own words the general drift of the poem, that should be sufficient.

Too often, to explain a passage too fully is to destroy its beauty. The apotheosis of this rage for explanation is seen in too many of our annotated editions of the poets, in which the annotations frequently occupy more space than the text.

4. Long Passages of Poetry are rarely Studied

No training is given in continuity of thought—hence one reason for the desire of snippet literature before referred to.

CHAPTER VIII

GEOGRAPHY

ITS PRACTICAL VALUE.—The practical value of the study of Geography is patent to the most superficial observer. In this age of newspapers, in which yesterday's history of the world is upon the breakfast table of nearly every household, in this age of quick transit, of international competition, of emigration, and of colonial expansion, a knowledge of Geography is absolutely necessary, not only to the man of commerce and to the man of enterprise, but also to the man who desires to be well informed upon topics of everyday life.

ITS INTELLECTUAL VALUE.—Geography has also an intellectual value which has been till recently strangely overlooked. Formerly the study of Geography was a mere memory exercise, and consisted of little else than the recital of lists of boundaries, mountains, rivers, productions, and manufactures. To-day the child's powers of observation, of imagination, of reflection, and of reasoning, are all called into requisition in the teaching of Geography.

Thus, after some formal lessons in form, position, and direction, the child is made to *observe* the build of the country in the immediate vicinity of the school; from his personal observation of a hill, and by successive efforts of *constructive imagination*, he is led to elaborate a mental image of a mountain; from a consideration of the position and aspect of a country he is led to *infer* its climate; from a consideration of the position, soil, and climate of a country he is taught to infer its productions and the occupation of its people. Everywhere he is trained to study causes, to note effects, and to connect causes with effects. In short, Geography is no longer a compendium of heterogeneous details; it is speedily and surely asserting its place as a *Science*.

METHODS OF TEACHING GEOGRAPHY

The Old Method

The opening sentences of a text-book in Geography much in vogue a generation back ran somewhat as follow: "The

Earth is an oblate spheroid, or put into more familiar language, the Earth is round like an orange." Leaving out of consideration the fact that the first statement was incomprehensible to the young child, and the second incorrect, the method of presentation was sadly at fault, insomuch as it began with something quite outside the purview of the child, instead of commencing with something with which he had already some acquaintance. Next, the young learner proceeded to commit to memory "definitions of land and water." If the lesson were recited correctly, the teacher deluded himself into the belief that the scholar was learning some Geography. But the child rarely realised that the examples illustrating the definitions which he learned were ever before his eyes—that the slope up which he walked on his way to school had many points in common with the mountain, and that the gutter after the April shower was typical of the river.

The New Method

1. *After preliminary lessons in form and direction, the child is led to study those geographical features within the range of his own observation.*

The teacher of to-day approaches the beginnings of Geography not through text-books nor even by word of mouth, but by getting the children to observe by means of School Excursions (see p. 216) and in other ways the geographical features of the immediate neighbourhood. The Lessons on the River (p. 191) illustrate this stage of the method. The environment of the school must be uninteresting indeed that does not furnish examples of the commoner geographical terms.

The children in a hilly district should be made to observe first the hill and dale, the mountain and the valley, the lake, the spring, the tributary, and the river near at hand. Children near the sea could commence with the cove, the bay, the river mouth, the rocky islet, and the sea.

The town child stands here at some disadvantage, but the ingenious teacher will turn the ornamental water in the park, the hilly and the flat road, the puddle and the gutter, all to good purpose. The town boy has a compensating

advantage later on, when he deals with Commercial Geography, for from an inspection of the goods and the advertisements displayed in the shops, he is able to glean much information denied to his country brother concerning the place of origin of many articles in daily use.

Maps should be drawn of the district studied, and only after the neighbourhood of the school has been exhausted should the study of formal Geography commence. The school-house, the church, the village, the roads to the nearest town, the town-hall, the railway, the canal, will form an admirable introduction to Political Geography, while the rising and setting of the Sun, the position of the Great Bear and the Pole Star, will lead up to the study of the little Mathematical Geography required. Object Lessons also may be made useful. Lessons on Granite, Limestone, and Chalk may be made introductory to lessons on the mountain and hill systems of England, lessons on Coal and Iron may be connected with our coalfields and our iron industries; similarly lessons on Cotton, Wool, and Leather, may well precede lessons on the Cotton, Woollen, and Leather industries.

2. *Gradually demands are made on the Child's Constructive Imagination.*

Clear and correct mental images can be built up only on the results of clear and correct observation. When the child has exhausted the things in his immediate neighbourhood, his imagination should be appealed to.

"Things near" should be made the basis of explanation of "things far," and rough analogies should be drawn between what has been seen and what has to be imagined. The lesson on a *Mountain* (p. 190) may be taken as a type of a lesson developing the powers of constructive imagination.

3. *As the study progresses greater demands are made upon the Child's powers of reasoning.*

Even in the early lessons, Geography makes *some* demands upon the child's reasoning powers, but as more and more information is acquired, determined efforts should be made to collect and classify that information, and to trace cause and effect. The connection between the position of coalfields and

the position of our large manufacturing towns, the connection between the "slope" of a country and the length of its rivers, between the character of the soil and the occupation of the people, are a few examples.

The elements of Mathematical Geography afford fine scope for training the reasoning powers. The outlines of Lessons on Day and Night (pp. 194–196) are given in illustration.

4. *Memory is made the Handmaiden and not the Master in the Study of Geography.*

Important data in Geography must be learnt by heart: they have to serve as "pegs" upon which other things will hang, but there is no need for the committal to memory of long lists of geographical data, *e.g.* the capes and bays of England, the heights of the principal peaks of the Alps, &c., the lengths of the rivers in South America, the populations of many countries and towns, exports and imports of particular countries, &c.

The child should have studied and drawn the map of England so frequently that he is able to call up a memory image of the map, and from this he should be able to select any important cape or bay that may be required. The appeal should here be to the *Visual*, not to the *Verbal* memory.

He might, with advantage, learn the height of Mont Blanc, in *round* numbers, and compare its height with Snowdon, because Mont Blanc (and Snowdon) will form a sort of standard to which other mountains may be referred. There is no practical utility in knowing the exact height in feet of a score of Alpine giants, nor can any great truth be elicited from the figures. They burden the memory without enriching it. Still less reason is there for learning populations, since they are constantly changing, and what is true one day is not true the next.

Lists of exports and imports of particular countries should not be learned by heart. The child should learn by heart the chief organic productions of the various climatic zones: he should know something of the climate of the country in question, the industry of its inhabitants, and from these data he should infer the exports and imports of the country.

5. *Illustration and Models supplement, and do not supplant the use of Actual Objects.*

The good teacher will draw attention to *things*. He will use models and pictures to supplement those things, or when those things are not possibly available. The *thing* first, the model afterwards, should be the rule.

It is so much easier to talk about a river, or to show a picture of a river, or even to make a model of a river, than it is to make a child actually *observe* a river, that too many teachers fall into the error of adopting the "short and easy" course.

Inexpensive models can be easily made to illustrate the simpler definitions. Plans and maps (and the best are those drawn before the class) should be freely used. The globe is indispensable in many lessons. Specimens of productions, exports, imports, and manufactures should be shown and *examined* whenever practicable. Some ingenious teachers draw large maps and put the actual objects over the places where they are found, grown, or manufactured. The lantern is rapidly coming into favour as a means of teaching Geography. We must, however, beware lest the child sees so many slides that he carries away no distinct impression of any one, and also that in the admiration of the "beauty" of the picture he misses altogether the truth or truths the picture is designed to teach.

Hints on Making Geographical Models.

Geographical models may be made in clay, moist sand, plasticine, or paper-pulp.

Kinds of Clay.—Potters' white or grey clay will yield the best results. Terra-cotta or brown clay will produce good results, but the latter is apt to be gritty.

The Conversion of Hard Clay into Plastic Clay.—The teacher will probably receive the clay in a more or less hard condition, and it will be necessary first to make it plastic, but not so soft that it becomes sticky. *The secret of success is the addition of enough, but not too much water.*

1. Break or cut the clay into small pieces. Place in a pail, or better still, in a shallow wooden box which, preferably, should be lined with zinc.
2. Saturate a woollen cloth with water. Wring out very lightly.
3. Place the wet cloth over the pieces of clay. Allow it to remain there for several hours.
4. Knead several pieces of clay on a board into lumps about the size of the fist. Some of the lumps are likely to be a bit too soft, others a bit too hard.
5. Work hard and soft lumps up together until the required consistency is obtained. The clay is of the requisite consistency if, when thus worked up, it yields easily to the pressure of the thumb, and the thumb does not stick to the clay, but can be brought away clean.
6. When the clay is of the proper consistency, it may be maintained in a fairly workable condition by spreading a moist (but not too wet) woollen cloth over it, and moistening the woollen cloth every night and morning.

To make a Simple Clay Model.

1. Cut off from the mass of clay the quantity required for the part (island, cape, mountain, &c.) it is proposed to model. Place upon the modelling board or tray.

2. The clay should not be manipulated more than is necessary. The heat of the hands causes it to become dry and cracked, the model is not satisfactory, and clay dust falls upon the table and the floor. It is well to keep the fingers moist by occasionally damping them on a sponge which should be just moist, but not wet.

3. A piece of wood shaped like the handle of a tooth-brush will be found useful for finishing off a model.

4. Where a large model is necessary, the substructure can be made of crumpled paper and the clay worked up on top.

Moist Sand. — Moist sand has many advantages over clay. It is less expensive, more easily obtained, easier to manipulate, and more cleanly in working. Some teachers prefer to have a groundwork of clay, and to indicate such physical features as hills, mountains, plateaux, &c., with moist sand. The great defect of moist sand is that it cannot be made into a permanent model.

Plasticine.—Plasticine is an artificial product which has recently come into favour for school models. As its name implies, it is very plastic, and it keeps moist for a long time with very little attention.

Paper-Pulp.—Perhaps this is the most satisfactory model-making material, especially if it is desired to make the model permanent. Paper can always be obtained, and the manipulation of paper-pulp is clean and easy. It is not so liable to crack in drying as clay is, and it colours much more readily and more effectively than clay does.

Method of making Paper-Pulp.

a. Tear some old newspapers into small pieces. Blotting-paper will be even better, but becomes expensive when large quantities are required.

b. Soak for some time in water. Stir frequently.

c. Afterwards squeeze and roll in hands till the whole is reduced to pulp.

d. Pour off the superfluous water.

e. Take small lumps of the pulp and gently squeeze them, till they seem to be of the proper consistency.

f. Knead the small lumps together into a compact mass. During this operation keep the hands moist with a damp (but not wet) sponge. The paper-pulp is now ready for use.

To make a Paper-Pulp Model of a Country or of any part of it.—[Much the same method may be pursued in making a clay model, or a temporary moist sand model.]

Apparatus.

1. Paper-pulp, plastic clay, or moist sand in sufficient quantity for the completion of the model.

2. A board or tray.

a. A piece of cardboard will do for a small permanent paper-pulp model.

b. A large board about the thickness of a drawing-board and about 3 feet square will answer well for ordinary class purposes.

c. A tray about 3 feet square with an inside depth of 2 to 3 inches is of great service. When the pulp or clay model is completed, water coloured blue can be poured in to represent seas or lakes.

d. Some teachers who model in moist sand use a tray with a glass bottom. The parts of the glass uncovered by the sand can be supposed to represent the sea. The course of a river can be traced out in the layer of sand, and the

glass which is exposed represents admirably the water of the river. Blue paper on the bottom of the tray answers nearly as well as a glass bottom.

3. A map of the district to be modelled.—Contour lines upon this map will be of great assistance in enabling the teacher to represent with fair accuracy the comparative elevations of various parts of the country.

4. Some blue-coloured water.—A little solid aniline blue can be purchased for a few pence, and will last a long time.

5. A knife or a wooden modelling tool.

The Building of the Model.

1. Draw the outline of the country or district in black lead on the modelling board.

2. Cover the surface to be represented by land with a layer of pulp of about one inch in thickness. The pulp should be made of uniform thickness.

3. Add pulp to represent the hills, mountains, promontories, &c. Work these up into the required shapes.

4. Trace out the chief river channels by lightly pressing on model with a blunt-pointed slate-pencil or a modelling tool.

5. Next direct attention to the coast-line, and remodel any parts that may have become somewhat distorted in operations 3 and 4.

6. If the model has been made in a tray, pour in blue-coloured water to the depth of about half an inch to represent the sea. Take care that the blue water does not splash over the model.

7. If it is desired to make the model permanent, it would be advisable not to pour in the water at all, because the water causes the coast to become pappy, and distortion in drying frequently results.

8. Let the model dry slowly and thoroughly. Place it out of the way of dust in a room or cupboard of fairly equable temperature.

9. Trace out the tributaries of the rivers, the main streams of which have been already traced out in 4.

10. Colour and varnish the whole model.

ORDER OF INSTRUCTION IN GEOGRAPHY

With Brief Hints and Illustrations

I. PRELIMINARY LESSONS IN FORM AND POSITION.

1. Simple Plans.

(*a*) Draw and get children to draw plans of knitting-needle, cardboard squares, triangles, circles, &c., *the same size as the objects.*

(*b*) Draw ground plans of kindergarten cubes, oblong blocks and balls, &c. Contrast these with the objects themselves and with pictures of them.

A plan is a drawing of a small area.
A map is a plan of a large area.
A picture is a likeness.

2. Introduction of the Idea of Proportion.

This is a difficult stage, and two lessons are given on pp. 187–188 in illustration.

3. Drawing of Plan of Class-room, School, and School District.

The plan of the class-room should be drawn to scale *from measurements taken by the children.* The board on which the plan

is drawn should be placed on the floor, and only when the plan is completed should it be put upon the easel. Details should be omitted. The plan must be simple to bring it within the capacity of the children. The plan of the school can be drawn to scale on the asphalt of the playground, likewise from actual measurements.

The first "plan" of the school district should merely show the position of the church, the chapel, the pump, &c., with reference to the school; it should not be in any sense a *map* of the district. This can well wait for a later stage.

II. PRELIMINARY LESSONS IN DIRECTION.

The Cardinal Points.

(*a*) Draw attention to position of sun at mid-day, at early morning, and in the evening, thus introducing the terms *south* (and its opposite *north*), *east*, and *west*. Emphasise that N. S. E. and W. are *directions*, and not any special spots.

(*b*) Get children to describe things in schoolroom as N. S. E. and W. of one another, next locate the class-room as regards the whole school, then have the positions of buildings outside the school fixed as regards the school itself.

(*c*) Interesting lessons on the weathercock, the magnet, and the school compass may be introduced at this stage.

III. INTRODUCTION TO MORE FORMAL LESSONS IN GEOGRAPHY—TOPOGRAPHY OF THE NEIGHBOURHOOD.

The Definitions of Land and Water.

A.—As many as possible should be taught by getting the children to observe (by school excursions, &c.) the physical features in the immediate vicinity of the school. (See also p. 216.) The order of instruction should be—

(*a*) The study outside the schoolroom of an actual example of the "definition."

(*b*) The study of a model of it in the class-room.

(*c*) The introduction of a picture and of a plan illustrating the "definition."

(*d*) Identification on a map—preferably the map of England.

(*e*) Committal of the "definition" to memory.

(*f*) Application of knowledge to new examples. See the lesson on a River, p. 191.

B.—Those definitions outside the child's environment should be taught by models and by appeals to the child's constructive imagination. See the lesson on a Mountain, p. 190.

The principles of comparison and contrast should be freely employed. Thus the lake should be contrasted with the island, the cape compared with the peninsula, &c. Too much importance is sometimes attached to the exact definition to be memorised by the children. Try to impart clear notions rather than parrot-like verbal precision.

IV. INTRODUCTION TO PHYSICAL GEOGRAPHY.

Lessons on Evaporation and Condensation, Clouds, Rain, a puddle, springs, a river, the work of rivers, a glass of sea water, the sea, waves, beaches, hard and soft rocks, denudation, could be advantageously given at this stage.

V. INTRODUCTION TO MATHEMATICAL GEOGRAPHY.

Lessons on a Circle, a Sphere, Appearances of Objects when placed at different points on a sphere, the Shape of the Earth, the Size of the Earth, the Force of Gravity, the Cause of Day and Night, the Causes of the varying lengths of Day and Night, are the chief lessons that should be given. (For outlines of lessons on Day and Night, see pp. 194–196).

VI. THE GEOGRAPHY OF ENGLAND AND WALES.

1. A lesson on the Union Jack (see p. 200) could be made preliminary to a lesson on the position of England as regards the British Isles.

2. An introductory lesson on the Build of England should follow.

3. Parts of England should then be separately studied, and everywhere the study should be made as real as possible by appeals to *things;* thus a lesson could be given upon an object, followed by a Geography lesson upon the district with which that object is connected; for example—

Object-Lesson.	*Geography Lesson.*
Slate.	North Wales.
Granite.	Lake District.
Limestone.	Derbyshire.
Chalk.	North and South Downs.
Coal.	Coalfields.
Kinds of Iron.	The Distribution of Iron and the Iron Industry.
Iron Ore.	
Iron Manufacture.	
Cotton.	The Cotton Industry.
Wool and Clothing.	The Woollen Trade.
The Soil: its Cultivation.	The Eastern Counties, South-east England, and Devonshire.
Milk.	The Dairy Industry.
The Horse and the Cow.	The Live Stock Industry.
Steam, Steam Engine.	Railways of England.
Rain, the Rain Gauge.	The Climate of England.

Sketch maps should be drawn upon the B.B., a large map should be used as reference, and each child should be provided with a small hand-map.

4. **An Introduction to Economic Geography** can be well made at this stage. If the school is in a manufacturing district, the source of the raw materials, the processes of manufacture, and the market for the manufactured articles can be dealt with. If the

locality is connected with foreign commerce, the docks, the ships in them, the ports from which they come or to which they go, their routes, the cargoes in them, will yield a great fund of information.

VII. GEOGRAPHY OF THE BRITISH ISLES.

The Geography of Scotland and Ireland should be taught upon the same lines as that laid down for England, less attention being directed, however, to details.

VIII. GEOGRAPHY OF THE BRITISH EMPIRE.

The position of the chief colonies should be taught by reference to the Map of the World, their climate and productions inferred from their positions, and the chief routes to the various colonies and dependencies should be shown. The relative positions of the principal countries of the world will be taught incidentally. Detailed attention should be given to such "homes beyond the seas" as Canada, Australia, and South Africa.

IX. GENERAL GEOGRAPHY OF THE CONTINENTS.

The children will have learned much incidentally, but the knowledge acquired will require systemisation and expanding.

The Continents may be treated under the following heads :—

(*a*) Position, surface, chief mountains and river systems.
(*b*) Varieties of climate, productions, chief centres of population.
(*c*) Chief political divisions: means of communication.

NOTES OF LESSONS

FIRST IDEAS OF PROPORTION

Apparatus.—*Coffee-pot; tea-cup; slates or squared paper for class; B.B.*

I. Things out of Proportion.

1. Show a coffee-pot. Sketch it, making spout too large (Fig. 1). Compare with object, and invite criticism.

Fig. 1.

Fig. 2.

Class tells that *the spout is too large.*

2. Try another sketch. Make handle too large (Fig. 2).

3. Make still another sketch with the lid too large (Fig. 3). Proceed as in the first case each time.

Fig. 3.

Fig. 4.

4. Sketch the coffee-pot correctly (Fig. 4), and elicit that—

(*a*) The drawing is correct.
(*b*) In the previous cases the drawings were neither the true shape nor size.
(*c*) The parts must be a certain size with respect to one another; *i.e.* if one part is half size, the others must be half size, and so on, or **the parts must be in proportion.**

II. Exercises in Proportional Drawing.

The children should now be given exercises on common objects, *with a view to cultivating the idea of relative size.* Slates, pencil-box, table, &c., might all be utilised. The objects should be measured and the drawings made half or quarter of the actual size.

FIRST IDEAS OF SCALE

Apparatus.—*Three pictures of the same place or object of different sizes; some small simple objects* (*kindergarten blocks, cubes, inkstand, inkwell, &c.*).

I. Develop the idea of Scale.

1. Show three pictures of different sizes of the same place or object.

Note.—Photographs or pictures are best. But if they are not attainable, the teacher could easily prepare before the lesson three shaded drawings of a common object like the square prism, or a cube. The drawings should be fairly accurate and of different sizes.

2. From an examination of the pictures get the class to note:—

(*a*) Each is a likeness of the same object or place.
(*b*) The pictures are of different sizes.
(*c*) The size has nothing to do with the likeness.
(*d*) The proportion is the same in each case.

II. Introduce the word "Scale."

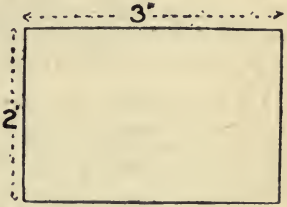
1. Draw a plan of the school table on the B.B., which should preferably be on the ground.

It is at once obvious to the children that it must be drawn less than its real size.

Let a boy come out and measure the table with a tape measure. Suppose the dimensions to be 3 ft. by 2 ft.

2. Remind class that we can have the drawing what size we like. Suppose we have it *half size.*

The teacher should now elicit that the dimensions become 1½ ft. by 1 ft. The plan should then be drawn on the B.B.



3. Now call attention to the fact that—

(*a*) The plan is the shape of the object.
(*b*) The proportion is correct.
(*c*) But the size is different.

Compare the sizes of the object and the drawing, and elicit that ½ foot or 6 inches on the plan represents 1 foot on the object. Then tell the class that such a plan is said to be drawn to **scale,** and that **the scale is said to be one-half, or 6 inches to the foot.**

4. Call attention to the pictures again, and elicit that they were taken or drawn to different scales.

III. A Corrected Idea of a Plan.

1. Introduce some simple small objects, such as can be drawn half size on the slates or squared papers of the class. In each case measure the object, dictate the dimensions, and tell the class to draw the plans half size, or to the scale of 6 inches to the foot.

Get the class to note—

(*a*) The sizes of the different plans vary because the sizes of the different objects vary.
(*b*) The scale is the same in each case.

2. Recapitulate the previous idea of a plan, and get class to note that plans tell—

(*a*) Something about the shape of bodies.
(*b*) Their position and distance from one another.
(*c*) Their relative sizes, but—
(*d*) **Not always their real size, because they are sometimes drawn to scale.**

Note.—2, *a*, *b*, *c*, and *d* could be used as a B.B. Summary.

MOUNTAINS

Apparatus.—*Model of hill; of England; pictures of mountain scenery; map of England.*

Very few English children will have seen a mountain, but many will have seen a hill. The object of this lesson is to endeavour to get the children to form, by constructive imagination, a correct mental image of a mountain.

I. Development of the Idea of a Mountain.

(1) Get the children to name a hill or hills in the neighbourhood of the school. Ask how long it takes them to get to the top. Now endeavour to get children to imagine a "hill" so high that three, six, twelve or more hours are required to reach its summit.

(2) In the early morning, or on a dull day, the children may have noticed a cloud resting on the top of the hill. Picture a "hill" so high that a cloud rests on its summit even on some fine days; and, if possible, show a picture of a mountain partly covered with clouds.

(3) The children may have observed that the grass, &c., does not grow so freely on the top of the hill as in the valley. Describe the ascent of a very high "hill," the gradual stunting and the final disappearance of the trees, the gradual disappearance first of grass and then of moss, and lastly a summit absolutely bare of vegetation.

(4) The children may have observed that in winter the snow remains on the top of the hill some time after it has melted in the valley, or they may have noticed that the top of the hill is white with frost or snow in the early morning when there has been no frost or snow in the valley beneath.

(5) Summarise, by drawing a word-picture of a very high "hill," the ascent of which takes some hours, which has a summit sometimes enveloped in clouds, bare of vegetation, and covered the whole or the greater part of the year with snow. The term "Mountain" may now be taught.

(6) Show some pictures of mountains; also of parties of mountaineers making ascents, &c. Vividly describe the ascent of a snow mountain.

Definition.—**A mountain is a very high hill.**

II. Examination of the Model of England.

(1) Direct attention to the model, and get the children to see that the mountainous parts of England are in the north and west.

(2) Point out the position of Snowdon. Show pictures. Let the thickness of one book represent the height of the church spire (say 100 feet), then take five books to represent the height of the nearest hill (say 500 feet), and lastly, pile thirty-five books against the wall to represent the height of Snowdon.

(3) Get children to observe that some of the mountains in the model are arranged in a "line," and some in a "crowd" or "ring." Teach the terms "Chain" and "Group." Have the positions of the chains and groups of mountains in England pointed out.

III. Examination of Map.

Show how mountains are marked on the map.

Note.—The term "Watershed" may be taught in connection with the term "Chain."

Blackboard Summary

A mountain is a very high hill.
Some mountain tops are always covered with snow.
A mountain chain is a line of mountains.
A mountain group is a crowd of mountains.
Snowdon is the highest mountain in England and Wales.

A RIVER

(FIRST LESSON)

I. OUTDOOR WORK.

In order that the maximum benefit may be derived from the following lessons on a river, the children's attention should be directed (by a school excursion, or otherwise) to the nearest stream, and as many of the following points as possible should be observed :—

(1) The water in the stream flows.
(2) The water flows faster in the middle than at the sides. (This may be noticed by observing boats, twigs, &c., floating in the stream).
(3) The direction of the stream is not straight, but winding. Attention should be drawn to the various obstacles to a straight course.
(4) The stream widens in the direction of the flow, and becomes narrower in the opposite direction.
(5) The stream is joined by watercourses from fields.
(6) Beds of sand and gravel are found at sides; in the middle, beds of stones.
(7) The shape, size, and arrangement of the pebbles may be noticed: also their similarity to, or dissimilarity from, surrounding rocks. Characteristic pebbles might be collected.
(8) Several bottles of water should be obtained from the stream.

II. CLASS-ROOM WORK.

A clay model should be made of the basin of the neighbouring stream, and a large map of the district should be drawn on the B.B.

The facts observed may now be accounted for in a manner somewhat as follows :—

1. The Water in the Stream flows.

Pour water into a level trough; note its stillness. Tilt the trough. The water flows. Compare the tilted trough with the bed of the stream, and infer that the bed of a river is higher at its source than anywhere else.

2. The Stream flows faster in the Middle than at the Sides.

Pour sand down a slightly tilted trough. Get children to note that some of the sand is prevented from falling by the sides of the trough. Infer that in a somewhat similar way the motion of the water at the sides is retarded, owing to the friction of the banks of the river.

3. **The Stream has a Winding Course.**

On a slightly tilted board covered with sand, place a few pieces of stone. Carefully pour water from the upper end, and note the winding of the stream. Infer that the stream "eats" its way through the softer rocks, and avoids the harder ones.

Blackboard Summary

The stream flows because its source is the highest point of its course.

The stream flows faster in the middle than at the sides because at the sides the water rubs against the banks.

The stream winds because it is easier for the water to make a bed in soft than in hard rock.

(SECOND LESSON)

Apparatus.—*A glass vessel containing water, stones, gravel, sand, and pebbles; bottle of river water.*

I. **The Stream widens in the Direction of the Flow.**

The fact may be illustrated by reference to the model and the map, and should be connected with the next heading.

II. **The Stream is joined by Watercourses from Fields.**

These watercourses add to the volume of water, and cause the widening of the stream (teach the term *Tributary*).

III. **Beds of Sand and Gravel are found at the Sides, &c.**

Have some sand, small and large stones, in a pail of water, or, better still, in a stout glass vessel. Stir rather gently. Get class to notice that the sand is carried round by the water, whereas the stones are unaffected. More vigorous stirring brings the stones into a state of suspension, first the small ones and afterwards the large ones. Suddenly stop stirring, and note that the largest ones are dropped first, then the smaller ones, and last of all the sand.

Infer that *the gravel and sand point to slowly moving water, the stones to more rapidly moving water.*

IV. **The Pebbles found in the Bed of the Stream.**

These may be classified in the following manner :—

(*a*) *Stones more or less angular*, which have probably been in the stream for a comparatively short time.

(*b*) *Stones rounded on one side and flat on the other*, which have probably rested in the bed of the stream for some time.

(*c*) *Stones rounded on all sides*, which have probably been transported for a long way by the stream.

V. **The Water brought away from the Stream.**

The bottles should be allowed to stand, and the fine sediment which is deposited should be noticed.

A portion of the clear water above should be evaporated, and the residue shown.

If the class has previously had a lesson on Solution, the difference between matter in suspension and matter in solution might be pointed out.

VI. **Recapitulation.**

By questioning on the knowledge already gained, and by the use of pictures, recapitulate the natural history of a river, introducing the terms *source*, *bed*, *banks*, *basin*, *tributary*, *mouth*, &c.

Get children to draw up a definition of a river, which should be somewhat as follows :—

A River is a stream of water which rises in high land and flows into the sea.

Rivers should be pointed out on the map of England.

VII. **Formation of Rivers.**

1. When rain is falling, part of the water runs off the surface of the land into little channels. These run together, where opposite slopes meet, and so form streams. These streams unite to form Rivers.

Illustrate by reference to state of the road and the gutters on a very rainy day, and get the class to infer that—

Rivers are formed mostly by surface drainage.

2. Take a shallow tray and heap up some damp sand at one end. Tilt the tray slightly, and from a toy watering-can pour water gently on the sand until it is saturated, and water begins to trickle out of the sand.

Explain in this way the formation of springs, and get the class to infer that—

Some Rivers commence in springs.

The melting of ice or snow will explain that—

Some Rivers commence in melting snow or ice. Some Rivers commence in lakes.

OUTLINES OF LESSONS ON DAY AND NIGHT

I. **Preliminary Observations.**—Remind children of facts within their observation regarding day and night, and summarise as follows :—

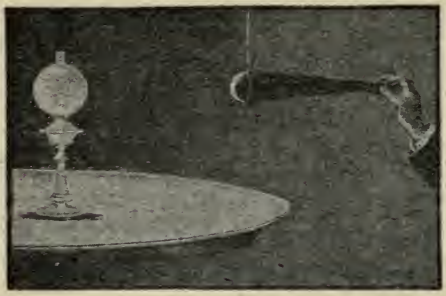
1. Day and Night succeed each other regularly.
2. Days and Nights are not all of the same length.
   (*a*) In summer the days are long.
   (*b*) In winter the days are short.
   (*c*) In spring the days get longer and longer.
   (*d*) In autumn the days get shorter and shorter.

II. **The Cause of Day and Night.**

Apparatus required.—Lamp, ball on knitting-needle, cone of black paper to represent shadow.

After illustrating the fact that the lighted lamp makes the ball cast a shadow, the various experiments can be worked in the daylight by substituting the black cone for the shadow.

1. (*a*) Demonstrate that if both earth and sun were still, half of the earth would have perpetual day and half perpetual night.



(*b*) As this does not happen, argue that either the earth or the sun must move.

2. Move the lamp round the ball. Keep the lamp still, and make the ball rotate on its axis. Get class to infer that day and night might be due to one of the following causes :—

(*a*) The motion of the sun round the earth, or
(*b*) The motion of the earth on its own axis.

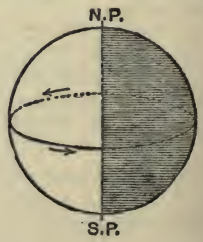
3. Ask which seems more probable. Certainly the motion of the sun round the earth.

4. Point out that the fact that the sun *seems* to move is no proof that it does move. When we are seated in a smoothly moving train the trees and telegraph posts all *seem* to be running away from the train, although we *know* that the train is running away from the trees, &c.

5. Tell children that for reasons that they may understand later on, we are certain that the sun is "still," and that the earth rotates on its axis once in 24 hours—thus causing day and night.

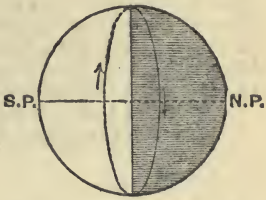
III. The Causes of the Varying Lengths of Day and Night.

1. Demonstrate with lamp, ball, and black cone that if the axis of the earth were perpendicular, days and nights would be of



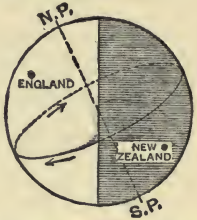
equal length. Since they are not of equal length, *the axis of the earth cannot be perpendicular.*

2. Similarly demonstrate that if the axis of the earth were horizontal, half of the world would have perpetual day, the other half perpetual night. But this is not the case ; therefore *the axis of the earth cannot be horizontal.*

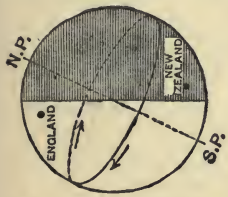


3. Since the axis of the earth is neither perpendicular nor horizontal, it **must be slanting,** *i.e.* inclined towards or away from the sun.

4. Arrange ball to represent the axis of the earth inclined towards the sun. England would *always* have long days and short nights. In summer we have long days, but these long days do not last always. Therefore get children to reason that **when it is summer in England the axis is inclined towards the sun.**



5. Place ball to represent the axis inclined away from the sun, and get class to reason that **in winter in England the axis is inclined away from the sun.**



6. Summarising, the children should be able to give the information that sometimes the axis of the earth is turned *towards*, sometimes *away from* the sun.

7. Tell children that the North Pole of the Earth always points to one fixed spot in the heavens—the Pole Star. Let a Nail high up in the class-room wall represent the pole star. Place lamp (sun) and ball (earth) in position, with the "north pole" pointing towards the "sun" and the "pole star." Ask class how it would be possible for the "north pole" always to point to the "pole star," and at the same time for the axis to slant sometimes away from the "sun." *By the earth revolving round the sun.*

8. Infer that the varying lengths of day and night depend on—
   (*a*) The inclination of the axis of the earth.
   (*b*) The revolution of the earth round the sun.

CHAPTER IX

HISTORY

A. THE AIM OF TEACHING HISTORY

THE primary aim should be to give both moral and intellectual training, and to cultivate patriotism.

I. **MORAL TRAINING.** — History is rich in examples of human conduct, and in pictures of human life, which teach vividly that no progress is real which is not moral.

1. The tyranny of John, of Henry VIII., arouses a righteous anger; the courage and prowess of Richard Cœur de Lion our admiration; the victories of Wellington and Nelson our pride; the obstinacy or firmness of Charles I. our pity or contempt; the virtue of Victoria our reverence; the diplomatic tact and peace-loving proclivities of Edward VII. our respect and esteem. In this way History cultivates the feelings.

2. In a lesson on Walpole the teacher calls attention to his failures, and points out that he was guilty of a breach of trust and of notorious corruption. Punishment follows, for he was committed to the Tower and expelled from the House. In this way the lesson is unobtrusively enforced that high trust demands high principle, and that great power demands great honesty.

Furthermore, many simple, primitive folk-stories, ballads, and legends are silent aids for instilling virtue. "I know a very wise man that believed that if a man were permitted to make all the ballads, he need not care who should make the laws of a nation." —(*Fletcher.*)

3. The **ballad** develops and encourages patriotism. It also cultivates the social affections—pity, admiration, and sympathy all being stimulated. On the literary side, its quaint words and forms combined with its simplicity and air of romance give it an intrinsic charm, which breeds a love for good poetry and the better forms of literature.

In the **choice of ballads**, especially for the lower forms or classes, the more painful sides of history should be omitted, the object being to avoid unpleasant associations. Books of suitable ballads are now upon the market; but with a view to assist the young teacher in his choice the following are suggested as suitable for study:—

a. For Lower Classes or Forms—

(1) The Mother's Book, by C. M. Yonge.
(2) The Battle of Evesham, by F. T. Palgrave.
(3) Wickliffe's Bible, by G. White.
(4) The Queen's Oak, by C. M. Yonge.
(5) The Spanish Armada, by G. E. Maundsell.
(6) Victoria's Promise, by C. J. Coleridge.

b. For the Higher Classes—

(1) Boadicea, by W. Cooper.
(2) Alfred the Harper, by J. Stirling.
(3) The Curfew Song of England, by Mrs. Hemans.
(4) Robin Hood and Allan-a-dale, Old Ballad.
(5) Chevy Chase, Old Ballad.
(6) Joan of Arc, by F. T. Palgrave.
(7) The Battle of Flodden, by T. Delaney.
(8) The Death of Essex, Old Ballad.
(9) The Landing of the Pilgrim Fathers, by Mrs. Hemans.

II. INTELLECTUAL TRAINING.—The intellectual function of History has been described as the giving of "some idea of the long and difficult process by which human civilisation has come to be what it is, and of the debt under which we live to the great men of all nations." Its office is also "to explain, in an elementary way, how History comes to be written, what are the materials for it, and what is meant by 'evidence' for a supposed historical fact; how History may be studied, where to look for the best books, and how to carry on the pursuit of it after school life is over."—(*Withers.*) Matthew Arnold tells us that the purpose of all culture and education is that we may know ourselves and the world. If this be so, then, says Meiklejohn, it follows that History is the shortest, and probably the surest, road to the best mental culture.

1. Pupils are invited to examine coins, study an election, learn about the policeman, visit the town hall, the museum, the market-cross, the village church, the neighbouring castle; and all these are thus made materials for cultivating the powers of *observation* and form starting points for the study of History.

2. The *memory* is largely exercised by the study of History, the learning of dates being a special example.

Important dates are among those things which may be learned by heart. In themselves they have little or no meaning; but by association they become important. Some knowledge of dates is absolutely essential to an intelligent comprehension of History. They are supposed to bear the same relation to History that the multiplication table bears to Arithmetic. They have also been called the eyes of History.

But it is useless to learn dates unless the events associated with them are also learned. Talk of the event, explain and illustrate it, and the date will become an enclitic to the event. The dates are best learned through the events, not the events through the dates. Mnemonics are not recommended as a rule. The best mnemonics are interest and repetition. Memory work, however, may be economised by making use of the Laws of Similarity; *e.g.*—

1215 Magna Carta.	1837 Accession of Victoria.
1415 Agincourt.	1857 Indian Mutiny.
1715 Rebellion of Old Pretender.	1887 Victoria's Jubilee.
1815 Waterloo.	1897 Victoria's Diamond Jubilee.

3. In a museum a child has seen a knight's suit of armour. The teacher is giving a lesson on the tournament. The child recalls the image of the armour. He calls up images of man and horse, places the man, as it were, inside the armour and upon the horse, and begins to imagine a knight ready

for the tournament. The child has been exercising his *imagination.* History appeals especially to the imagination, which may be regarded as the complement of observation, and which supplies us with knowledge unobtainable in any other way.

4. A pupil visits an Exhibition and expresses the opinion or *judgment* that Exhibitions are useful things. How has he arrived at that judgment? He has compared Exhibitions with useful and also with useless things, and he has come to the conclusion that Exhibitions have more points in common with the class of useful things than with the class of useless things, *i.e.* he has performed an act of judgment.

5. A scholar reads of the Civil War during the reign of Stephen and the intense suffering that accompanied it. He reads of other wars—the Peninsular War, the Crimean War, the Indian Mutiny. He notices the unfortunate consequences that inevitably follow war, and he infers or comes to the conclusion that War is always a misfortune. He has performed an act of *reasoning.*

III. PATRIOTISM.—The study of History teaches the pupil that he is a child of the State, that the State studies his interests, watches over his welfare, protects him and gives him the advantages of a civilised and progressive life. It tells of past struggles for right and freedom, of his country's progress, its victories and its greatness; and the influence of this teaching is to develop a legitimate pride in his country, a love for it, a desire to defend its liberties and to keep its honour unsullied. The pupil thus becomes a patriot and a prospective good citizen.

1. Patriotism is developed in school by a due regard for *National Celebrations.* The celebrations—if quietly and discreetly carried out—of great national events and national anniversaries are of high value on the practical side of History teaching. "If care is taken that they appeal to the thought and responsibility of children, as well as to their love of excitement, they may give rise to lasting impressions of a common share in the life of a great human society. Such impressions relieve the routine of the school programme, and help to colour the whole round of school duties."—(*Withers.*)

2. Patriotism may also be fostered by a judicious use of *National Songs;* in fact music and song may be made a powerful aid for the purpose of national celebrations, and "it will be noticed that many of the old national melodies are as beautiful as they are simple and strong. Such melodies have a powerful influence, not only in rousing but also in refining the feelings of the children. Their value to the school is twofold: they supply a form of music infinitely superior to the tunes specially written down to a mistaken idea of the taste of our schools, and also they illustrate much of our history and of old English social life. Dibdin's 'Sea Songs' make a stirring accompaniment to the story of British enterprise and adventure. The Jacobite Songs give life to lessons on the first half of the 18th century. The old Hunting Airs and Country Songs bring a wholesome and bracing influence into close urban school-rooms. So, also, the national and favourite melodies of foreign nations may be used to illustrate their characteristics and their history. The abundance, variety, and musical richness of the 'Folk Melodies,' used in German Elementary Schools, may well attract the attention of English Students of Education."—(*Withers.*) Again, the Russian nation possesses a great wealth of folk-songs which are able to exercise a remarkable influence over their listeners. The Cossack or soldier songs are said to be bold and stirring compositions, full of freshness and vigour, inspiring feelings of loyalty, courage, and contempt for death.

3. There should be no desire, and certainly no attempt, to encourage that

aggressive form of patriotism which flaps *the national flag* in the faces of other nations. But the flag is the symbol of good government and of national life. It is a badge of freedom and progress. It is the register of national achievements, of legitimate national pride, of national sentiment and national unity. It is, and can be all this without any indulgence in "flag flapping." Hence the national flag might advantageously figure in all the national celebrations observed in the school.

A lesson on the Union Jack now follows.

LESSON ON THE UNION JACK

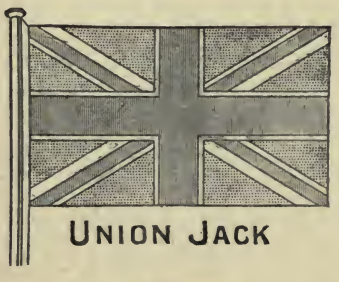
Apparatus.—A Union Jack; pictures of "Herald" or of a Crusader; Ensign (red, white, blue); five shilling piece.

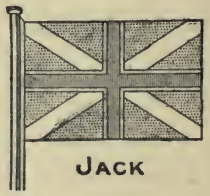
I. Explanation of term Union Jack.

Show a Union Jack. Explain term *Jack*. Explanations given—

1. Jack from Jacques (James), because first Union Flag formed under James I. Thrones of England and Scotland united under James I.

2. From the name of a coat once worn by a herald. Show picture of a Herald with an ornamental coat, or a picture of a Crusader. (*Cf.* Jack-et.) Proceed to explain that patterns on these "Jacks" or coats were afterwards used to ornament flags.





3. In reign of James I. ships of war had then, as now, for their principal flag the ensign (show picture of one, or sketch on B.B. Note that it did not yet contain the Union Jack), but they also bore, as they still do, a miniature union flag as a *jack—i.e.* a flag displayed from a staff at the end of the bowsprit (show picture of ship flying a *jack*, or sketch a bowsprit flying a *jack*), whence the name Union Jack, which has, in common speech, come to be wrongly applied to the larger as well as to the smaller Union flag. This explanation is the true one.

Tell that the "Jack" was the first Union flag, used from 1606 on merchant shipping only. About 100 years after, its use for the first time was sanctioned both on sea and land. It was also incorporated in the Ensign (Red, White, Blue). Show picture, or sketch. "Three Cheers for the Red, White, and

Blue." Explain that for more than 200 years the British Fleet consisted of three divisions—red, white, blue—hence three ensigns. Point out that—

1. The Red Ensign now belongs to merchant ships.
2. White to Navy and Royal Yacht Squadron.
3. Blue to Navy Reserve and certain Yacht Clubs.

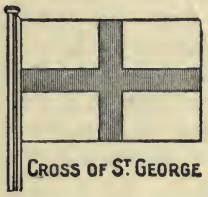
Inference from term "*Union* Jack"—*two or more "Jacks" or flags have been united.*

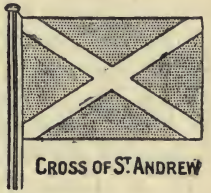
II. Examination of a Union Jack.

1. Analyse "Jack"—

a. Red upright cross on white ground (sketch on B.B.).
b. White diagonal cross on blue ground (sketch on B.B.).

Tell that (*a*) is the Cross of St. George, the "patron saint" (*i.e.* the guardian saint) of England; that (*b*) is the Cross of St. Andrew, the patron saint of Scotland.





Recapitulate.—1. The Union of Thrones—300 years ago.
2. The Union of Parliament—200 years ago.
First Union Jack—limited use for first 100 years. Flag of Great Britain.

2. Analyse "Union Jack."

a. Cross of St. George.
b. Cross of St. Andrew.
c. Diagonal red cross on white ground (sketch on B.B.).

Tell that (*c*) is the Cross of St. Patrick, the patron saint of Ireland. Explain that about 100 years ago Great Britain and Ireland united to form a common Parliament. The flag of St. Patrick was added to the "Jack" of Great Britain, and the result was the second Union Jack—the flag as we now have it.

Note.—1. "Pat," a favourite nickname for an Irishman. Why?
2. The Union Jack as we now have it is the flag of the United Kingdom and of the whole British Empire.
3. The narrow white border bounding the red crosses of the "Jack" is for clearness in the upright cross. The diagonal red cross is grafted on the white diagonal cross of St. Andrew. Hence the white border in part is broader than in the upright red cross.

B. WHAT SHOULD BE TAUGHT IN HISTORY

The subject-matter may be conveniently and wisely divided into three stages or grades, the division in each case depending on the age and attainments of the pupils. For the junior forms the teaching should be in the form of stories; for the middle

forms biographies; and for the higher forms the history of the people.

I. The Teaching of Stories in History

Begin with stories; children love them if they are pleasantly rendered. The aim should be not so much to inform as to interest and amuse. For this purpose early stories are best, especially if they are told, as far as possible, after the manner of the old poets and romancers. Such stories will include the lives of famous men and women *of all times and countries*, "for they furnish types of human character and types of human situations, a knowledge of which constitutes wisdom." All History, both sacred and profane, should contribute examples, and tales even from the great national collections should be utilised, such as *The Sagas*, *The Morte d'Arthur*, *The Arabian Nights*, *The Poems of Homer*, &c., and all should be illustrated by the lantern or by wall-pictures. Such Biblical characters as Cain, Joseph, Samson, David, Saul, &c., will readily suggest themselves, while the history of our own country teems with rich stories suitable for teaching. Among these may be named:—

Caractacus, Boadicea, Alfred, the Vikings, Hereward, Becket, Prince Arthur, the Crusaders, Robin Hood, Wallace, Bruce, the Black Prince, Wat Tyler, Jack Cade, the Young Princes of York, Raleigh, Drake, the Pilgrim Fathers, &c.

For younger scholars the Object Lesson may sometimes be made the basis of a History Lesson; *e.g.* a lesson on *Sea Water* may lead, through a reference to Canute, to the story of the *Vikings*. Other subjects will readily suggest themselves; *e.g.*—

1. Mistletoe and the Druids.
2. Road-making and Roman Roads.
3. The Moon and the Gods of the Saxons.
4. A Candle and Alfred the Great.
5. Draining Land and Hereward.
6. The Fire Brigade and the Curfew.
7. The Lion and Richard I.
8. The Spider and Robert Bruce.
9. A Hammer and Wat Tyler.
10. A Rose and the Wars of the Roses.
11. The Compass and Geographical Discoveries.
12. Combustion and the Fire of London.
13. The Oak and Charles II., and Worcester.
14. An Orange and William of Orange, &c.

II. The Teaching of Biography in History

The transition from "Stories" to "Biographies" is more nominal than real, for most of the "Stories" centre round the

lives of individuals and are therefore practically Biographies. But the aim and therefore the treatment will be different. With "Stories" the chief aim has been to interest and amuse, to create a love for History; with Biographies interest will still remain, but amusement will be accompanied with some attempt at training. The "Story" stage is the stage of amusement and instruction; the "Biography" stage that of instruction and education. In writing lessons on Biographies effect and cause should be pointed out and inferences made, points of conduct observed and criticised, and a wise use made of contrast and comparison.

A series of lessons might be given upon Walpole; *e.g.* there might be one on his early life and personal characteristics; another on his statesmanship as illustrated by his love of peace and his acts of bribery; and a third lesson might follow on his financial policy as illustrated by his Excise Bill and his Free Trade Policy.

The second lesson is sketched here, and it is drawn up to suit the older scholars.

LESSON ON WALPOLE'S STATESMANSHIP.

INFORMATION.	EDUCATION.
1. **His Love of Peace.**—Unsuccessfully resisted the Spanish war. *a.* "They are ringing their bells now; they will soon be wringing their hands." *b.* "Madam, there are 50,000 men slain in Europe this year, and not one Englishman." *c.* "My politics are to keep free from all engagements as long as we can."	1. Describe his peace policy and show— *a. Its Success.*—The country daily grew more wealthy; taxes were light; trade was flourishing. Quote his proud boast expressed in 1 *b*. Point out that he understood the truest interests of his country better than any of his contemporaries. *b. His Foresight.*—The Spanish war ended disastrously. He maintained that a nation never gained anything by war. Point out that his opinion expressed in 1 *a* became true, and justified his policy as expressed in 1 *c*. Compare with Lord Salisbury. *c. His Obstinacy.*—He took no interest in foreign policy. Show that this was one of the chief factors in his downfall. Compare with Gladstone.

LESSON ON WALPOLE'S STATESMANSHIP (*continued*).

INFORMATION.	EDUCATION.
2. **His Bribery.** *a*. Refer to venality of Commons. M.P.'s sold their votes. Electors were bought and sold. *b*. No publicity on the votes given in Parliament. *c*. Newspapers not allowed to publish members' speeches. *d*. "Every man has his price." *e*. The charge of bribery overstated. Only one case proved.	2. Put these facts about his bribery before the class. State the circumstances which led to it. *a*. The fierce opposition he had to face. *b*. The ease with which it could be done. *c*. That it was an established practice. *d*. His great love of power. *e*. The lack of publicity. Give true history of 2 *d*. *Note.*—1. That *he durst do right, but he durst do wrong.* 2. *An honest man.* In an age of bribery he was beyond bribes himself and died a poor man heavily in debt. Contrast 2 *a* with the purer electoral atmosphere of to-day; contrast 2 *b* and *c* with present publicity and freedom of the press.

III. The History of the People

A wide and varied syllabus will now be opened up to the teacher. His difficulty will be mainly one of selection and classification as well as treatment. He will need to teach the natural history of society; to teach all the facts which will help his pupils to understand how a nation has grown and organised itself. Such a syllabus will include lessons on the following subjects:—

1. **GOVERNMENT.**—The teaching should embrace lessons on both political and municipal government, and as much as possible it should deal with the structure, principles, methods, prejudices, and corruptions which it exhibited.

Lessons might be given on the constitution of the Borough Council, the County Council, the House of Commons, the House of Lords. Other lessons might deal with the functions of these bodies. The powers and prerogatives of the Sovereign should be taught, and the idea of a Limited Monarchy could then be developed. The pupils should also learn how our laws are made and how those laws are enforced. An illustrative lesson follows.

The young student will read up his information, so as to be master of his subject. Teaching hints only are offered here.

Lessons on an Election to the House of Commons

N.B.—This lesson would best follow after one on the Franchise.

(1) **The Candidates.**

a. Briefly explain the existence of *organised political forces* in the borough ; *e.g.* Conservative Associations, Liberal Associations, &c. Explain method of selection.

b. Refer to Local, Municipal, or Parliamentary *Election*—recent if possible.

c. Call attention to "*Posters*," &c., of the rival Candidates. Show some if possible. Refer to *mural literature* generally, and to political *cartoons*, setting forth the weaknesses and strength of the rival programmes. Show specimens.

d. Note work of the *Press*—in newspapers, pamphlets, and leaflets. Show specimens.

e. Explain the part played by the "*Platform*" in the contest, in the form of public meetings. If possible show bills advertising these meetings.

f. Explain the work of the *Canvassers*, the existence of Committee-rooms, and the employment of *Sandwichmen*.

g. Summarise all this as the "educational work of the contest."

(2) **The Election.**

a. Describe a polling-booth. Show picture of one, or roughly sketch essentials on B.B. Better still, show a rough model of the voting compartments. Use the class-room to illustrate.

b. Show a ballot-box, or failing that, sketch and describe one on the B.B.

c. Show an actual voting-paper, or a polling-card. If not, make a copy of one.

d. Get the school admission book and use it to illustrate the register of voters.

e. The actual process of voting should then be illustrated. A few desks might be used for voting compartments, a box used for the ballot-box, boys appointed as polling clerks and personating agents, another boy as a policeman at the door ; a certain number of other boys should be allowed to actually record their votes, under proper guidance and explanation. (A number of rough voting-papers could be easily prepared for this purpose.)

f. Explain that the poll is usually open from 8 A.M. to 8 P.M. At end of poll boxes all sealed, taken away to a central place (Town Hall) ; votes counted by properly appointed persons. The one with largest number of votes elected, and becomes an M.P.

2. THE ARMY, NAVY, AND AUXILIARY FORCES.—The necessity for the existence of these forces should be explained—defence, not offence, being the policy ; insurance, not aggression, the principle. The growth of the army and navy, the various changes in dress, arms, fortifications, &c., will afford scope for teaching that should be both interesting and educative. Good teaching will show that uniform, arms, and defensive positions mutually influence one another ; and that a change in the one leads to changes or modifications in the others.

But a great portion of the teaching will have to deal with battles. Now such teaching may be made instructive if properly handled, and care is taken to guard against any undue preponderance of the emotional element.

A brief description of the campaign might be given, leading up to the particular battle in question. This will arouse interest, although "battles" possess an intrinsic charm for children. A rough map might be drawn on the B.B., showing the relative positions of the contending forces. Where possible, a relief model in clay and the use of coloured pins or tiny flags would be preferable. The battle should then be described in sufficient detail to give an accurate idea of the event. The pins or flags should be moved from time to time to illustrate the progress of the battle. A careful use of any pictures and portraits suitable for the subject could be made with advantage. This would be enough for the lower forms or classes.

In the higher forms the intellectual side should receive more attention. Why were the armies opposed? Give the *causes*, immediate and remote. Then show the many interests always tending for war—standing armies, military and naval classes, the ambitions of sovereigns or politicians, portions of the press, international greed and jealousy, contractors, manufacturers, aggressive commerce, the craving of the masses for change or excitement, and other causes.

Why *war?* Ask for better methods of settling disputes. Discuss briefly their degree of practicability. Point out the influence of custom, and refer to some modern cases of arbitration; to the Hague Tribunal. Elicit by questioning and regulate opinion on the value and morality of war versus arbitration. Why is war more general than arbitration?

Some of the *results*, like death, sickness, poverty for the masses, loss of trade and increase of taxation, can easily be obtained from the pupils. The other results, specific and historic, both direct, as embodied in treaties, and indirect, as arising out of treaties (*e.g.* the bitter feeling engendered between countries), should be told and impressed upon the scholars.

3. **THE CHURCH.**—The organisation and government of the Church, its conduct, its power, and its relations to the State, will furnish another series of lessons. The influence of the Church upon the morality of the people, as indicated in their laws, habits, proverbs, and deeds, should also be taught.

In a lesson on the **Conversion of the English**, the *cause* of the conversion will be traced back to the nature of the struggle between Christian Northumbria and heathen Mercia, and the ultimate victory of Northumbria; to the marriage of Æthelbert of Kent to a Christian princess (daughter of the West Frankish King). Result: (1) The landing of Augustine in Thanet; (2) England once more brought into contact with Europe. The results will be traced still further. Edwin of Northumbria married the daughter of Æthelbert of Kent—a Christian marriage; and as a result of Edwin's rule, "a woman with her babe might walk scatheless from sea to sea."

Attention will then be called to the *growth of Christianity*, to the rival activities of the Irish and Romish Churches. Conversion came, but two rival churches were struggling for the upper hand. Northumbrian monasteries, and especially Whitby, were based on the Irish model; *i.e.* a clan round some one person. The fame of Whitby Monastery will be noted. For instance, it was there that English Song had its beginning in Caedmon. The result was that a new world of feeling was opened up by Christianity. It was also there that the famous synod (explain) was held to decide between the rival claims of Irish and Roman Christianity. Rome won, and the victory

saved England from the clan system. This latter fact might be elicited by questioning, and the further fact that where there are clans there are always clannish quarrels. The history of Ireland and Scotland will afford numerous examples, and the Irish Church was a special case. Further inferences might now be made that by the victory of Rome (1) internal quarrels in the Church were avoided; (2) the Church came under a better religious discipline; (3) and it became part of the European system.

A reference to the *rise of Canterbury* under Archbishop Theodore of Tarsus will complete the lesson. The facts are briefly these: (1) Organisation of the Episcopate (explain) by the creation of new Sees (explain) and their subordination to Canterbury. It should then be shown that this led to progress: industrial progress by the clearing of forests; religious progress by the foundation of such abbeys as Peterborough, Crowland, and Ely. (2) Later on, the organisation of the parish system, settled clergy taking the place of missionaries. (3) The political effect of the work seen in the preparation for national unity by the supremacy of Canterbury and the convening of general synods. An easy inference would show that being united in religion, they were learning to unite as a nation.

4. **SOCIAL LIFE.**—Lessons should be given on the daily lives of the people—their food, clothing, homes, amusements, social observances. The influence of public opinion on social customs as shown in titles, salutations, and forms of address; the social control exercised by class and "caste"; the historic truth that the rise of one class means the corresponding fall of another; the superstitions of the people, and the influence these have upon the life of the nation.

As an illustration, let it be supposed that the teacher is giving a few lessons on the clothing of the people. Properly handled, such lessons may be made to throw a flood of light on the social life of the nation, and that, too, in a way which is not only practical and interesting, but which permits some exercise of the reasoning powers, brings out in vivid contrast the condition of the people, and gives a good object-lesson in that contentment which is an important factor in the abiding peace and prosperity of any country.

The dress of the period—all classes—should be accurately described with the aid of suitable pictures and drawings (executed during the lesson), and any of the material aids (see p. 202) which might be suitable. The object is to appeal to the activity of the class by making the lesson objective or pictorial, or both. A lesson of this nature which is purely descriptive is doomed to failure, however skilful the teacher may be at word painting. Comparison and contrast might then be brought into play. Each article might be compared or contrasted with its modern substitute, the points of likeness or unlikeness indicated, and the necessary inferences made as to the greater or less degree of the suitability of modern dress to climate and the altered conditions of life. The lesson would thus receive a practical application, which should bring something more than mental profit only.

In preparing such lessons the teacher will have to formulate a series of questions which will make the mental demands desired, and lead up to the practical results pointed out; *e.g.* the following are suggestive rather than exhaustive:—

1. Did it keep the body at a nearly uniform temperature, and that temperature a suitable one? Did it allow free play to the functions of the skin—

perspiration, absorption, and feeling? Was it woollen, cotton, silk, linen, &c. With the poor people, did it change for the seasons, and if so, to what extent? Was it adapted to the body? Did it allow the body the full exercise of all its motions? The answers to such questions, among other things, would reveal, not so much the knowledge of the time as to the scientific principles which should regulate clothing, but *how far these principles were applied.*

2. Was it showy, extravagant, or neat in its style? *Did politics or creed have any modifying influence?* Was there any marked difference in its style or texture between the different grades of society, and if so, how far was the quality of the dress considered a measure of social standing? Was the difference in this respect more or less marked then than now, and if so, why? Were there any laws regulating dress, and if so, why?

   Give the *average wage* of the artisan and labouring classes, and, if possible, the *cost of living*, including food, shelter, and clothing. The class will then be in a position to infer the capacity of the poor to clothe themselves, and their consequent comfort or discomfort in winter.

   The answers to such questions, aided by the information suggested, would in some degree reveal the measure of the taste of the people, and the degree of luxury indulged in by them. In neither case would it be a sole test; but in each a valuable and suggestive one.

3. Was it varied, and if so, for what purpose? The answer to such a question would again give much information on the social life and habits of the people, and a rich field of observation would be opened out by a comparison or contrast with the varied dress of the present day.

Obviously, the teacher will not be able to crowd all these points into one lesson. A selection, both in kind and quantity, must be made and thoroughly dealt with. A few points, well described, illustrated pictorially, and well worked out with objective aids, will be far better than trying to crowd in a mass of detail which only breeds weariness or gives mental indigestion. It is necessary to emphasise this point, for *it is this overcrowding of the subject-matter which experience shows to be the most common fault of young teachers.*

5. **TRADE.**—The growth of trade should be traced, showing the rise and fall of various trades, the introduction of new trades, the localisation of special trades, the influence of custom on trade; the progress of invention, the growth of machinery, the division of labour; the relations existing between employers and employees; the influence of caste, Guilds, and Trade Unions; the means of distribution and other causes affecting trade.

   For instance, several interesting lessons might be given on **Trade Unions**; lessons which would lend themselves easily to the conversational method. One lesson might be given upon their constitution and aims; another upon their machinery or method of work; and a third upon their early history and development.

   In his teaching, attention might be called to the fact that the early history of Trade Unions was one long repression, a repression probably inherited from the Guilds. Persecution helped to give them permanency, and so, as always, was futile. This truth can be enforced by reference to

the various religious persecutions and their invariable failure; and thus a spirit of *toleration* can be cultivated.

In speaking of the character of Trade Unions he will emphasise the fact that they are Voluntary Associations, and that freedom to combine implies freedom not to combine—a lesson *against coercion.*

A reference to their aims with regard to wages and hours will enable him to point out the success of their efforts to improve the material conditions of life of their numerous members. They must therefore be regarded as one of the great governing forces of the country, and a standing object-lesson as to the value of *self-government.*

He will note that the *provident benefits* of the best Unions are substantial, and he will inform the class that it was the provident side of their work which reconciled the public to their legal recognition and protection.

He will be able to point out that similar Unions exist in other countries, and that International Labour Congresses are held regularly. The incident is full of teaching, for mutual help is not only national, but international. Such acts make for peace, so that the Unions must also be regarded as great *peace agencies.*

Other points will readily suggest themselves to the student who reads up his subject sufficiently, but it is hoped that enough has been said to be suggestive to the young teacher on the educational as distinct from the mere information side of his work.

6. **EDUCATION.**—The nature and extent of the education of the nation should be depicted, both past and present. Art, as exemplified in architecture, sculpture, painting, dress, music, poetry, and fiction, should also be described.

In a lesson on the **Renascence** the young teacher will speak of Constantinople as the centre of all mental activity in Europe for many generations. He will point out that its libraries were stored with MSS. of most of the famous works of antiquity. He will then refer to the sack of Constantinople by the Turks, and the flight of the scholars all over Europe, and that these scholars carried with them many copies of their precious books. The class could then infer the result—the opportunity given to nations of the West to come into direct contact with ancient thought. He will then refer to the discovery of the art of printing in Germany a few years afterwards. The class then makes another inference—an enormous increase in the number of MSS. or books. Proper questioning would now elicit from the class that there would be a revived and much wider interest in learning than before; in fact, that there would be a new birth (renascence) of learning. This took place during the closing years of the fifteenth century.

And so, dealing with the subject in some such way, he could speak of the influence the New Learning had upon Oxford and Cambridge, how Greek drove out scholastic logic, and how sympathy was made the first requisite for teaching. He could then proceed to deal with the religious, social, and political aims of the New Learning, and in a subsequent lesson he might point out some of its results.

C. METHODS OF TEACHING HISTORY

I. The Chronological Method

Most authorities consider this the right method, and therefore the best method. The study of history, it is asserted, should be progressive, so that the most picturesque and

elementary portions can be taken first. This method starts with simple conditions of life and society, and so appeals to *curiosity*. It does not, at first, require much initial knowledge, and it makes less demand on that higher intelligence which is necessary for a proper understanding of much of the later history. *It proceeds from the simple to the complex. It is a synthetic method.*

II. The Regressive Method

This method begins with the present and works back, step by step, to the earliest times. Its opponents assert that the present is more or less commonplace and less attractive, and that it is a method of teaching history backwards. It is further charged against it that it demands "a familiar acquaintance with the political and social conditions of modern times, and an ability to recognise and understand the causes which have brought about the present complex conditions of society." The method is therefore said to be unsuited to the capacity of young children, although its suitability is admitted for more advanced pupils. *It proceeds from the known to the unknown. It is an analytic method.*

The degree of truth attaching to these objections depends upon the nature of the initial lessons. Where available, these should proceed through Object-Lessons, such as our English Coins, the Market Cross, the Village Church, the Neighbouring Castle, &c. The strong point of such lessons is that they develop observation and interest in existing things. But if the first lessons should be on such complex notions as a State, a Nation, a Dynasty, a Parliament, Legislation, Justice, &c., the method is not to be commended.

III. The Concentric Method

A series of lessons is taken, completed, repeated in greater detail, and yet again in still greater detail. The circle of knowledge expands with each repetition. It is an old method and a good one, proceeding *from the simple to the complex*, and after the first completion, *from the known to the unknown*. It allows the work to be carefully graded; but carelessly handled, it may destroy interest. "Hashes" are not popular even if strengthened with scraps of fresh meat.

D. SOME GENERAL HINTS ON THE TEACHING OF HISTORY

1. **Use the Oral Method principally.**—The Oral Method enables the teacher to utilise class knowledge and to cover more ground than any other in the same time. The work is vitalised, and its results live. The living word is the most powerful agent of instruction, and hence can produce effects where other means are inadequate. A graphic descriptive style stimulates the imagination, and the value of a history lesson depends upon a successful appeal to that faculty (see p. 198). Besides, under normal conditions, listening is easier than reading.

2. **Appeal to the Activity of the Class.**—The Lecture form of teaching is often a fine somnolent. At the best it rarely does more than put the class into a receptive condition, and this is a great strain on young folks. Where possible, the teacher should give the class something to do. For young pupils the teaching might sometimes proceed through *Object-Lessons*. Older pupils might draw *maps* or *charts* for themselves. *Note Books* and *Reading Books* might be utilised, and still older pupils might be encouraged to use *Books of Reference* from the School Library. An "*Events*" *Board* could be kept daily or weekly furnished with current history, and all classes could be stimulated by a judicious use of *questioning* (see p. 34).

But the use of **material aids** goes farther than this. A liberal supply of *Historical Pictures* should be provided, and freely used. The *Lantern* should also come into use. By the aid of *Drawings* and Pictures the employment of the past could be compared with the industries of to-day, and the same is true of Clothing and Dwellings. Visits to *Museums* and *Picture Galleries* should be made, the teacher pointing out the objects of special interest from the point of view of the History Lessons. *Historical sites* (local battlefields, castles, houses, churches, palaces, &c.) should be visited, and made either the subjects of lessons themselves, or should be used as illustrations in other lessons. *Local Monuments* should also be seen, and their aid enlisted for biography lessons.

3. **Let the Subject-Matter be Unbiassed.**—The politics, and in some cases, the special religious or economic views of the teacher should never lend colour to the lessons. History lessons should not become vehicles for partisan feelings, nor should they be utilised as a means of glorifying war. Neither should they indulge in international bitterness, which may be kept alive for years by biassed history lessons.

4. **Make a Judicious Use of Text-Books.**—The term "text-book" is meant to include not only the ordinary text-books proper, but the History Reader and the Historic Novel.

a. **The Ordinary Text-Book.**—These should be used, and not abused; that is, they should always be subsidiary to the oral lesson. The nature of the text-book will vary with its purpose; that is, as to whether it is written for private study or for school use.

(1) *For Private Study.*—Such books need to be more comprehensive, to contain more detail, and by their method to develop more clearly the internal relation of the subject-matter.

(2) *For School Use.*—Less detail is required, since the teacher's commentary will fill up the gaps. The book should be written in a spirited, vigorous, and human style, so that it may be attractive and create a love for the subject itself. The text-book, properly written and properly used, ought to be the forerunner of the *reference book* and the *library*.

b. **The History Reader.**—In a primary school these books should be used in all classes above the two lowest. The best reading books will be those which—

(1) Are descriptive and explanatory.
(2) Are suitably illustrated.
(3) Contain sufficient, varied, and interesting matter.

It is not necessary that the lessons in the reading book should cover the whole area of the course of instruction adopted for the class subject, as the teaching will be mainly oral. It must be remembered that the chief use of such a book will be—

(1) To give greater *definiteness* to the teaching.
(2) To make thorough *recapitulation* easier and more effective.
(3) To invest the subject with new *interest*.

c. **The Historic Novel.**—When we review the ordinary practice associated with the teaching of History in our schools, *the use of the Historic Novel seems to be naturally complementary to that of the History Reader.* The *History Lessons* may or may not be supplemented by the use of the *History Book*, but they are generally aided by the use of *Historical Reading Books* with their interesting stories and biographies, and so the scholars are insensibly led up to the *Historic Novel.* In fact, this type of book is always helpful to the student, because it conveys to the reader the *spirit* of the period. Let it be granted then that every school library should contain a selection of such books carefully chosen by the head teacher or by some other efficient and responsible person. The choice should include as wide a range as possible, and should illustrate the whole period of our history, so that if a class should be studying a certain period, historic novels dealing with that period might be put into the hands of the scholars.

CHAPTER X

NATURE STUDY, OBJECT-LESSONS, ELEMENTARY SCIENCE

NATURE Study has been defined as a "study of man's immediate surroundings and general environment." It is regarded by many as a "new" subject in our schools.

The necessity for Nature Study is generally recognised. The education given during the past decade has come to be regarded as too oral, too aural and not sufficiently visual. Children have been taught to read too exclusively from *man's* book; the great book of Nature has been comparatively neglected.

The cry for "Nature Study" represents the reaction against mere book-knowledge. It is felt that a study is required which should appeal to the rural instincts of urban dwellers; also that country children on leaving school should have been so trained as to find themselves in sympathy with their environment, and thus fitted to take an intelligent interest in country scenes, country occupations, and country life.

The too bookish character of much of the education given in our schools is held by some to be *one* of the causes of the preference shown by the present generation for town as contrasted with country life. The demand for Nature Study is perhaps the echo heard in the schoolroom of the cry, "Back to the Land."

DIFFERENT VIEWS REGARDING NATURE STUDY

Now while little difference of opinion exists regarding the necessity for Nature Study, there is little, if any, unanimity regarding its scope and its position in the curriculum of our schools. We shall proceed to examine the principal of the divergent views on Nature Study.

1. **The Book Method.**—Those who use this method shut their eyes to the first-hand evidence of Nature, and confine their own

and their pupils' attention to second-hand evidence contained within the covers of some manual on "Nature Knowledge." This is really "bookish education" masquerading in new attire. Both the method and those who use it need not longer claim our attention.

2. **The Object-Lesson Method.**—Teachers using this method draw up a series of object-lessons and call the course "Nature Study." Object-lessons are an important part of school work and of Nature Study, but the terms Object-Lessons and Nature Study are not controvertible: the latter embraces more than the former.

3. **The Combination of easy Elementary Science and Sentimentalism.**—Children are given a lesson on "*Flowers*," are exhorted to "love flowers," and are perhaps taught some poetry about flowers. Or, they are given a lesson on some animal, and occasion is taken to inculcate the duty of kindness to animals. Such teaching has its place, and a high place, in the curriculum, but the *direct* inculcation of sentiment is no part of Nature Study *per se*.

4. **The Informal Dissertation upon some Object or Natural Phenomenon.**—A boy brings a dead mole to school, and the teacher talks about the life and habits of the mole, or a lesson is interrupted during a storm to explain the cause of thunder and lightning, &c. This is merely *chatting* about Nature, not Nature *Study*, and is likely to degenerate into loquacity on the part of the teacher, and passive receptivity on the part of the pupil.

5. **The Study of the Superficial Aspect of Nature by Direct Observation.**—*This may be considered to be the true aspect of Nature Study.* The essentials of such a study are—

(*a*) *Seeing* what one looks at—"positive, direct, discriminating, *active* observation."

(*b*) *Understanding* so far as is possible *why* the thing is so.

(*c*) *Desiring* to know more about the thing.

Viewed in this light, Nature Study is a "process by which simple natural objects and events acquire meaning" and interest. Its value does not lie so much in the acquisition of any particular information, as in fostering in the mind an attitude of "observational alertness."

Nature Study is the study of the superficial aspect of Nature as contrasted with the study of that deeper and fuller aspect of Nature termed Science. It is not Science, but a part of general education. Science teaching belongs to a later period. Nature Study may lead up to scientific studies, but it is complete in itself.

SOME SUGGESTIONS FOR THE PROSECUTION OF NATURE STUDY

are now given. No teacher can or will endeavour to deal with *all* the subjects enumerated. His choice will be guided by the locality in which the school is situated, the home life of his pupils, his own knowledge and his own predilections.

1. **Weather Study.**—Daily observations can be made of the weather. The temperature can be noted, also the force and direction of the wind, the height of the sun at noon, the amount and kinds of clouds, &c. Each class should keep a weather diary. In the junior classes, everyday expressions, such as "cloudy," "wet," "windy," "warm," will be sufficiently descriptive. In the upper classes, daily readings of the thermometer and barometer might be made, and the amount of rainfall measured.

A "home-made" barometer, thermometer, and rain-gauge yield sufficiently accurate results, are more interesting to the children, and more easy of manipulation than finer and more accurate scientific instruments. Formal lessons on Clouds, Rain, Hail, Snow, Dew, Draughts, Winds, might be given *after* a prolonged course of weather observation.

2. **The School Garden.**—Part of the school garden might be common property, part allocated to certain children or groups of children.

The changes seen in the garden from month to month might be noted; common shrubs, herbs, and weeds observed, compared, and contrasted. Seeds, germination, seedlings, buds, leaves, flowers, roots, should all receive attention. Animal life in the garden (insects, snails, worms, &c.) can also be studied.

In the drawing class, the leaves, flowers, &c., can be drawn *from life*. The results will be crude, very crude at first, but so long as observation is being cultivated and interest aroused, the teacher must be content. Of course he could produce finer and more speedy results by allowing the pupils to draw *from a copy*—but this would be nature study with the *nature* left out.

3. **Animal and Plant Life within the immediate Purview of the Children.**—Pets and domestic animals, wild animals and game in the neighbourhood, the birds (our all-the-year-round friends and our summer guests), the reptiles, the fish in the streams, are some of the subjects on the zoological side. The life-history and habits of one or two may be especially studied. Aquaria and vivaria can be kept in the class-room, but these devices should *supplement*, and not supplant, the study of life in its natural habitat.

On the botanical side there are such subjects as the common wild flowers of the locality, the chief trees, and the life-history of typical plants.

The common names only should be taught, the naked eye characteristics alone studied; Latin and Greek terminology and the microscope have their proper place in *science;* they are out of place in Nature Study.

With older children such topics as the adaptation of means to ends and the struggle for existence are interesting subjects arising out of Nature Study.

4. **The Minerals in the immediate Neighbourhood of the School.**—The stones on the roadside, the pebbles found in streams and rivers, the surface rocks and soils, the railway cutting, the quarry, the mine, the landslip, and the sea-shore, useful minerals and their connection with local industries, are some of the many themes which readily suggest themselves.

5. **The Topography of the Neighbourhood** is admirably adapted for Nature Study, and some suggestions for dealing with this side of the subject are given in the chapter on Geography.

THE SCHOOL EXCURSION

The school subjects which lend themselves most readily to this form of instruction are Nature Study, Geography, and History. The half-day ramble, the excursion perchance occupying a day or more, visits to museums, to scenes of historic interest, are the principal forms of the school excursion. Local circumstances will govern the exact form the excursion should take. It will be possible here only to give an outline of the general principles to be observed in all school excursions.

1. **Preparation.**—Lessons should be given in the class-room which should *prepare* the minds of the children for what is to be seen. They should be given some idea of what they are going to see, and how best to see it. They will thus better understand the things observed in the actual excursion, their attention will be aroused and their curiosity excited.

2. **The Actual Excursion.**—There should be one teacher for at least twenty children. While aimless wandering should be discouraged, the children should not be expected to make the excursion under the military discipline of soldiers on the march. Due respect should be inculcated for objects, for "neighbours' landmarks," &c., and the children should be left as far as possible to the indulgence of the exploring instinct. When anything of especial and general interest is to be observed, the teacher should assemble all the scholars and briefly direct attention to the special subject, but the open-air *teaching* should be as brief as possible. Nature should be the teacher, not the

schoolmaster. A few characteristic and illustrative objects, specimens, &c., should be collected, but the promiscuous collection of all sorts of odds and ends should be discouraged.

3. **After the Excursion.**—The main points learned during the school excursion should be summarised, connected with previous knowledge, and used as a means for the acquisition of new knowledge.

ADVANTAGES ACCRUING FROM SCHOOL EXCURSIONS

1. Accurate, first-hand knowledge of things *in situ* is obtained.
2. Powers of observation are developed, also the ability to concentrate attention upon a few things at a time.
3. Self-reliance is encouraged.
4. They enable the pupil to use his after-school excursions rationally.
5. A love of Nature is cultivated.
6. Teacher and scholar are given opportunities of displaying mutual sympathy and regard often unobtainable in the class-room.

OBJECT-LESSONS

There is still much misconception as to what an object-lesson really is. This is due to the fact that two distinct kinds of instruction are not always clearly differentiated—(1) The *observation* of the object itself, and (2) *the giving of information* about the object.

An object-lesson may be defined as a lesson on a thing *actually present before the class.*

"No instruction is properly so-called unless an object is presented to the learner so that the addition to his knowledge is made through the senses."—(*Government Circular on Object-Lessons.*)

SOME LESSONS WRONGLY STYLED OBJECT-LESSONS

1. Lessons on Plants and Animals which cannot be brought into the Class-room.—A lesson on a *Whale* or on a *Lion* is not an object-lesson, because neither a whale nor a lion can be present before the class for inspection. They are *information* lessons, useful in their way, but still not object-lessons.

2. Lessons on Pictures of Objects. — Pictures are indispensable in a lesson on a Whale or on a Lion, but such lessons are, as we have seen, information lessons, and not object-lessons at all. In such cases, the picture is a substitute

for the unobtainable object. But too often the picture is allowed to *supplant* an obtainable object. Thus a lesson is given on a *Rabbit* and illustrated, not by a live rabbit, but by a picture of one.

Such teaching is sometimes the result of indifference — the teacher is too indifferent to real education to trouble to obtain the actual object; sometimes the result of ignorance—he thinks "the picture will do just as well."

But a picture is at best but an imperfect symbol of the thing, and appeals to one sense only. The thing, the whole thing, and little else but the thing, should be a guiding principle in object-lessons.

THE CHIEF AIMS OF OBJECT-LESSONS

1. To Train the Senses.—Everything we know, everything we can know, comes to us ultimately through our senses. Hence the proper training of the senses is a necessary preliminary in education.

Merely allowing children to *see* the object is not sufficient. The child naturally desires to *touch* and *handle* what he sees. If necessary, possible, and convenient, he should be allowed to see, touch, smell, taste, and hear the object. Almost every object appeals to more than one sense. Bunyan says that the town of Man-soul has five gates—eye-gate, ear-gate, &c. Too many teachers approach one gate only.

In giving a lesson on Copper, one teacher deals with the colour and then passes on to some such topic as the method of obtaining the ore, thus appealing to one sense only—sight. Another teacher not only lets the child look at the copper, but lets him *feel* it, *bend* it, put the *tongue* to it, *strike* it, thus appealing to the senses of touch, muscularity, taste, and hearing, as well as to the sense of sight.

Good teachers "knock" at as many "gates" as possible. The child has not a complete idea of the thing "orange" unless he can recall its shape, colour, touch, smell, and taste, and he can recall these ideas only after he has gained them through the senses.

2. To Cultivate the Power of Observation.—The object of the teacher should be to get the children to observe a few things thoroughly. The facts gained from observation are really of secondary importance. It is the *power* to observe which is *the* thing; it is the *habit* of observation which has to be cultivated.

Observations should be first directed to the thing *as a whole.* It should be compared and contrasted with other better known

things. Thus the most striking features can be studied; next some of the less important features may be noticed. Lastly, the main results of the various acts of observation should be summed up and definitely connected with the object.

3. The Training of the Reasoning Powers is a Subsidiary Aim in such Lessons.—The comparison and contrast of the object under consideration with other objects involve the exercise in a rudimentary way of the reasoning powers. Easy inferences are permissible, but such reasoning as is implied in generalisation and classification is quite outside the purview of the object-lesson.

4. The Imparting of Information is another Subsidiary Aim.—It is not *what* is acquired, but *how* the acquisition is effected which is the important consideration in object teaching.

SOME PRINCIPLES TO BE OBSERVED IN GIVING OBJECT-LESSONS

1. The Object itself should always be Present, and, if possible, each child should be provided with the object to be studied.

Sight is not the only sense to be cultivated, and the provision of an object for each child is moreover imperative where the object to be examined is small; *e.g.* in a lesson on *Leaves* it is not sufficient for the teacher to have specimen leaves; each child should be furnished with examples of the principal specimens.

Greater interest will frequently be given to the lesson if the subject is announced beforehand and the children allowed to bring their own specimens.

Some laudably anxious teachers introduce too many objects and illustrations into their lessons. Sufficient examples should be at hand to illustrate the lesson and to maintain interest, but we must beware of the "peep-show" order of instruction in which so many things are seen that practically nothing is seen at all.

2. Observation should be first directed to the thing as a whole, then its parts should be examined, and, lastly, these parts should be definitely co-related to one another and to the whole object.

3. The Teaching should be Educative rather than Instructive.—To this end the children should be told as little as possible, and made to discover as much as possible. It is a common mistake for the teacher to state the result of an act of observation, and then turn to the object to substantiate his statement.

"The object is not allowed to speak for itself, eloquent though it is and capable though it is of adapting its teaching to the youngest child who questions it. The teacher buries it under a heap of words and second-hand statements, thereby converting the object-lesson into a verbal lesson, and throwing away golden opportunities of forming the scientific habit of mind. Such teachers proceed 'as though their pupils had eyes that saw not, ears that heard not, and palates that tasted not, and skins that felt not, and muscles that would not work.' They have insisted on taking the words out of Nature's mouth and speaking for her."

The wise teacher guides and controls the observation of his pupils; he puts before them a set of facts and gets them to draw their own observations from those facts; he endeavours to make his children discoverers, not weary pilgrims along a beaten track.

4. Frequent use should be made of the Black-board, especially for sketches of parts of the object under examination, and for recording the principal points elicited during the lesson.

"Children who are jaded in five minutes by a lecture will be open-eyed and receptive for half-an-hour while the teacher draws as well as talks."

5. Questioning.—At various stages during the lesson the teacher should discover by a few searching questions whether the lesson has so far been understood.

At the end of the lesson a few scholars might be required to give in the form of a *continuous narrative* an outline of the lesson in which the method of obtaining the results should figure as well as an enumeration of the results obtained.

A very simple Object-Lesson on a *Candle* is now given. It will be noticed that it deals mainly with *one* object, and is observational in its character.

An Object-Lesson on *Iron* is next given. A perusal of it will show that it demands a great deal of observation, a few simple experiments, and some little reasoning.

As the child progresses more experiments proper may be introduced and greater demands made on the reasoning faculties. The subject then begins to develop into simple Elementary Science. The lesson on *Carbonic Acid Gas* illustrates this stage.

OBJECT-LESSON ON A CANDLE

Things required.—Candles, matches, fire, lamp, paper, slate, spoon, small sheet of glass, lard, butter.

(The lesson should be given in a darkened room, or a dark day should be chosen for the lesson.)

Observations and Experiments.	Results.	Inferences.
1. (*a*) Drop pin on floor; ask child to find it. (*b*) Light candle to assist search.	Pin cannot be found. Pin can now be found.	**Room is too dark.** **Candle gives light.**
2. Blow out candle; light lamp, gas, &c.	Things can again be seen in room.	**Lamp, gas, &c., also give light.**
3. Relight candle; ask child to put hand nearer and nearer to candle flame. Repeat with fire.	Hand becomes warmer.	**Flame is hot. The nearer we get to the flame the hotter it becomes.**
4. Bring piece of paper and match nearer and nearer candle and fire.	Paper and match catch fire.	**It is dangerous to go too near anything burning.**
5. (*a*) Tilt burning candle over slate. (*b*) Note wax on slate.	Wax drops on slate. Wax becomes hard.	**Heat melts wax.** **Cold makes wax hard.**

OBJECT-LESSON ON A CANDLE (*continued*)

Observations and Experiments.	Results.	Inferences.
6. Scrape wax off slate; put into spoon over lamp.	Wax first becomes soft, then melts.	**Heat makes wax soft at first, then melts it.**
7. Slowly melt lard or butter in a spoon. Ask what happens when butter is put on warm toast.	Lard or butter becomes first soft, then melt.	**Lard or butter, when heated, acts like wax.**
8. Make notch in candle about half an inch from top; light. At end of lesson examine candle and wick.	Candle shorter; wick has wax in it.	**The melted wax goes into the wick, and is there burnt away.**
9. Hold sheet of white paper flat over candle flame, or smoke glass in candle flame. Refer to soot in chimney, blackening of ceilings, &c.	Paper, glass, become covered with soot.	**Candle produces soot; so do fire, lamp, &c.**

B.B. SKETCH

Candle

Candle gives { Light. Heat. Soot.

Heat melts wax.

Cold hardens wax.

Oral composition should follow the lesson.

OBJECT-LESSON ON IRON

Things required.—Nails, hammer, and poker; pieces of iron and wood of equal size; water; iron rod, and piece of glass tubing about same diameter; heavy weights; iron and lead tubing of about same diameter; fire; sheet iron; iron wire; piece of rusty iron; lead; iron spoon; magnet; penny; shilling; iron filings; sand.

Observations and Experiments.	Results.	Inferences.
1. (*a*) Let child hold piece of iron and wood of same size. (*b*) Drop each into water.	Iron harder to hold up than wood. Iron sinks; wood floats.	**Iron is heavy.**
2. (*a*) Let child scratch wood with iron nail. (*b*) Drive nail into piece of wood; pull nail out and examine.	Wood easily scratched. Nail not altered, but hole has been made in wood.	**Iron is hard.**
3. Rest iron and glass rods on two supports; hang heavy weights on rod between the two supports.	Glass rod breaks; iron rod does not break.	**Iron is strong.**
4. (*a*) Get child to try to bend iron and lead tubing. (*b*) Put poker into fire till end is red hot; press poker sideways on hearth.	Lead tubing bends; iron tubing does not bend. Poker easily bent.	**Iron does not bend when cold, but bends when hot.**

OBJECT-LESSON ON IRON (*continued*)

Observations and Experiments.	Results.	Inferences.
5. (*a*) Get child to strike piece of iron wire with hammer. (*b*) Make wire red hot; strike it with hammer. (*c*) Show specimen of sheet iron and iron wire.	No effect is produced on iron. The iron wire is flattened.	Iron can be hammered out when hot, but not when cold. It can also be made into wire.
6. Melt lead in iron spoon.	Lead melts; iron spoon does not.	Iron does not melt easily.
7. Show piece of iron that has been exposed to air for a long time.	Iron is covered with brown scales.	Air rusts iron.
8. (*a*) Try to pick up nail, penny, shilling, lead, &c., with a magnet. (*b*) Separate iron filings from sand by means of a magnet.	Magnet picks up the iron only.	Iron is the only common thing a magnet will pick up.

B.B. SKETCH

Iron

Is heavy, hard, strong.
Can be bent and hammered out into sheets.
Can be drawn out into wire.
Does not melt easily.
Rusts in air.
Is picked up by magnet.

CARBONIC ACID GAS

(*First Lesson*)

Things required.—A pickle jar, with cork fitted with a thistle funnel, and bent tube; chalk; any acid (vinegar will do); water; several glass jars; quicklime; candle mounted on wire; scales; spirit-lamp; saucer.

Observations and Experiments.	Results.	Inferences.
1. (*a*) Place chalk in saucer; pour a few drops of acid on it. (*b*) Pour a few drops of acid on quicklime.	Bubbles are formed on the chalk. No bubbles are formed.	The bubbles must be gas. This gas must have been driven off when the chalk was turned into quicklime.*
2. (*a*) Place piece of chalk in glass jar; lower lighted candle into jar. (*b*) Pour acid over chalk; lower lighted candle. (*c*) Again lower lighted candle, and note if the new gas burns. (Teach the name Carbonic Acid Gas.)	The candle continues to burn. The candle is extinguished. The new gas does not burn.	The gas given off is not air, for the candle will not burn in it; it is not coal gas, for it does not take fire.
3. Fit up apparatus described in "Things Required"; before corking bottle insert some chalk; pour *dilute* acid through the funnel.	Bubbles are formed.	Carbonic acid gas is being produced.

* A previous lesson should have been given showing how chalk is turned into quicklime by the application of heat.

CARBONIC ACID GAS (*continued*)

Observations and Experiments.	Results.	Inferences.
4. Lower lighted candle into the glass receiver.	The candle is extinguished.	The receiver must contain carbonic acid gas.
5. (*a*) Ask the children if they can *see* the gas in the receiver; compare with air and coal gas.	The carbonic acid gas is invisible.	Carbonic acid gas, like air and coal gas, is invisible.
(*b*) Let child *smell* the jar; compare with air; contrast with coal gas.	The carbonic acid gas has no smell.	Carbonic acid gas, like air, and unlike coal gas, has no smell.
6. Take jar (1) filled with carbonic acid gas. Test jar (2) with lighted candle to show it contains no carbonic acid gas. Pour carbonic acid gas from jar (1) into jar (2) in the same way as water would be poured; test jars again.	Jar (2) now contains carbonic acid gas; jar (1) has no carbonic acid gas.	Carbonic acid gas is heavier than air, because it can be poured downwards.
7. (*a*) Allow carbonic acid gas to bubble into water for some time.		Carbonic acid gas is soluble in water.
(*b*) Take the water used in (*a*) and gently heat it in a long glass vessel.		
(*c*) Lower lighted candle into the vessel; do not allow it to touch the liquid.	The candle is extinguished.	The carbonic acid gas may be obtained from the water by heating it.

B.B. SKETCH

Carbonic Acid Gas

Invisible.	Puts out candle.
No taste, no smell.	Heavier than air.
Does not burn.	Soluble in water.

Proceeding on the same plan, in a subsequent lesson, it may be shown that—

1. Carbonic acid gas turns clear lime water milky.
2. Chalk – carbonic acid gas = quicklime.
3. Quicklime + water = slaked lime.
4. Quicklime (in water) + carbonic acid gas = chalk.
5. Air breathed out contains
   A burning candle produces
   Bottled lemonade, &c., contain
   } carbonic acid gas.

ELEMENTARY SCIENCE

Differences between Object-Lessons and Elementary Science. It is at first sight difficult to distinguish between Object-Lessons and Elementary Science, yet a little reflection will show sufficient difference to warrant distinct terminology.

Object-Lessons.	Elementary Science.
1. Concerned mainly with *single* objects.	1. Concerned rather with *classes* of objects.
2. The object is first considered as a *whole;* then the *parts* are examined. Method mainly *analytic.*	2. Concerns itself first with *details;* proceeds from "particulars" to "generals." Method mainly *synthetic.*
3. Not concerned with generalisations.	3. Generalisations *the* object of Elementary Science.
4. Observation *the* feature; little experiment and less reasoning.	4. Experiment *the* feature. Much reasoning involved. Observation mainly automatic.

Elementary Science as distinguished from Object-Lessons is mainly concerned with Experiment and Reasoning, and it would be well to devote some attention to these processes.

Experiment is that kind of experience in which we take causes and examine the effects which those causes produce.

A teacher takes a jar of hydrogen and applies a light (*cause*). The hydrogen burns (*effect*). In observation we note effects and sometimes we can

note causes, but we cannot control either. In experiment, man is master of Nature; in observation, Nature is master of the man.

PRACTICAL HINTS ON THE WORKING OF EXPERIMENTS

Before Lesson.

1. Carefully rehearse the experiments beforehand. This will give certainty of manipulation and will economise time, *e.g.* the teacher could arrange for the children to sketch apparatus in their note-books while a substance is being heated or cooled.

2. Have *everything* ready before the lesson begins. There should be no running about during the lesson for bits of apparatus that have been forgotten. If a flask is likely to break during an experiment, have a duplicate at hand properly fitted up to supply its place.

During the Lesson.

1. Point out the essential parts of the apparatus. Draw the whole or some special parts on the blackboard.

2. Work the experiment step by step. Do not hurry, and do not be nervous about the result. Nervousness is the result of insufficient preparation. Rehearsal gives confidence.

Sometimes, but very rarely, with all possible care, a failure ensues. If there is time, have recourse to the duplicate apparatus, or reserve the experiment till another lesson. Above all, do not dismiss the failure by saying "Such and such should have been the result."

3. Do not *tell* the class the result which is expected, but *lead* the observation of the class in the direction desired. This is one of the refinements of the teacher's art attainable only after long practice. See also p. 220.

4. At the conclusion of the experiment, question upon it, and separate essentials from non-essentials.

Too often, means are mistaken for ends. Thus a child will recollect the pretty red and the pretty blue (*means*) produced by the action of certain liquids on litmus, but will forget that the red denotes the presence of an acid and the blue the presence of an alkali (*ends*).

5. Write on the B.B. the great truth taught by the experiment.

6. Let class sketch apparatus in note-books if this has not already been done (see above).

After the Lesson.

1. At a subsequent lesson rehearse by questioning the whole experiment. Many anxious teachers omit this stage. But Experimental Science is not all experiment; there is *science* as well, and this implies the exercise of the powers of memory and of reasoning, such as a recapitulation lesson gives.

2. The simpler experiments should be re-worked by the pupils in the Laboratory. The ingenuity and reasoning powers of the pupils should also be exercised by requiring them to work experiments somewhat different from those worked in the Lecture Room.

3. Examine the pupils' note-books.

ELEMENTARY SCIENCE AND REASONING

Outlines of a Series of Lessons leading up to the Law, "*Matter expands with Heat.*"

First Method,

1. Teacher obtains an iron ball which will just pass through a ring. He heats the iron ball and again places it on the ring. *It does not pass through.* **Inference: Heat caused the iron ball to expand.**

2. Experiment is repeated with brass, copper, leaden and glass balls. **Inference: All these bodies expand with heat.**

3. But iron, brass, copper, lead, and glass are solids. **Further inference: Solids expand with heat.**

4. Teacher takes a flask filled with water, and provided with a well-fitting cork, through which runs a narrow glass tube. The class notes the level of the water in the tube. The water is heated. *The water rises in the tube.* **Inference: Water expands with heat.**

5. The experiment is repeated with alcohol, milk, and treacle, &c. **Inference: Alcohol, milk, &c., expand with heat.**

6. But alcohol, milk, &c., are liquids. **Further inference: Liquids expand with heat.**

7. Teacher partly fills a bladder with air, ties up the opening, draws attention to the wrinkled surface, and places bladder before the fire. **The wrinkles disappear, showing the bladder is now full of air. Inference: Air expands with heat.**

8. The experiment is repeated with coal gas and carbonic acid gas. **Inference: These two gases expand with heat.**

9. But air coal gas, &c., are gases. **Further inference: Gases expand with heat.**

10. But solids, liquids, and gases are forms of matter. **Final inference: Matter expands with heat.**

Second Method.

1. The teacher enunciates the principle: **Matter expands with heat.**

2. He argues that solids are a form of matter; iron is a solid: therefore **Iron expands with heat.**

3. He then proceeds to work an experiment to prove his assertion.

4. He deals with liquids and gases in a similar manner.

Chief Difference between these Two Methods

First Method.	Second Method.
Particulars (*i.e.* single cases) were dealt with, and from these particular cases general laws were inferred. This method of reasoning is known as **Induction.**	The general law was first enunciated and particular cases were then shown to be examples of this general law. This method of reasoning is known as **Deduction.**

For further differences between the two Methods see p. 32.

The skilful teacher will use either method as occasion may demand. Many lessons require the application of both.

Elementary Sciences best adapted for Young Scholars.

1. *Elementary Physics and Elementary Chemistry.* — These sciences furnish a large number of experiments easily worked and capable of giving exact results. No elaborate apparatus is required, and the subjects are within the compass of the young scholar. They are especial favourites with boys.

2. *Elementary Botany.*—This is an observational rather than an experimental science. It is especially suitable for country children, inculcates a love of nature, requires very little apparatus, and would appear to be a favourite study with girls, probably because of its æsthetic character and of its freedom from mathematical calculations.

The Advantages of a Study of Elementary Science.

In addition to training the powers of observation, science may lay especial claims to affording a training in exactitude. Measurement needs accuracy, and "Science is Measurement." The accuracy of observation required, the careful manipulation of apparatus, the clearness of definition, and the accuracy of mathematical calculations involved, all tend to form a habit of exactitude—a valuable acquisition for the real business of life when school days are over.

INDEX

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