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SCHOOL MANAGEMENT

AND

METHODS OF INSTRUCTION

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WITH SPECIAL REFERENCE TO ELEMENTARY SCHOOLS

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PREFACE

In times past it was considered that the chief, and indeed almost the only, qualification necessary in a teacher was a knowledge of the subject to be taught. A knowledge of child nature and of the principles of the working of the mind was not considered at all essential. The tendency of the present day is to go to the other extreme, and regard a knowledge of psychology as being the only qualification that a teacher should bring to his work. The correct view seems to be that the ideal teacher should not only be well versed in the subjects he is required to teach and in the principles of psychology, but should also have studied the relation of subject-matter to mind. He should have considered carefully the effects that the subject is calculated to have in the development of the pupil's mind, and how the subject may best be divided up and presented so as to produce those effects. In the hope of assisting their fellow teachers in their work on these lines the authors have undertaken the present book, which they trust will be

found in agreement with the latest developments in psychology, although its technicalities have been avoided as far as possible. They must not be understood however to depreciate in any way the value of a knowledge of this important subject. Every earnest teacher should give close attention to the study of it, and should strenuously endeavour to apply its teaching, and in addition to this he should endeavour to gain an intimate acquaintance with the lives and work of the great teachers of the past. Such wider reading will, we are sure, result in an increased interest and enthusiasm in the more commonplace duties with which this book is more directly concerned.

It has been considered advisable to limit the treatment of school organisation to that of elementary schools, but it is hoped that the treatment of the different subjects of instruction will be found useful to teachers in schools of every grade.

G. C.
C. W. C.

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SCHOOL MANAGEMENT

CHAPTER I

SCHOOL AND HOME

After the passing of the Elementary Education Act, which brought into the school many children of parents who were strongly antagonistic to anything like education for their children, an idea was prevalent among these that school and home were distinct phases of the child's education, and that one was inimical to the other. The better feeling that has since arisen has been produced partly by the benefits which the parents have seen to result from Elementary Education, and partly by the various methods which teachers have adopted to increase the interest of parents in the education of their children.

The whole progress of child-life consists in a development of its mental, moral and physical powers. While the mental training is largely the work of the school, the moral training largely the work of the home, and the physical training to some extent outside both, on neither influence alone

should any of these be allowed to rest, but the sympathies and active assistance of each should freely be given to the other.

The Parent's Side.

On the parent's side the best aid can be given—

Early Training.

a. By the early training in truthfulness, obedience, and cleanliness. Of these virtues the former is most difficult to obtain, and it is remarkable with what ease even very young children will allow a falsehood to spring to their lips. The habit of "story-telling" is best conquered when it first appears, and all through school and home life the idea of personal honour should be ever brought before the child.

The valuable habit of obedience should have its foundations in the home influence, but too frequently such is not the case. In many homes far too much licence is allowed to the children.

Regular and Punctual Attendance.

b. By sending the child regularly and punctually to school. Nothing but the illness of the child should be allowed to excuse absence from school, and in all cases of absence courtesy alone should ensure the sending of a note of explanation—beforehand if possible. Where there is only one child in the family, or where both parent and children have been demoralised by the laxity of many of the private-adventure schools, the importance of regular and punctual attendance is not sufficiently recognised, and children are kept at home for the most trivial reasons. The loss to the child is great, and such "keeping away" is the greatest unkindness that could be shown to him. He probably misses some part of his school work essential for his future

progress, and has laid the foundation of the vices of irregular and unpunctual work.

c. By exercising a kindly supervision over work done at home. The importance of this will be emphasised in the chapter on school work. **Supervision of Home Work.**

d. Although it is too much to expect that differences of opinion between teacher and parent should never arise, such differences should never become apparent to the child in any way. The influence of both teacher and parent is weakened when the child sees the two in conflict. All communications on such differences should be carried on by interview or by letter. **Harmony with Teacher.**

e. The method of speech adopted by the child is that which he hears at home. The evil influence of the streets should be kept as far from him as possible. **Method of Speech.**

f. The parent should heartily support the functions organised for the school. **Interest in School Functions.**

There are, of course, many other ways in which the parent's influence upon the school life of his child may make itself felt. There is nothing better than kindly sympathy of object between teacher and parent.

The Teacher's Side.

On the teacher's side various ways of interesting the parents in the school work are in general practice. School concerts and treats, prize distributions, school sports, athletic clubs in connection with the school are general throughout the country, and the tendency is, perhaps, to overdo them. Besides those before mentioned, which do not actually belong to school work, it is a good plan—

The Parent to be seen at the Child's Admission.

a. To see the parent when the child is admitted to the school. The particular character and weaknesses of the child may then be learnt, and the principal and essential rules of the school made known to the parent. No application for admission should be entertained without the parent's expressed sanction, given either in person or by letter.

Term Reports.

b. To issue reports three or four times during the year, showing the marks obtained by each pupil in each subject, and drawing attention to lapses in conduct or attendance. A class list in order of merit may accompany these.

School Cap and Badge.

c. In many schools a distinctive school cap and badge have been adopted, and a marked increase in the esprit de corps of the school has resulted.

Open Session.

d. In some schools also a session is set apart at stated intervals, and the parents are invited to visit the school when in working order. If these sessions are not too frequent, and care is taken that the ordinary routine of the school is interfered with as little as possible, this seems an excellent method of uniting school and home influences.

Owing to the migratory character of the population of our large towns, Old Boys' Clubs, except at P.T. Centres and some of the older Higher Grade Schools, have not as yet made more than a sporadic appearance.

A marked advance towards a more complete union of school and home life is very apparent in our elementary schools, and the greater sympathy and cordiality between parent and teacher so shown cannot but aid both in their endeavours towards a perfection of our system of education.

Homework.

Upon the question of giving homework in elementary schools the Board of Education has laid down no decided rule. On page 38 of the instructions to Inspectors we read :—

"Nothing should be attempted which, having regard to the proper classification, &c.,...cannot be efficiently taught in the proper school hours." The almost direct discouragement of this paragraph is somewhat modified by an earlier statement on page 19 of the same instructions :—

"In some good schools the aid of the parents has been successfully enlisted, and they have been urged to hear their children read aloud from a newspaper or from a book for a few minutes at home every day. The amount of oral practice which any one child can obtain in a large class is obviously insufficient, and a little home exercise in reading aloud is often found to have an excellent effect."

In other words reading at least cannot be efficiently taught in the proper school hours. In a recent letter from the Board of Education with reference to homework it was stated that—

> "Children who do not conform to the rule cannot be expected to make the same progress, or be classed in the same standard, as children who do home lessons."

The "would" and "would not" of those contradictory instructions has no doubt resulted from the very varied character and home circumstances of the children attending elementary schools. With parental care and a home training of the best kind, homework should be the rule ; but the character of many of the homes and the amount of labour done

by the children out of school hours—as shown by the recent inquiry—have produced a general neglect of this valuable aid to school training. Homework is given only in those schools situated in the better districts, and in Higher Grade Schools and the Pupil-Teacher Centres connected with the Elementary system.

Advantages of Homework.

The advantages of homework are these :—

a. The very short number of hours available for "practice" in school is materially increased.

b. An additional link is added to the chain binding home and school life together. The child learns that school and home are working hand in hand for his benefit, and in consequence his respect for both parent and teacher is increased. The parent is enabled to watch more closely the progress of his child.

c. A habit of private study and of self-reliance is fostered by work done at home without the teacher's supervision.

How best to Secure these Advantages.

In order to secure to the full these great advantages, and to minimise as much as possible the great amount of time required for the teacher in marking homework, it is necessary that the homework should be —

a. Within the child's capacity.—It should not require the assistance of any one at home. Work following easily upon and illustrating the previous teaching should be the general rule, and work preparatory for future lessons is generally to be avoided. In upper standards, however, the subjects for composition are often given out beforehand, and home preparation of material for essay is required.

b. Moderate in amount.—The amount will of course vary with the age and capacity of the child, but where $5\frac{1}{2}$ or 6 hours of school work have already

been done, an hour seems to be the outside limit of work that should be required for children up to the age of 14. The amount of work set should require this time from the boy of average capacity. The statement of the parent that an hour's work has been done, even though the amount set has not been completed, should satisfy the teacher.

c. Easy to test and always tested.—It is on this point that many young teachers give themselves a needless amount of trouble. Unless such homework is set as can easily be marked, the value of the work done at home is destroyed by the loss of the teacher's time in marking it. It is an expeditious and useful way, teaching self-reliance and honesty, to let the children mark their own work wherever possible. It has the further advantage of bringing their mistakes prominently before them. The teacher should always carefully supervise such marking. If the homework is not always marked all its advantages are lost by the slipshod manner in which it will soon be done, and by the injury which will result to the school tone and discipline from the knowledge that one of its rules may be broken with some impunity.

d. Done and done well by every child.—Nothing but illness or the permission of the head teacher should excuse neglect of homework.

A great difference, to the disadvantage of the homework, is often seen between the work done at home and school. Homework should be done at least as well as school-work, because the child can take his own time over it.

e. Difficult to copy.—When the watchful eye of the teacher is removed the lazy child is naturally tempted to indulge in his favourite vice of copying. It is difficult always to set such work as cannot be

copied, but the teacher should endeavour to secure this as far as possible. Work which has to be written and learnt has this happy advantage. Arithmetic and algebra, unless a separate card is given to each child, give immense scope for the practice of the vice.

Attendance.

Punctuality and Regularity.

Two of the most important effects of school training consist in the development of the habits of punctual and regular attendance. The value of these habits to every one is apparent. They are particularly valuable to the units of a business nation like ours, and the fostering of these habits should be one of the most important aims of every teacher.

Their value is, however, not limited to their use in after life, but from the great saving of time and labour that results when children are punctual and regular, they make all school work easier and more effective. The amount of time lost when children are not punctual at the commencement of the session, or where the regularity of attendance does not far exceed the average percentage of the United Kingdom (about 82), is very deplorable.

Of the two faults of unpunctuality and irregularity, the former is more directly under the teacher's control, and no head teacher should allow any laxity in this respect. Where a large percentage of children habitually come late, the head teacher should ask himself whether he has done all in his power to prevent the spread of this vice, and should not be content until he is certain that every child who is late has been detained by unavoidable causes.

Punctuality.

The following are among the plans generally adopted by teachers to secure punctual attendance :—

i. *Early and Late Marks.*—The school registers are marked in red ink at the commencement of each meeting, and again in black at the final closing. The sum of the black or late marks is deducted from the sum of the good marks obtained during the year. The net result decides whether a prize has been obtained, and fixes the position of the child in the class. In schools where the great majority of the boys are punctual, the mark system is very effective, and little else is needed to maintain a high standard of punctuality throughout the school.

ii. *Detentions and Impositions.*—But there are in all schools some children who do not trouble about this loss of marks, and in some schools such children are very numerous. More stringent methods are therefore necessitated, and the system of punishment by detention and imposition may be adopted. In the chapter on discipline punishments of this kind are deprecated, and they are allowable perhaps only in the cases of late coming or irregularity, where such means of discipline are natural. The detention and imposition are most effective when the work of each session commences with some short lesson which the late comer must be made to complete after the early children have gone home. A monitor should be appointed to take the names of all late comers, and the teacher should see that the work set is carefully done.

iii. *Help of Parents.*—In cases where even detention and imposition are of no avail, and the habit of irregularity is deep-seated, a letter to the parents

of the children is frequently very effective in checking the evil, and in most cases it will be found better to address the letter to the father of the child. Most parents readily understand the danger of neglecting to check this fault, and when the child learns that parents and teacher are united against him, the endeavour to reform receives an increased impetus.

Corporal Punishment.—As a last resource, when all other methods have been tried and have failed, it will be necessary to make use of corporal punishment. Some School Boards have passed rules that corporal punishment should not be inflicted for late coming, and have doubtless been led to do so by the fact that some teachers have used it not as a last, but as the first, resource in combating this evil of unpunctuality. Such a limitation is entirely unnecessary where records of punishment are kept, and the abuse of the power in some cases should not necessitate its total prohibition. Persistent late coming, without real cause, is one of the greatest faults of school life, and for few faults is corporal punishment more justifiable or more effective.

Persistent Watchfulness.

The need for detention or punishment of any kind will depend to a large extent upon the regularity with which the teacher attends to his late-comers, and to the degree to which he makes his children certain that their late-coming will be known to him and will be punished in some way or other. That spasmodic zeal which some head teachers show when they suddenly become aware that the vice is rife in their schools is only of temporary effect, and is apt to lead to reaction as violent as the remedies generally adopted in these fiery outbursts. The late comers should be seen by the head teacher on every occasion, the reason for the lateness should be asked, and the unpunctual attendance should never be

excused without a note from the parent stating that it is not the child's own fault. We will repeat here our remarks in the chapter on discipline that punctuality of attendance is the rule which the head teacher himself should enforce, and that in consequence, where the rule is lightly broken, the head teacher's influence upon the discipline of the school is seriously weakened. There can be no doubt that punctual and regular attendance go hand in hand, and that where the teachers allow a laxity in the former, the parents and children will soon develop a similar laxity in the latter. Every effort therefore that is made towards improvement in the one is equally an effort towards improvement in the other.

Influence of Punctuality upon Attendance.

Regular Attendance.

Inside and outside the school every effort is supposed to be made to secure the attendance of every child who is not prevented by illness from being present. It is a discreditable fact, and a cause of serious loss in many ways, that about one-fifth of the children on our school rolls are absent every session. The agencies employed in obtaining this meagre result are :—

The School Staff.
The Attendance Officers.
The Attendance Committee.
The Magistrate.

The School.—The most effective of all these agencies as a general rule is the school staff, and of these the head teacher should make the regularity of attendance his special care. The attendance of a school can be maintained at a very high level by using the same persistence of attack which has been

The School. Head Teacher.

Persistence Notes.

recommended against unpunctuality. The head teacher should visit each class at some time during each session, should notice the absence of every pupil, and should receive a note of explanation from every boy upon his return after an absence. The insistence upon the production of this note for every absence is one of the best preventatives of truanting.

Absentee Notes.

In some schools notes are sent from the school by means of other children whenever any child is absent, and an explanation is required to be written on them and returned on the next session. Many school authorities, wisely we think, do not allow such notes to be sent. Absences are not unfrequently due to the presence of infectious disease in the house, and the danger of the spread of the infection is much increased when other children call at the house. As it is the parent's duty to send the child regularly to school, the initiative in seeking excuse for absence should come from the parent.

Punishment for Absence.

Punishment for Absence should not necessarily or in wisdom follow a similar line to those for unpunctuality. There are so many other methods of punishment available to a resourceful head teacher that detention and corporal punishment should never be resorted to as punishments for absence. Absence from school is not generally the fault of the boy himself, but of the parent; and though it is possible in some cases to punish the parent through the child, it seems unjust to do so, especially as there are, or should be, means by which the parent himself can be brought to book. Unless therefore it is certain that the absence is the fault of the child himself these methods of punishment should not be utilised, and even in actual cases of truanting great hesitation should be shown in inflicting corporal punishment. Where prizes are given which depend either entirely

or in part upon regularity of attendance, *loss of marks* for absence will necessarily follow, and it should be pointed out to the parents that any injustice so inflicted upon their children is inflicted by the parents themselves. Where absence is so frequent as to interfere with the progress of the child, and he is found in consequence of such absence to be gradually falling behind the average standard of work in his class, it will be unjust to the boy to expect him to have fitted himself for the work of the higher class, and any attempt to promote him would result in over pressure and serious detriment to the completeness of his education. *Loss of promotion* is therefore a natural corollary to frequent absence, and the fact that the loss of promotion is due to this cause should be firmly focused in the parent's view. A *letter to the parent* pointing out that the absences are due to unsatisfactory reasons, and are proving detrimental to the progress of his child, is frequently productive of good results.

Rewards.

Rewards for Regularity.—In nearly all schools rewards are given for regular and punctual attendance, and take the form of *prizes of books*, &c., or *of medals*. To obtain a prize a child generally has to make about 95 per cent. of the possible number of early marks, while to obtain a medal he must never be absent or late during the year. The value of the medal is increased when this perfection of attendance has been continued during two or more years. The question has arisen in many places as to whether it is right that children should be rewarded for regular and punctual attendance. By law their attendance at school is compulsory, and the advantages in progress and habit which follow from good attendance are a sufficient reward. The whole question of rewards of prizes in any form is a very

debatable one, and prizes given for regular and punctual attendance alone are not more easily earned than others provided the standard is fixed sufficiently high, and they have the additional merit that they may be gained by every boy, while prizes for special subjects are the "perquisites" of the clever ones. The giving of medals, however, is not so easily upheld. There is no doubt that a child who is never absent nor late during a year or a period of years must either be gifted with remarkably good health, or must have attended on many days when his presence at school has been unwise and possibly injurious to his future well-being. There are some occasions also when a boy ought to have a holiday—his Sunday School, Band of Hope, or choir, treat, &c.—and the self-denial practised in giving up these is a hardship. Cases of infectious disease frequently occur, and either the medal is lost through an absence from school which by the law of the land is compulsory, or the presence of infectious disease is hidden, to the danger of all. That medals have the effect of increasing the regularity of attendance of children who are naturally very regular there can be no doubt; but these are not the children from whose ill attendance the school suffers, and the standard of perfection expected is beyond the dreams of the irregular.

Banners.

School Banners.—In many districts a special banner is sent every week to the school which has obtained the highest attendance during the previous week. This in its inception is no doubt an inducement to greater effort, but there are few districts where all the circumstances are equal; and when, as generally happens, the banner goes to the same schools week after week, the inducement soon weakens, and the banner loses its effect. Where the banner is kept in each school, and is held by the best class of the

previous week, there is more to be said in its favour, as the attendance in different classes of the same school may be expected to be more even.

There are many little ways also in which the head teacher may encourage his boys to better attendance, such as the giving of weekly attendance cards, magic-lantern displays to the most regular boys, extra play to these, &c.; but, better than all rewards or punishments, are the regular inquiry concerning absence each session, the insistence on the production of a satisfactory note of explanation, and the impressing upon the parent of the great loss each absence involves. The eruptive efforts sometimes seen are followed by long dormant periods, and the enthusiasm of the moment only shows the parents and children how bad they have been in the past, and how bad they may be again when the enthusiasm again sinks into quiescence. The improvement secured for the moment is more than counterbalanced by the reaction which follows, and the average regularity is in no way improved.

Attendance Officer.

The Attendance Officer.—Of the other agencies at work in endeavouring to secure good attendance we will say but little, as their work lies to some extent outside the ordinary school routine. The agent who comes into closest connection with the staff of the school is the school attendance officer. It has been said that the teacher is the best attendance officer; and in many ways this is true, but the advantages of having an official whose sole duty it is to make inquiries concerning absence are very great.

In small country districts one attendance officer is supposed to do the work necessary for all the schools in his district. In the large towns several officers are appointed for this work, and are under the direction of a superintendent of visitors. Each

visitor generally has charge of a certain district, and duplicate attendance schedules are made out for their guidance each week.

A far better plan is adopted in some districts, where the attendance officer is attached not to a district but to a school. By the other plan three or four officers may be involved in making inquiries upon the attendance of the same school, and frequently there is much difficulty in finding out who is responsible for a particular case. Where the officer is attached to a certain school there is no doubt about the responsibility, and his pride in success will cause him to spare no effort to secure the best attendance possible. He should have stated times for calling at the school, and should report on each case directly to the head teacher, and not on the duplicate schedules. Suppose, for instance, that he called at the school on Monday, Wednesday, and Friday mornings. On Monday morning he might receive a list of those children who were absent on the previous Friday afternoon without reason. This has a splendid effect upon the habitual Friday afternoon absentee. On Wednesday morning he might report on these, and then take a list of the children who have not been present so far during the current week. On Friday morning a list of those who have been absent from unsatisfactory reasons should be presented. In schools where the attendance is fairly good one officer by this plan can overlook the attendance of two thousand children, and where the attendance is very good, he can easily undertake two blocks of this size, or can spare some of his time to aid other schools less fortunate.

The list of parents to be called before the attendance committee should be prepared by the head teacher, after consultation with the attendance officer.

B., or Attendance Meetings.—The next turn in the tightening of the screw upon breaches of the attendance laws is given by the managers of the schools at what are known as Notice B meetings, from the letter upon the notice which summonses parents to the meetings. Two or more of the managers of the school are generally in attendance, and have the aid of the attendance officer and of the head teacher of the school. The parents of those children whose names appear on a list previously drawn up are then heard in defence of the irregularity of their children, and a decision is arrived at as to the action necessary to meet the case, a summons to attend before the magistrate being ordered in the worse cases. Notice "B."

The length of time which must necessarily elapse between the punishment for bad attendance and the offence nullifies to a large extent the advantage of the pressure these meetings may bring to bear. It is unfortunate also that in many cases the managers attending may rely upon the votes of the offenders for any local position they may hold or desire, and cannot always eliminate this factor in forming their judgments. To be effective, these meetings should be held once per month, and, if possible, the same managers should attend at the school on each occasion.

The Magistrate.—When head teacher, attendance officer, and attendance committee have all decided that the attendance of a certain child is very unsatisfactory, a summons is issued against the parent, and he has to attend at the local police court. It would seem improbable that any parent who had travelled thus far would escape punishment, but it is remarkable that a very large number of the summonses issued do not result in punishment of any Magistrate.

kind. When it is remembered that it usually takes at least three months to get as far as the summons, that the maximum penalty until this year was 5*s.*, and that the greatest care has been taken that only the worst cases are called up, it is little cause for wonder that the attendance in English schools reaches only the discreditable percentage of 82.

There is no doubt some truth in the complaint of the magistrates that they are much over-burdened with other work, and that these are not such cases as should properly be dealt with in a police court. There is a general consensus of opinion that special magistrates should be appointed to deal with these cases.

CHAPTER II

SCHOOL BUILDINGS AND EQUIPMENTS

School Buildings.

Knowledge of Methods adopted.

ADMIRABLE rules for the lighting, warming, ventilation, and drainage of an elementary school are laid down in the Code, and although it is not very probable that the teacher will have any voice in the planning of his school, it is advisable that he should make himself thoroughly acquainted with the details of these important points as they are carried out in the school in which he labours. The best-devised schemes of warming and ventilation are frequently rendered of little value because they are improperly carried out.

The Plans. (a) *Hall and Class-Rooms.*

A. *Before Plans are drawn up.*—Should a teacher be fortunate enough to have a voice in the planning of his school he should urge upon his managers the great advantages which follow the adoption of the separate class-room system, provided of course that a hall be added large enough to accommodate the whole of the school in close order, or a class of 60 in extended order for drill. The class-room system with or without a hall is advantageous, but the corporate life of the school suffers much when the "oneness" of the school is never shown.

The class-rooms should not be all of the same size, but at least one for 50 and one for 40 should be added to the usual 60 size.

(b) *Manual and Science Rooms.* Rooms for manual training, and for chemistry and physics should be detached from the main building, if possible, as the character of the work done in them is such as to interfere with the ordinary school work.

(c) *Store Room.* A store room properly fitted with shelves and sliding doors is a great acquisition. The doors should have glass fronts as far as is possible. The shelves should be deep enough to take foolscap the longest way. One cupboard should be pigeon-holed to hold examination papers, unless such a cupboard is placed in the hall, where of course it is more convenient.

(d) *Cloak Room.* If there are two staircases and two sets of cloak-rooms it is advisable to have two lavatories, one near each staircase and cloak room.

(e) *Teachers' Rooms.* It is the general custom in all well-built and well-equipped schools to have two private rooms, one for the assistant teachers, and one for the head teacher. The custom should be universal.

One private room only for both head and assistant teachers is sometimes provided, but there are so many occasions on which the head teacher requires to interview either parents, managers, or children on matters of private and special importance that a special room for the head teacher is a necessity. One for the assistant teachers is also most desirable, especially if any of them stay on the premises during the dinner hour. Books forming the reference library for the assistant teachers' use should be kept here, and cupboards provided for such of their own books as they desire to keep at school, as well as for exercises to be marked, &c.

B. *After plans are drawn up.*—Even after the

plans of the school have been approved, there are many points of detail upon which the suggestions of the teacher will be sympathetically received by the architect, and will be adopted, provided they do not necessitate structural alteration. A few of these points are mentioned below.

(a) *Water Supply.*

Taps and drinking cups should be placed in the playground for the convenience of the children.

In every lavatory there should be a basin adapted to the cleaning of ink-wells. The water-tap of this should turn with a detachable key. Where older children are taught, a water (and gas) supply should be laid on to a demonstration table, fitted for experimental science lessons in one of the class-rooms.

(b) *Cloak Rooms.*

The cloak-rooms preferably should have two doors or four doors. Where three doors are used, one of them is useless, unless it is made of width sufficient for two boys to pass each other. This door should be in the middle.

(c) *Playgrounds.*

(*a*) *Walls.*—In large towns it is better to surround the playground with a wall. Railings certainly give a more attractive appearance, but in many districts where they are adopted open-air drill is rendered impossible by the rudeness of onlookers.

(*b*) *Covered shed.*—Part of the playground should be under cover, so that boys who stay during the dinner hour. or who arrive before the usual time of assembly, may be protected during severe weather. A notice-board may conveniently be placed beneath the covered shed.

(*c*) *Waste-bins.*—A waste-bin should be placed in the playground for the reception of waste-paper, &c. It is of great assistance in training children in habits of tidiness.

(*d*) *N. and S. line.*—A well-defined N. and S.

line marked in some way right across the playground is of great help in many ways, especially in the teaching of geography.

School Furniture.

Every properly-equipped school should be provided with the following requisites for effective teaching :

Desks. A. *Desks.*—The best kind of desk is the single desk, but the space taken up by these is too great to admit of their use in elementary schools. The dual desk consequently is the one usually adopted. These should be made of as few sizes as possible ; three sizes, for small, medium, and large children, being quite enough. It is to be remembered that every special fitting in a class-room lessens the elasticity of organisation. The tops of the desks should never have a movable section. The desks should be of the same type throughout the school, so that the desk-drill may be uniform. Desks which hold more than two children render the children's work more difficult to supervise, and encourage surreptitious talking and copying. Of course there is a gain in spacing, but with dual desks the children are crowded quite enough for healthy work.

Cupboards. B. *Cupboards.*—i. *Class-room cupboard.*—Each class-room should be fitted with a cupboard of convenient size. The lower section of this should be deep enough to hold slates if these are used in the school.

ii. *Ink cupboards.*—In the corridors of the school should be placed one or more special cupboards to contain ink-wells. These are usually made with sliding trays, and with divisions to hold two gallon jars of ink, and an ink-can. A cocoanut mat should be placed near each cupboard to prevent ink being spilt on the floor. A wide-mouthed bottle containing

chloride of lime should also be kept in the ink cupboard, for removing any ink-stains accidentally made on desks or floors.

iii. *Museum cupboards* are generally provided, and are to be encouraged. They form a link between school and home, and are a help in broadening the somewhat limited character of elementary work. They are best placed in the hall of the school, and so as to fit the window recesses. The best form we have seen consists of a glass-covered top, placed at a height convenient for the average boy, and fitted below with pigeon holes deep enough to hold foolscap examination papers. These are far better than the type generally seen, which is merely an ordinary cupboard with the upper half glass-fronted.

iv. *Other cupboards.—Pictures or Maps.*—In schools recently finished a tendency has arisen to avoid entirely the display of maps on the school walls and to replace these with pictures. Where the pictures are well chosen, and their subjects are such as appeal to the better instincts of children in any way, there is much to say in favour of the change. The class of children who attend elementary schools may certainly be greatly benefited by being brought into contact with the finest examples of art. It is questionable, however, whether the advantage is not gained at too great a cost. Much knowledge of geography was unconsciously imbibed by children who saw the maps of the various countries displayed on their school wall. Unless, therefore, the pictures are of the best kind, and unless the teacher takes care that the children may be able to replace this loss in other ways, maps should be hung up in preference to the inartistic and taste-destroying chromos of continental origin. The pictures or maps are now generally hung from picture rods. Where maps are not hung up on the

walls, it is best to have a rack in each room upon which the map can be placed when rolled up. The position of each map should be labelled, so that the same map may always occupy the same place. It is well that the map under immediate study should always hang in full view of the class. In some schools the racks are made into cupboards. These are certainly preferable.

Where dumb-bells, &c., are used for physical exercises a special cupboard or *rack* should be made to contain these. Indian clubs and bar-bells are most conveniently hung from slots.

Cupboards specially fitted for needlework are required in girls' schools.

Other Class-Room requirements.

C. *Other class-room requirements.*—Each class-room should be fitted with (*a*) a small table, (*b*) teacher's desk, (*c*) an ordinary chair for the table, (*d*) a taller chair or stool for the teacher's desk, (*e*) a swing slate, (*f*) a blackboard and easel, (*g*) a clock, (*h*) a thermometer,[1] (*i*) an attendance board, (*k*) a time-table frame. A desk for the head teacher should be placed in the hall.

Other School requirements.

D. *Other school requirements.*—1. *An attendance board,* marking the attendance of every class in the school. Each head teacher will, of course, have this made and ruled to suit his own requirements.

ii. A key-board, fitted with hooks and labels. The keys belonging to each class-room should be placed on a ring provided with a label. They should never be taken home by the class teacher, but should either be hung upon the key-board each night, or care taken in some other way that they are available next day should the class teacher be absent.

[1] A cheap form of thermometer is sold which is guaranteed correct at 60°, and as this should be regarded as the normal temperature for a class-room, inaccuracies in other parts of the scale will be of little consequence.

The key-board is best placed in the head teacher's room, or it may hang in the hall.

2. *Fire equipment.*—It is only of late that any attention has been paid to the great danger which would attend any outbreak of fire in our schools. The more modern schools, however, are now fitted with pumps and hose, so that any outbreak of fire may be temporarily combated, and, if not too serious, may be overcome. These must be so placed that any part of the school building may be quickly reached.

The head teacher will find it advisable to appoint a special fire brigade to work each of these pumps, and to give them occasional drills so as to familiarise them with the implements they have to use. The alarm of fire should be given on one or two occasions during the year, so that the children may be accustomed to leaving the school rapidly and without panic. The teacher or monitor should be taught to take care of the school registers on these occasions.

3. *Medical equipment.*—A small medicine chest, containing diachylon, scissors, a sponge, forceps, carron oil and cotton wool for burns, &c., and simple remedies for such other accidents as may happen to children, should form an essential part of the school equipment.

4. *Notice boards.*—Besides the notice board in the playground, which should be mainly for the use of the children in their sports, &c., it is well to have one or two notice boards hung in convenient places in the school. One is specially convenient in the assistant teachers' room and in the school hall.

Sanitary Details.

In the sanitary arrangements it is of special importance that everything should be strong and simple. If there is any liability of a piece of sanitary apparatus getting out of order it should not be adopted in a school.

(a) *For Rural Schools.*

Rural schools are fortunately well placed with respect to the only natural treatment of their sewage matter, viz., by burial in surface earth. They should be provided with earth-closets, which must be emptied at least once a day and the matter at once buried. Nitrification at once sets in, all danger to health is avoided, and a valuable "humus" is the result. This process, however, takes place only within a short distance of the surface, and if waste matter be allowed to accumulate in cesspits, grave risks are run of the contamination of water supplies within a very considerable area. Those in charge of the provision of sanitary arrangements in rural schools are strongly advised to read *Rural Hygiene*, by Dr. G. V. Poore.

(b) *For Urban Schools.*

The above simple and effective method of disposing of sewage matter is not however available in town schools, and we are obliged to have recourse to a water-borne system,—a method which still leaves the ultimate disposal of the waste matter an unsolved problem, and fouls such an enormous quantity of water as to make the water supply of our cities a very serious problem to face. Where it is adopted the sanitary inspector generally satisfies himself that the arrangements are provided with (*a*) a syphon trap which will prevent the passage of sewer gas back into the house; and (*b*) a ventilating shaft beyond the syphon which will carry the gas up above the top of the walls of the house. Rainwater pipes should discharge on to a grating, below which there is communication with the drain pipe through a syphon trap. It should not be in the children's power to waste the water by leaving a tap turned on. Separate flushing tanks may be provided for each W.C., but for a large school it is preferable to have, running under all the separate W.C.'s, a common

trough, which can be emptied periodically, either by an attendant raising the plug, or by an automatic syphon arrangement.

In boys' schools the urinals should be separated into compartments by slate slabs set at right angles to the wall. It is essential that the urinals should be kept scrupulously clean; they require the periodical personal attention of the caretaker, whatever system of flushing be adopted. The system which allows a little water to trickle down in one or two places is very inefficient, and cannot compare with the automatic syphon flush tanks, which use no more water, but allow it to collect and discharge with force when full.

(c) *Relation to rest of School.*

The offices should stand apart from the rest of the school buildings, and as children frequently use them during school hours it is a good plan to have the covered part of the playground between them and the school door.

(d) *Inspection.*

The teacher should consider it an important part of his duty to inspect the offices frequently, in order to see that the caretaker is doing his duty, and that no writing or drawing is done on the walls.

CHAPTER III

ORGANISATION

THE organisation of the school is the work of the principal teacher.

Perfect organisation places every child and every teacher under the best possible conditions for effective work.

To secure this the head teacher has to arrange—

(*a*) The number and size of the classes.
(*b*) The distribution of the staff.
(*c*) The syllabus of work for each class.
(*d*) The classification of the scholars.
(*e*) The time table.

Number and Size of Classes.

In schools of the most modern type the class rooms are arranged to seat from forty to sixty scholars, and consequently the number of classes and the size of each are necessarily determined by the plan of the school. Owing, however, to the varying regularity of attendance the number of children on the roll of each class may exceed these numbers by from five to ten.

In older schools one large room with or without a classroom is the general rule, and the number of classes will depend upon the staff allowed. Where a classroom exists it should be utilised as far as possible for the noisier lessons.

Distribution of Staff.

Wherever it can be avoided the head teacher should not undertake the responsibility for a class. His time will be fairly well occupied in the active supervision of the work of every class, and any time that can be spared for actual teaching should be devoted to those subjects where weakness is shown, or to the help of those teachers who may be overburdened by their work.

There are three systems under which the staff of a school is distributed.

A. The class teacher goes through the same course year after year.

B. The class teacher advances with his class.

C. The teacher takes a special subject or subjects throughout the school.

In elementary schools the plan adopted is either A. or B., except in such subjects as drawing, drill, and singing, when a teacher with special gifts in these directions will teach his special subjects to the whole school.

Plan A.

Of the two plans A and B, each has its advantages and disadvantages. It is obvious that where the first method is adopted the teacher who has been through the course one or two times previously will have a thorough grasp of the difficulties in the way, and will have gained a knowledge of the best methods to be applied. *Per contra* he loses his intimate knowledge of the character of each pupil in

his former class, and his own experience of school work will be very limited. He will be an expert in a limited portion of the curriculum.

There is also great danger that the teacher's enthusiasm may be damped by the monotony of his work.

Plan B. By the second method the teacher who advances with his class has the great advantage of an intimate knowledge of the varying nature and capacity of the children under his charge. His experience too will be widened, as the curriculum he teaches is widened also. His fresh difficulties should be very much lessened by the advice and sympathy of the head master. It is urged against this plan that the child should be placed under the influence of more than one teacher during its school life, and there is no doubt that every teacher has his idiosyncrasies and grooves, however good a teacher he may be, and from the dangers of these the child may be rescued by a change of teacher.

Compromise between A and B. In many good schools therefore neither A nor B is entirely adopted, but a compromise between the two plans. The school is divided into sections, say Standards I.—III., IV.—VI., and Standard VII. The teacher works from the lowest to the highest class in each section, and then commences again. In this way most of the advantages of each plan are secured and the drawbacks of each avoided. It is obvious too that the system may be prevented from becoming too rigid by transferring the teacher from one section to another.

Appointing Teacher to Class. Great care and judgment are required in appointing each teacher to his class. The two most important classes are the lowest class and the highest. Both demand most efficient teaching, and there are few who are ideal teachers for either work. In

these as in all other classes the power of maintaining discipline is the great essential, but Standards I. and II. require an abundance of sympathy and painstaking perseverance, and Standard VII. demands greater tact and wider knowledge, with the power of giving this knowledge vivid expression. There is no doubt that lady teachers are generally more suited to the work of the lower standards, and many school authorities have placed Standards I.—II. in boys schools under their care. These authorities should remember that such teachers are doing the work of men, and are placed at great disadvantages through their lesser chance of promotion. Their salary should equal that of the men they replace.

Appointment of Assistants.

Although it is the custom in secondary schools for the appointment of assistants to rest with the head teacher, this is not often the case in the elementary school. In nearly all cases the assistant teachers are appointed by the school managers, and it is only by their courtesy that the head teacher's voice is heard. Fortunately this courtesy is generally shown, but the custom should be universal. In all appointments the engagement should not be made permanent until the head teacher has had sufficient opportunity of seeing the assistant at work, and has certified as to his efficiency.

Pupil Teachers.

Where pupil teachers are on the staff it is advisable to avoid giving them the responsibility of a class. In the first place, though they are at school to learn the practice of their profession, they should do this with the least possible injury to the children. In the second place, in almost all schools they now have to attend day classes for pupil teachers, and their services are available only for a portion of the week. Junior pupil teachers should be placed under the supervision of a good teacher in the lower part of the

school, should make and present brief notes of the lessons given by the class teacher, and as often as possible should give an easy lesson, subject to the criticism of the class teacher and the head master. Senior pupil teachers may be given the responsibility of the class in certain subjects, under the supervision of the teacher in charge. A weekly criticism lesson should be required of them, with full notes of lessons, and they should also listen to and be encouraged to criticise the lessons of the junior pupil teachers.

In selecting pupil teachers the head teacher should endeavour to have an equal number of seniors and juniors, in such years that both are never away at the centre together.

It is somewhat unfortunate, as causing a difficulty in arranging a time table by means of which the powers of the pupil teacher may be best utilised and developed, that the end of the school year and of the pupil teacher's year do not always correspond. In such cases a time table which gives a pupil teacher the responsibility of certain subjects on certain days becomes useless when, by a change of year, the pupil teacher is at centre instead of school on those days. The time table must be recast, or the pupil teacher must leave these subjects in the middle of a course.

The Syllabus of Work.

Liberty allowed.

With the freer hand allowed to teachers and managers a curriculum can be drawn up in which the whole course of elementary work can be divided into two, three, or more sections according to the number of members of the staff, provided that the sanction of her Majesty's Inspector is obtained. Owing no doubt to the evil influence of the pernicious system of payment by results, many teachers have

hesitated to use this liberty—they still feel the effects of their former fetters. The freedom now granted should be fully utilised.

Scope of Curriculum.

Having settled the number of sections it is well to remember that in the Code we have an admirable guide as to the amount of work possible in each subject during the school years (7—14). As regards the amount of work to be done each year the Code should be the standard. In determining the number of subjects to be taught the head teacher has to avoid on the one hand the danger of a limited and cramped curriculum, and on the other the allurements of an imposing array of subjects. The former fault is by far the more pardonable; indeed, there are many who prefer a few subjects well taught. Experience teaches us, however, that within reasonable limits many boys can be taught a more extended curriculum not only without any detriment to the more important subjects, but actually with advantage to them by increasing their interest in school work, and thus lessening its monotony by the greater variety of studies. The Code prescribes the minimum of subjects to be taught. Extra subjects should be added only when success in the more limited work warrants it, and when it is certain that the new work can be thoroughly well taught without harm to the essential subjects. No subject should appear on the time table merely for show. Sincerity of purpose should permeate all school work.

Change of Subject.

When once a subject has been taught in the school it should not be changed, unless there are strong reasons for so doing. Some teachers, especially upon their first appearance in charge of a fresh school, are too much inclined to emphasise the proverb regarding new brooms. If their own pet subject is not taught it must at once replace another, their own methods

must certainly be best, and the former and older methods must at once give way. This enthusiastic uprooting of old subjects and methods—admirable as enthusiasm, but excessive in zeal—must be moderated to a pleasant and gradual grafting of the newer ideas. Violent changes must be avoided, and when new subjects are introduced the change should be made in the lowest class and the older subject allowed to work itself out. Of all people, a head teacher has most need to follow Bacon's advice, and "innovate slowly."

Records of School Work.

Every class teacher should have a copy of the curriculum of his class, and every month should enter in the record book the parts of the curriculum that have been taught. The head teacher should carefully examine this record book and accelerate or diminish the rate of progress as he thinks necessary. He will insist that nothing shall be entered in the record book but what has been actually and efficiently taught. Some head teachers follow another plan, and determine in advance what part of the work has to be done during the following period. It is however so difficult to gauge what is a satisfactory month's work in each subject and teachers and circumstances vary so much, that the plan of putting down the work done seems much the wiser.

Staff Conferences.

In connection with the subject of curriculum periodical conferences of the staff are very helpful. Methods of teaching the various subjects can thus be easily correlated. Where these methods are likely to vary, the method of the lowest class should always be followed, and this should agree with the method of the infant school, if the subject is taught there. The advantages of this uniformity of method are so great that the head teachers of the various departments of a school should also agree upon the plans to be

followed throughout the school, and should also have their periodical meetings to settle these important matters.

Classification of Scholars.

Admission.

All new scholars should be examined in the three R's upon admission, and should not be placed in any class unless they can show a satisfactory knowledge of the work of the class below. Of course some little allowance should be made for the natural nervousness of a new scholar, and for the increased difficulty due to change of environment. In many of our school districts it is customary to give transfer notes, stating the standard and character of the scholar wishing to be transferred. This is an excellent plan, and it is to be regretted that the practice is not universal, as it not only gives official evidence of the standard reached, but acts as a check upon the roving tendency which some children show. The greatest difficulty is with children from private schools. When these are young they are generally fairly good readers, but are weak in spelling and arithmetic. Should they have reached the age of eleven they have probably been all through the arithmetic course, but are very inaccurate. Their handwriting is usually very bad, and neatness of work is seldom shown. In whatever class they are placed they will be backward in many subjects, and possibly in advance in others. Unless, however, their attendance at a private school has been caused by ill-health, they are usually intelligent boys, and have generally greater home advantages than the majority of our elementary scholars. A knowledge

of their age, and a few questions, will be the best guide to their classification. Their written work will not do them justice.

The admission of new boys should take place as far as possible at the beginning of the course of work.

At end of year.

Advancement from class to class is generally made at the end of each school year. Under the present Code this promotion depends entirely upon the opinion the head master has formed of the child's work. It is usual to hold an examination in the three R's either quarterly or at the end of each term (Easter, Summer, Christmas), and to promote after the final examination. The papers of these examinations must be preserved for future reference. Other subjects of course may be added, and are useful both as information regarding progress in those subjects and also as guides in doubtful cases. In Standard I. reading is the most important subject, in II.—IV. spelling, and above IV. arithmetic. The head teacher should be thoroughly satisfied of the child's fitness for promotion. It is unfair to the boy to place him in a class for the work of which he is unprepared, and it is manifestly unfair to the teacher in whose class he is placed. In cases of doubt the results of the earlier examinations should be consulted, and the opinion of the class teacher should receive great consideration.

Classification and Attendance

A boy who attends regularly and punctually should be promoted if possible. The head teacher will find that his power of promotion from class to class gives him a powerful lever for securing regular and punctual attendance, and he should use this lever to the fullest extent possible. Gross unpunctuality and irregularity should preclude a child entirely from promotion, and the reason for non-

promotion should be brought before the parent's notice.

Promotion at any other time than the beginning of a course should be most rare, as such promotion weighs heavily on the boy promoted and on the teacher whose class he joins. A boy very rarely can have completed the full course in all subjects much before the appointed time; and even if he has a short period of marking time, this is harmless and may even be beneficial. **Spasmodic Promotion.**

The Code allows the head teacher to classify differently for as many subjects as he pleases, but very wisely points out that cross-classification is to be avoided. It will be necessary, however, in some subjects—drawing and the specifics—and a teacher is unwise who does not take advantage of it. Some teachers have a double classification for drawing, the child remaining in its ordinary class for geometrical drawing, and being classified again according to skill in freehand. This decreases the amount of changing from class to class, and also gives much greater scope for promotion in freehand and model, skill in which is to a great extent a matter of natural talent. The cases of cross-classification should be very few in number; a few cases of exceptional weakness in arithmetic generally occur. **Cross Classification.**

The Time Table.

The construction of a satisfactory time table is the most important and most difficult part of school organisation. The time table is the regulator of the school, and in its construction the head teacher requires all the skill and knowledge he can command. **Importance**

Before writing in the details of the time table the

Preliminaries. ground must be prepared by a determination of the following points :—

A. Times of assembly and recreation.
B. Length of lessons.
C. Apportionment of time to various subjects taught.
D. Arrangement of classes.

A. Times of Assembly and Recreation. Where these times are not settled by the school authorities, the head teachers of the different departments should arrange them for the same hour for all departments. No fault in organisation is more blameworthy or more easily remedied than the common fault of each department of a school having its recreation interval at a different time. For half an hour each day each department has to continue its work with the noise of children's play all round. This is so unnecessary and so easily avoided by a little tact and compromise that its existence should be considered a serious blot upon the organisation of the school.

B. Length of Lessons. In determining the length of lessons the age of the child requires great consideration. It is very difficult for young children to keep their attention concentrated upon any subject for a great length of time, so that lessons in the lower classes should be short and varied. Lessons which come earlier in the day, when the brains of the children are fresh, may be a little longer than the others, and, of course, "practical" lessons such as drawing need not be so short.

The need for constant variety is not so great in the case of elder children, and their lessons may be longer, especially when we remember that each change of lesson necessitates some loss of time.

In specific subjects, in which it is usual to have two lessons weekly, an hour is not too long.

A list of subjects forming the curriculum should be drawn up, and the length of time to be allowed to each should be determined. One or two lessons weekly should be entered as "optional" so that the teacher may be able to devote this time to the strengthening of weak subjects. C. Apportionment of Time.

The next point to settle is the arrangement of the classes. It is well to draw a rough plan of the school, and to mark down on this the position each class will occupy. Classes which are likely to cross-classify should be placed near each other so that the movement from class to class may take place as readily and noiselessly as possible. D. Arrangement of Classes.

The relative positions of the classes will necessarily influence the arrangements of subjects on the time table.

With the preliminaries settled the filling in of the details of the time table will be the next step. The principles which guide the head teacher in doing this are :— Order of Subjects.

The Nature of the Subject.—Lessons which require more mental effort, such as arithmetic and grammar, are placed early in the session. The more mechanical lessons may be placed later, or as relief lessons to those requiring vigorous brain effort. The strain upon the teacher has also to be borne in mind, and supervision should alternate with active teaching as far as possible.

Where a separate classroom does not exist, great care has to be taken that the work of one class does not interfere with that of another. No teacher ought to give an oral lesson when the class on one side of him is engaged in one of the "noisy" lessons, —singing, recitation, simultaneous reading. Even in schools where separate classrooms do exist this must be remembered. The *plan of class arrangement* there-

fore must be always by the side of the constructor of the time table.

The head teacher therefore has to bring his subjects under twofold classifications, according as they are—

A. Mental or Mechanical,
B. Quiet or Noisy,

and has also to consider the amount of work each lesson requires from the class teacher.

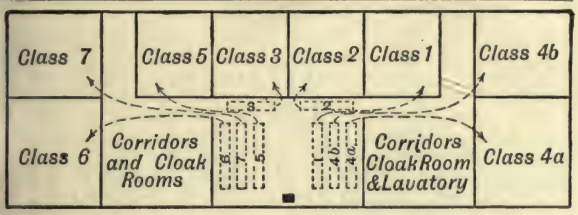
The Requirements of the Lesson.—In the case of lessons requiring the preparation of apparatus—as object lessons or lessons in practical science—an opportunity of making the preparation should be given to the teacher, either by placing the lesson at the beginning of the session or immediately after recreation, or by giving him some lesson beforehand in which the boys may be left to themselves to some extent.

Lessons which require a cross classification should come immediately after recreation if possible, so that the children may fall into their new positions after play. The hours 11 to 12 or 3-30 to 4-30 are excellent hours for such lessons as drawing or the specific subjects.

The circumstances of schools vary so much that no time table would meet satisfactorily the requirements of many. The conditions of each school will naturally affect the time table. It is hoped however that some little help towards that ideal—a perfect time table—has been afforded by the above remarks and by the careful study of the time tables here inserted.

TIME TABLE FOR BOYS' SCHOOL. WORKING SCHEME IV.
AVERAGE 450.

Subject.	1	2	3	4	5	6	7
Scripture & Prayers .	3.20	3.20	3.20	3.20	3.20	3.20	2.55
Reading . .	1.50	1.50	1.50	1.50	2.30	2.20	2.55
Grammar .	1.20	1.20	1.20	1.20	1.20	1.20	1.20
Repetition .	.35	.35	.35	.35	.35	.40	.35
Composition	1.45	1.45	1.45	1.45	.35	.35	.35
Spelling . .	—	—	—	—	1.45	2.20	2.20
Writing . .	—	—	—	—	—	.25	.25
History . .	1.20	1.20	1.15	1.15	1.20	1.20	1.20
Geography .	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Arithmetic .	2.15	2.15	2.15	2.15	3.45	4.20	3.45
Algebra . .	1.30	1.30	1.30	1.30	—	—	—
Mag. & Elect.	1.20	1.20	1.20	1.20	—	—	—
Drill	1.00	1.00	1.05	1.05	1.05	1.00	1.05
Drawing . .	2.15	2.15	2.15	2.15	2.15	1.40	1.40
Singing . .	1.10	1.10	1.10	1.10	1.10	1.10	1.10
French . . .	2.30	2.30	2.30	2.30	2.30	1.40	1.40
Optional . .	1.15	1.15	1.15	1.15	1.15	1.15	1.15
Recreation .	2.05	2.05	2.05	2.05	2.05	2.05	2.05
Total . .	27.30	27.30	27.30	27.30	27.30	27.30	27.30



STAFF.

Head Master.
7 Certificated Assistants.
1 Ex-Pupil Teacher.
2 Pupil Teachers.

Class 1. { Ex. / VII. } Certif. Assistant.
2. (VII.) ,, ,,
3. (VI.) ,, ,,
4. (V.) ,, ,,
5. (IV.) ,, ,,
6. (III.) ,, ,,

Class 7. (II. and I.) Ex-Pupil Teacher and two Pupil Teachers.

HOME LESSONS.

Monday. French and Arithmetic.
Tuesday. Algebra and English.
Wednesday. French and Arith.
Thursday. Algebra and English.
Friday. Geography.

Standards I., II., III. and IV. take Spelling instead of French and Algebra.

8.55 to 9	9 to 9.10	9.10 to 9.40	9.40	9.40 to 10.25	10.25 to 10.40	10.40 to 11.20	11.20 to 11.35	11.25 to 12		1.55 to 2	2 to 2.15	2.15 to 2.55	2.55 to 2.30	3.30 to 3.40	3.40 to 4.30
Assemble in playground.	Prayers, &c. Early Marks in red.	Script. O.T. " " " " " " " H. " " Script. N.T. " " " " " H. " N.T. " " Script. O.T. " " " H. " O.T. " " " " Script. N.T. " " " H. " N.T. " " " " " " Script. H. " " " N.T. " O.T. " N.T. " O.T. " "	Close registers. Late marks in black.	Arith. " " " " " Algeb. " " " Arith. " " Arith. " " " Algeb. " " " " " Arith. " " " " " " "	Recreation.	Mag.& Elec. " " Drill. Reading. " History. " Drill. History. " " " Mag.& Elec. " " " Reading. Repetition. Reading. History. " " Drill. History. " " Reading. " " " " " " Drill.	Physical Exercises.	Reading. " " " Spelling. " Compositn. " " " Spelling. " " Reading. " " " Spelling. " " Compositn. " " " Spelling. " " Compositn. " " " " " " "	Monday. Tuesday. Wednesday. Thursday. Friday.	Assemble. Early marks in red.	Optional. Late marks in black.	Geography. " " " " " Engl. (formal) " " " " " Geography. " " " " " Engl. (formal) " " " " " Geography. " " " " " "	Geometry. " " " Scale Drawing. Arithmetic. Singing. Drill. Singing. History. Singing. Reading. " " Repetition. " Singing. " Repetition. Drill. Repetition. Singing. Drill. Singing. History. Singing. " Writing. Singing. " Repetition. " Singing. " "	Recreation.	French. " " " " Writing, Reading. " " Drawing. " " " " " French. " " " " " " Drawing. " " " " " " French (in winter) optional, or Swimming (in summer).

N.B.—The optional lessons are used principally for Writing and French Verbs.

TIME TABLE FOR MIXED SCHOOL OF 4 CLASSES.

Class 1 (iv. v. vi. vii.) Class 2 (iii.) Class 3 (ii.) Class 4 (i.).

Subject.	1	2	3	4
Scripture	2.30	2.30	2.30	2.30
Reading	3.05	3.05	3.10	3 10
Spelling	—	2.00	2.30	2.30
Composition	2.40	—	—	—
Copy Books	1.20	1.20	1.20	1.20
History	1.20	1.20	1.20	1.20
Repetition	.40	.40	.40	.40
Geography	1.55	1.55	1.20	1.20
Arithmetic	3.45	4.25	4.25	4.25
Singing	1.20	1.20	1.20	1.20
Sewing / Drawing	2.40	2.40	2.40	2.40
Drill	1.00	1.00	1.00	1.00
Recreation	2.05	2.05	2.05	2.05
Optional	1.30	1.30	1.30	1.30
Total.	25.50	25.50	25.50	25.50

TIME TABLE FOR MIXED SCHOOL OF 4 CLASSES.

Class 1 (iv. v. vi. vii.) Class 2 (iii.) Class 3 (ii.) Class 4 (i.).

	Morning.							Afternoon.				
9 to 9.10	9.10 to 9.40	9.40 to 10.25	10.25 to 10.40	10.40 to 11.15	11.15 to 11.20	11.20 to 12		2 to 2.10	2.10 to 2.50	2.50 to 3.30	3.30 to 3.40	3.40 to 4.20
Assembly and Prayers.	Scripture.	Arithmetic.	Recreation.	1 Reading. 2 Geography. 3 Reading. 4 Writing.	Physical Exercise.	1 Compos. & Spelling. 2 Spelling. 3 ,, 4 Reading.	M.	Assemble Optional Lesson.	1 History. 2 Arithmetic. 3 ,, 4 ,,	1 Repetition. 2 History. 3 Geography. 4 ,,	Recreation.	1 Geography. 2 Reading. 3 Repetition. 4 ,,
				1 Reading. 2 ,, 3 Spelling. 4 Reading.		1 Compos. & Spelling. 2 History. 3 Reading. 4 Writing.	T.		1 Sewing and 2 ,, 3 ,, 4 ,,	1 Drawing. 2 ,, 3 ,, 4 ,,		1 Geography. 2 Repetition. 3 History. 4 ,,
				1 Drill. 2 ,, 3 ,, 4 ,,		1 Compos. & Spelling. 2 Spelling. 3 Reading. 4 ,,	W.		1 Singing. 2 ,, 3 Copy Books. 4 ,,	1 Copy Books. 2 ,, 3 Singing. 4 ,,		1 Reading. 2 ,, 3 History. 4 ,,
				1 Reading. 2 ,, 3 Spelling. 4 Reading.		1 Compos. & Spelling. 2 Spelling. 3 Reading. 4 Spelling.	Th.		1 Sewing and 2 ,, 3 ,, 4 ,,	1 Drawing. 2 ,, 3 ,, 4 ,,		1 History. 2 Geography. 3 ,, 4 ,,
				1 Geography. 2 Reading. 3 ,, 4 Spelling.		1 Reading. 2 History. 3 Spelling. 4 Reading.	Fr.		1 Singing. 2 ,, 3 Copy Books. 4 ,,	1 Copy Books. 2 ,, 3 Singing. 4 ,,		1 Optional. 2 ,, 3 Lesson. 4 ,,

Registers M. Early marks at 9 and 2.
Late marks at 9.40 and 2.10.

Geography as Object Lessons in 3, 4 and partly in 2.
Class 3 and 4 grouped for Geography, History and Singing. English taught with Composition in Class I, and reading in lower classes.

Registration and School Records.

The registers and records required to be kept in an elementary school are :—

The School Folio.
The Log Book.
The Stock Book.
The Admission Register.
The Summary.
The Fee Book.
The School Attendance Registers.
The Register of Infectious Cases.
The Record of Work done and to be done.
The Record of Progress of Scholars.

To these are added in many schools :—

The Mark Book.
The Punishment Book.
The Transfer Book.
The List of Applicants for Admission.
The Visitors' Book.

The methods by which these are to be kept are carefully detailed both in the Code and in the books themselves. It is necessary here therefore only to add a few hints which may lessen the labour required in keeping them.

School Folio.

This is not kept at the school in Board schools, and requires nothing more than care that all the official communications are *at once* placed in it and kept in sequence of time.

Log Book.

A fixed time for making entries into this should be recognised, and the end of the week will generally prove most convenient. Besides the care to avoid all personal reflections upon the staff, as mentioned in the Code, it must not be

forgotten that all absences of staff should be noted therein, and the reason for absence given. Points of great importance and likely to give great trouble if neglected are :—

The dates at which members of the staff commence and leave.

The arrangement of the staff and classes each year.

It is advisable to reserve specially for the names of the staff a few pages ruled in columns for the information required on Form IX.

In addition to the entries demanded by the Code, important results of term examinations, changes in the arrangement of the staff, and the exact duration of holidays, should always find a place.

In making all entries it is to be remembered that the log book is not the private diary of the head teacher, but the official record of the work of the school.

The Stock Book.

This is probably the most difficult book to keep correctly. Stock has generally to be taken and entered twice each year. It is a good plan to enter the materials used in different subjects on separate pages. Thus the pages will be headed "General Apparatus," Arithmetic, Drawing, Geography, &c.

All invoices should be entered in the stock book immediately on the receipt of the goods, and then transferred to the school file.

Each class teacher should have a list of the stock in his charge, and a duplicate of this should be kept by the head teacher. The class teacher should check his list every month, and should at once report any deficiencies to the head teacher.

Admission Register.

The Admission Register should not be brought up to date spasmodically, but should always be kept so.

It is best to have printed forms asking for all the details required upon admission; and these should be filled up by the parent and filed for future reference. These forms will prove most useful at the opening of a new school, or at times when a large influx of new children takes place. On no account should a child be admitted without the expressed consent of the parent, and where transfer-forms are used they should always be required as an act of justice and courtesy from teacher to teacher.

The details obtained from these forms should be immediately entered in the admission register, and a copy of these required in the class register should be given to the class teacher, so that the name, &c., may be entered exactly on the class register. The indexing of the name should be done at the same time as the original entry. Where there are many children in the school it is advisable to subdivide each letter into five classes, according to the first vowel of the surname, using a separate column for each vowel, *e.g.* :—

Banks, A.....590	Best, W.....482
Bartlett, J. ...598	Bennett, T....477
Biggs, N. 380	Brock, J. 571
Bister, L.....392	
Blundell, T.....837	

This will render the finding of any particular name a much easier matter.

The names of children who have left should be taken from the class register at the same time as the weekly attendances, and the date of leaving should be at once entered in the admission register, with the cause if known.

Immediately after the annual promotions take place the progress of the promoted boys should be

noted in the proper columns. The longer these entries are delayed the more difficult becomes the task of obtaining them.

In the course of transferring details from page to page of the class register discrepancies are sure to appear, and each register should be compared with the admission register at least once per year.

The Summary. This apparently formidable book requires nothing but care and promptitude to ensure its being correctly kept. All totals should be made at the earliest possible moment, so as to render the detection of any error as easy as possible.

Other particulars besides those mentioned in the summary are frequently required by School Boards or attendance authorities, and it is well to find some means of noting these in the summary. The number of children absent all the week, and the percentage of attendance for the week, should always find a permanent record.

Most summaries contain a duplicate of Form IX. at the end of each year's records, and it is well to fill this up for future reference.

The Fee Book. The passing of the Free Education Act has relieved most teachers of the necessity of keeping this book. The few who still need it can meet with no difficulty.

The School Attendance Registers. These are generally known as the registers of the school, and strict rules as to what they shall contain, how they shall be marked, and who shall mark them, have been laid down by the Board of Education. These rules are generally to be found at the commencement of each class register. The rule that they are to be signed by the correspondent on the date when they are first given for school use is a rule likely to be overlooked. It may also be found necessary to remind the managers

that the registers are to be tested at least once each quarter.

In nearly all schools registers are marked twice each session, once in red ink for early marks, and once again in black for late marks and absence. This is of course essential when prizes depend to any extent on attendance or punctuality.

In each class-room the number present is usually entered on a board, and a special board summarises these for the whole school. It would perhaps be a better plan if the class attendance board contained two columns, one for the number absent, and another for the number of boys late. Where the boys absent or late are very few in number, their names might be posted, instead of merely the total number. If the head teacher cannot find time to undertake the duty himself, a monitor should be appointed to go round immediately after the time for closing the registers. This will prevent carelessness or neglect on the part of the assistant teachers, some of whom, especially the younger ones, may not appreciate the importance of exactness and promptitude in these matters.

It is preferable to arrange the names on the register in alphabetical order, although in some schools the order of merit is adopted.

The age column, once so important for schedule purposes, is now chiefly of importance with reference to the "over 15" clause of the Education Act. Where only one or two children in the school are likely to have reached this age limit, no special means of dealing with them are necessary, but where there is likely to be a number of such children it is advisable to transfer their names to a separate register immediately they reach the age limit. In order to do this the head teacher should examine

the age column of the various classes at the commencement of each quarter or term, and should make a list of those who must be added to the special register, with the exact date at which they become disqualified for retention on the other.

In some class registers a column is added for the addresses of the children, and the possession of these addresses is naturally a great convenience. Where such a column does not exist a slip of paper should be given to each pupil at the commencement of the term, and upon this the address should be written. The various slips are then collected, arranged in alphabetical order, and fastened together so as to be convenient for reference at any time.

When children are transferred from class to class at any time, care should be taken that the admission number, age, attendances, &c., are transferred at the same time, and the transfer should be cross-referenced. Neglect of the cross-reference may cause great trouble and waste of time in future years.

Each day's attendance should be dated, and the *year* should be entered on each page of the register.

In many schools some difficulties in registration are caused by the varying periods for which the school year is reckoned. Thus in many schools the financial year and the educational year terminate at different times, and in all cases certificates for exemption from school by the attendance qualification are always given for the ordinary civil year. Thus there may be a school year ending on July 31st, a financial year ending September 30th, and an attendance year ending December 31st.

The varying date of the school and financial years gives but little inconvenience, only causing the summary terms and the class registers terms to differ. Great difficulty, however, is frequently ex-

perienced when the dunces' certificates are required, and it is generally necessary to examine two years' registers for one year's attendances. As individual attendances are now not required for any other purpose than these certificates, wherever the demand for them is frequent it would seem to be a wise plan to make the totals up from December 31st to December 31st, and not for the more obvious quarters or terms.

After the school year is ended the head teacher should see that the "date" and "class" are entered plainly on the back of each register before they are put away for future reference.

Specific Registers.

The latest alteration in the Code has fortunately rendered the keeping of these troublesome registers unnecessary.

Records of Work and Progress.

These have been dealt with in the chapter on organisation, so that it is not necessary to discuss them further.

There are no points which should present special difficulty in the other records mentioned as being required, and full instructions are always printed with them. The great point with these, as with all the other school registers, is that they should be entered up with promptitude and regularity. Almost all faults in registration are caused by the spasmodic attention which is sometimes given to them, and the teacher who leaves his school on Friday afternoons with no entry lacking in any register will save himself much future labour, and need have no anxiety.

CHAPTER IV

DISCIPLINE

Definition. In the organisation of the school the head teacher places every teacher and every pupil under the best conditions for effective work. The discipline of the school aims at producing the most effective work in the easiest possible way. Perfect discipline is shown by the prompt and eager obedience of the pupil, and by his close attention to the work in hand.

Even with faults in organisation very good work may be done in school, but with weak discipline good work is impossible, and its evil influence upon character is incalculable.

The discipline of the school is the central pivot upon which the whole work of the school turns, and success or failure depends entirely upon the degree to which the standard of perfect discipline has been approached.

Four factors of Discipline. In producing good discipline four agents are mainly responsible :—

I. The Parent.
II. The Architect of the School.
III. The Head Teacher.
IV. The Class Teacher.

I. *Parental Influence.*

In the chapter entitled "School and Home" we have endeavoured to show in what ways the parent may best aid the teacher's work. We will therefore now briefly summarise these as follows :—

(*a*) By training his child in habits of obedience and truthfulness.
(*b*) By showing every sympathy with and giving every support to the teacher's efforts.
(*c*) By sending his child to school with regularity and punctuality.

But little difficulty is felt in securing good work from boys who have had the invaluable advantage of a good home training, and it is much to be regretted that so many cases occur where the home training is an influence in opposition to the teacher. Indeed, parental opposition or indifference is the most frequent cause of unpleasantness and insubordinate conduct in our elementary schools.

II. *The Architect.*

The foundation of good organisation and good discipline is laid with the foundation of the school. It is almost impossible to obtain good discipline where teachers and taught are working in physical discomfort from bad ventilation, lighting, or heating ; or where the classes are so arranged that the work of one must interfere with the work of others. Great improvements have taken place in the planning of our elementary schools, and more attention has been paid to the requirements of school life. If the excellent rules of the Board of Education were carried out in all the schools, there would be little cause

for complaint. Many of the older schools, especially those in rural districts, are very faulty in their structure; and it is precisely in these schools where every help of the kind is needed and appreciated by the overburdened teacher.

III. *The Head Teacher.*

The influence of the head teacher upon the discipline of the school is incalculable, and is exerted in many ways, both directly and indirectly.

I. Indirect Influence. Organisation.

The great importance of *good organisation* has already been shown in the chapter upon organisation, and it has been pointed out there that it is the work of the head master to see that every child and each teacher is placed in the best position for effective work. With good home influence, good internal arrangements for comfort, and good organisation, the work of obtaining good discipline is rendered as light as possible.

Personal Influence.

Another indirect mode of influencing the discipline of the school, and one most potent in its effects, is the utilisation of that *feeling of reverence for the authority and character of the head teacher* which every pupil should possess. In the eyes of the pupil his authority is supreme, and he is the model of justice and truth. Every head teacher, therefore, with a knowledge of his position on this pinnacle of reverence, must take care always to act so that this feeling is not injured or destroyed. The supremacy of his authority must never be abused, the justice and truth of his actions must never be questioned. By his personal influence alone the discipline of the school can be well maintained, and where this influence is of the best kind, cases of gross insubordination and disobedience are impossible.

Upon this personal influence the "tone" of the school depends, and although discipline may be forcibly obtained by sterner measures, no head teacher can properly fulfil his duty, and no school can be properly managed, where this feeling of reverence is absent. Honour and truth in children, the virtues most difficult to cultivate, are fostered in school mainly by this influence, and are absent where the influence is absent.

II. Direct Influence. Regularity and Punctuality of Scholars.

Directly, also, the head teacher must influence the discipline of the school. It will be mentioned below that obedience to discipline is a habit, and the head teacher must do everything in his power to develop that habit. He can best do this by securing the *punctuality and regularity of his scholars.* A separate chapter will be devoted to this subject. It is sufficient to mention here that regular and punctual attendance is the rule of every school, and the rule which it is the head teacher's duty to enforce. Where the head teacher's special rule is lightly broken, little attention to other rules can be expected.

General Movements of School.

The head teacher must also take care that in all movements in which the whole school is engaged, such as assembly, dismissal, prayers, &c., perfect order is maintained. These can be numbered among the few occasions when a discipline approaching the strict military discipline is essential.

Sympathy with Class Teacher.

The head teacher should also support in every possible way the teacher who represents him and his authority to the class. He should never do anything to lower the influence of the class teacher with his boys. No fault should be found with the teacher while the class is there, and no innuendoes upon the teacher should be conveyed in remarks made to the class. The head teacher should show to his assistant the respect and courtesy he himself hopes to receive;

should ask for his opinion upon all points where it may be helpful, and should give this opinion due weight.

Rewards and Punishments.

Close attention and careful work should spring from habit and a sense of duty, and lavish rewards or severity of punishments are evil as departing from this ideal. One of the great effects of the training of a good school is the gradual development of this idea of duty for duty's sake. If nothing else be done but this, an excellent education will have been given, and however extended and perfect the curriculum may be, the child has not been educated unless this idea guides his future actions.

As, however, the sense of duty is only of gradual growth, and as there must necessarily be some cases where tangible incentives to action are required, some system of rewards and punishments is necessary.

(a) *Prizes and Marks.*

Most of our school authorities allow a certain proportion of prizes to each class, and in the best schools these prizes are made to depend upon the marks obtained by the scholar each year. In some districts the prizes are given for attendance and punctuality alone, and a great disciplinary power is thus taken out of the hands of the school teacher. A better system is to make the gaining of a prize depend upon the character of the boy's work combined with these valuable points of attendance and punctuality. Good marks are given for any excellent work done during term, and for all work done at the term examination. Bad marks are deducted for such faults as serious misconduct, absence without reasonable excuse, late coming, and neglect of homework. These marks can be given and recorded with little trouble, and, even if no prizes are given, by making promotion and position in class depend upon them, a good teacher has at hand a powerful means of discipline. In awarding marks for class

work, it must be remembered that "effort" and not "success" is to be rewarded.

We give below a specimen term report merely as a guide as to the kind of report which may be adopted. The number of subjects and the marks for each will of course be subject to great variation. Some teachers find it better, and a cause of much less friction with the parents if marks are *given* for each early and punctual attendance, and not deducted for late coming or absence without excuse. This is undoubtedly the case, but where the records of absence and unpunctuality are carefully kept the *deduction* of marks brings the faults in these respects much more prominently before the parents' notice.

Report of....., *Class*....., *for the term ending*.....

Marks Gained in Examination.	Maximum.		Marks Lost.	
*Arithmetic	20		Bad Conduct ...	
*Reading	20		Neglect of Home-work	
*Dictation...	20		Late Coming ...	
Mental Arithmetic	10		Absence not excused	
Recitation...	10			
Writing	10			
Grammar	20		Total	
Geography	20			
Freehand Drawing	10			
Scale or Ruler Drawing...	10			
Marks gained for excellent work during term			REMARKS.	
Total Marks gained.. ...				
Total Marks lost				
Nett Marks				

* Promotion from Class to Class depends principally upon the Marks gained in these three subjects.

.....Class Teacher.

.....Head Master.

Wherever it is possible a summary of these marks and a class list in order of merit should be sent to the parent of each child at the end of every term.

(b) *Punishments.*

The best reward for a child should be his teacher's praise, his frown the worst punishment, but no teacher would act wisely who relied upon these alone as aids to discipline. Punishments in school generally take the form of

(A) Loss of marks.
(B) Detention after school hours.
(C) Impositions.
(D) Corporal punishment.
(E) Expulsion.

(A) With a system of marks carefully carried out the need of the methods of punishment lower in the list is almost dispensed with, especially when prizes and promotion are made to depend upon these marks, and the attention of the parents is called to cases of excessive loss of marks by the term report.

(B) Detention after school hours is generally combined with the giving of an imposition. Both are forms of punishment which should be avoided as much as possible. It is the aim of modern education to make the school bright and attractive; but by using detention as a punishment we directly oppose this aim. In detaining the boy the teacher is also detained. We consider, therefore, that detention is only justifiable where the laziness of the pupil has prevented the completion of his fair share of work, or where the work has been done carelessly. It should never be used as a punishment for bad conduct of other kinds, should never exceed half an hour in duration, and should always take place under the supervision of a teacher. For the latter

purpose, a "rota" of the teachers should be prepared.

(C) Impositions are even less justifiable than detention for completion or improvement of work. They generally consist of the repetition for a certain number of times of a word or a phrase, or the copying of so many lines from some school book. The sole merit of both kinds of imposition is that they certainly are punishments, but beyond this the former is mere waste of time, and induces a degeneration in handwriting, the latter puts schoolwork in the light of a punishment, and so is opposed to the aim of all good teaching.

(D) *Corporal Punishment.*—A great outcry against the use of corporal punishment in elementary schools resulted in a general rule that such punishment should be administered only by the head teacher. Where schools were conducted by only one certificated teacher, aided by pupil teachers or uncertificated adult teachers, such a rule was justifiable and, indeed, wise. In our good schools, however, each class is in charge of a certificated teacher, qualified by this certificate to take supreme charge of any school, and many of them much more experienced than the head teachers of the small country schools. In such cases as this the restriction was quite unnecessary, and produced amongst some of the rougher children a spirit of defiance and disrespect, which soon came to be reflected in later years by their conduct in the streets. The rule also proved irksome to the head teachers of large schools who had thus their share of an unpleasant duty much increased, and who had to punish without the complete knowledge of the circumstances of each offence. There is no doubt, therefore, that the rule was frequently broken by assistant teachers, whose spirit of endurance could

not always resist the strain placed upon it, and whose lapses in this respect could not always be blamed by the head teacher if they came to his knowledge.

Many of the large school boards have of late modified the stringency of this rule, and have allowed to the head teacher the power of delegating to any certificated teacher on the staff the right of inflicting a limited amount of corporal punishment, each case of such infliction having to be detailed in the punishment book. It is found that the knowledge of the fact that the class teacher has the power to inflict the punishment materially diminishes the need of it.

As in our large public schools, so even in the elementary school, cases in which corporal punishment is necessary will arise, and then its application is far more beneficial than detention, or imposition, or the surreptitious method of punishment sometimes adopted by those who profess to dispense with its use. The power to use it should always be with the well qualified teacher, the use of the power should be as infrequent as possible.

E. *Expulsion.*—The power of expulsion, a power wisely given to the head teachers of the public schools, is, by the nature of elementary education, not possible to the head teachers of elementary schools, however great their experience may be. Cases will arise, however, where it becomes the duty of the head teacher to ask the managers of his school to insist upon the removal of a child from the school, and such cases have been well defined by the Board of Education.

IV. *The Class Teacher.*

With the increase in the size of our elementary schools, and the more liberal allowance of staff now

required, the best equipped schools have a certificated teacher to take charge of every class in a separate room. Each class therefore becomes to a certain extent a separate school, and the influence formerly exerted by the head teacher is now shared with him by the certificated teacher in charge. It has therefore become much more necessary that each class teacher should possess to the full the power of obtaining good discipline. The broader methods of the head teacher must be detailed by the teacher who deals directly with the boy himself. To the young teacher, anxious to develop the necessary power to the full extent, we give the following advice :—

(a) *Position.*

Always stand just so far away from your class that you may have every scholar before your eyes, and yet may be heard by every one without raising your voice above its natural tones.

(b) *Tone of Voice.*

Do not strain your voice by unnecessary shouting, but use the natural tone of your voice for all oral teaching. The slightly louder tone, or the sudden pause, will be useful aids to you in claiming the attention of your class.

(c) *Orders.*

Let your orders be few in number, and clearly expressed; never give a second order until the first one is obeyed, and give it so that the children may see that you expect obedience, and not disobedience. A neglect of this rule is the most frequent cause of bad discipline.

(d) *Preparation.*

Never appear before your children to give a lesson you have not thoroughly prepared. You owe a thorough preparation to your own self-respect and to your class. Many teachers, especially those who are just in the full flush of pride for their success in examination, are apt to think that they are quite capable of giving any ordinary lesson upon the spur of the moment. Nothing is more unwise. Every

lesson you give is a link in the chain of your work, and the strength of this depends upon the weakest link. Therefore consider every lesson before you give it, and dovetail lesson into lesson as cleverly and completely as possible.

(e) *Interest Pupils in their own Progress.*

There are many lessons given in school in which it seems very difficult to maintain any interest in the work. Put before your class the end you aim at, and bring to their notice every step towards the end. Children delight in getting on.

(f) *Thorough Work.*

Insist upon a high standard of excellence in the work of your children. Never allow slovenly work or slovenly answering. To this end take care that you see and mark all written work done by your class. Remember that it is better that no written work should be done at all than that it should be done and not marked. If there is a fair risk that the work will not be seen the average boy is gambler enough to take that risk, and careless and slipshod work will spread through your class like an infectious disease.

(g) *Utilise Rewards and Punishments.*

Utilise to the fullest extent the system of marks adopted in your school, and take care that each good mark is worthily earned, and each bad mark deservedly lost. Avoid excessive or capricious punishments—such are sure to be unjust—but give them in gradation of severity, and make it as certain as possible that the punishment follows the offence. Above all things check slight offences as early as possible, and serious ones will not occur.

Besides those general to the school there are many other slight rewards and punishments you may utilise as aids to your discipline. Amongst these are the appointment of monitors, position in class, giving special work to a painstaking boy, &c. Take advantage of all these as far as possible.

Children who have finished the lesson set them should never be allowed to remain idle. They are certain to find some mischief still for their idle hands to do! Make sure first that their early finish is not due to hurried or careless work, and if you are satisfied on that point, reward them either by sending them down to the playground, if the lesson precedes an interval, or by giving them some special work to do.

(h) *Keep Children Employed.*

Remember that the class over which you are placed has implicit confidence in you, looks upon you as the standard of justice and truth, and unconsciously assimilates itself to the model you place before it. Endeavour to retain and strengthen this confidence by doing nothing to forfeit it. Be sympathetic with the young natures you are set to guide along the thorny paths of knowledge, and let mercy always season justice. Try to cultivate by your own example the high principle of work for the work's sake, and develop the ideas of honour and duty as the best education you can give your pupils. Be friendly with them without lapsing into familiarity, and sometimes unbend from the high position in which you are placed. A brow of severity is not always needed.

(i) *Manner to Children.*

No doubt you will feel that the difficulties in your way are almost insuperable, and that no man can ever become a perfect disciplinarian. In this you are probably right, but he who aims at the sky shoots higher than he who aims at a tree, so that perfection must be the aim, and you must approach this as nearly as possible by gradually removing your faults. We will add to your difficulties these two "don'ts." Don't be too ready to threaten what you will do if something happens. You will probably then be compelled either to inflict some punishment far

Don't Threaten

more severe than is necessary, or your threat will not be carried out, and you will lose caste with your class for lack of firmness.

Don't Use Illicit Punishment.

Secondly, avoid illicit punishments. If you are not allowed to inflict corporal punishment, limit yourself to the methods allowed you. Other punishments are degrading to you, and may be injurious to the class.

In all your difficulties try to rely upon yourself to overcome them. Remember that your head master has the responsibility of all the school upon him, and although he will be quite willing and anxious to help you when necessary, he will consider it a sign of weakness in you if he is called upon to support you when no support should have been required.

Kinds of Discipline and its Tests.

The kind of discipline required in school varies with the subject under consideration, but may be catalogued as either discipline of the mind, or discipline of the body. Of the two the former is by far the more important, and the latter is only necessary as tending to produce the former. A great change has been seen of late in our elementary schools, and the military or martinet discipline formerly so commonly demanded in all lessons has given way to a more rational and more human method. This strict, exact discipline, valuable in its proper place as tending to produce the habit of obedience, and excellent from the physical benefits it bestows when rightly used, is only necessary in—

Discipline of the Body.

a. All general movements of school or class.
b. Such physical lessons as drill or singing.

In every good school a uniform drill is used for all general movements, and prompt obedience should be exacted upon the word of command. The movements cannot be done too smartly, and precision in them is in keeping with the high standard of work which should be maintained in every detail of school work.

Discipline of the Mind.

This same precision in position, so necessary in the movements and lessons mentioned, should not be exacted in those lessons where the powers of the mind are required to be doing their best work. No student working for an examination sits with his arms folded, or behind his back, or puts his feet in a certain position and his body at a certain angle. He places himself in the position he finds most suitable, and tries to forget everything else except the work upon which he desires to concentrate his attention. In other words, in oral lessons and lessons requiring thought, "apple-pie" order is not only unnecessary but harmful. It is far more important that the mind should be actively bent upon the matter in hand than that the feet and hands of every child should be in a certain position. In these lessons the body should be in perfect ease, the mind at perfect attention. Every teacher can tell easily when this perfect attention is being given, and can call to mind many cases where the discipline of the class has been apparently perfect, heads, eyes, hands, feet, all correctly placed, but where three out of every four brains in the class have been vacantly or delightedly wool-gathering, and a sudden question has brought them back with the unpleasantness of an electric shock.

Tests of Good Discipline.

The best test of good discipline is that indefinable something we know as the "tone" of the school. Although an inspector can tell easily enough where

the discipline is decidedly bad, it is very difficult for him in his few brief visits to decide whether the obedience he sees results from the proper motives, whether the children obey from fear of punishment, or from a well developed sense of honour and duty. Each head teacher or class teacher, however, may ask himself the following questions, and must not rest satisfied with his work until he can safely answer in the affirmative :—

(*a*) Can I rely upon the honour of my boys ?
(*b*) Are my boys generally truthful to me ?
(*c*) Are they eager to perform any little services for me, not from any desire to "cringe," but from pure respect towards me ?

The two former questions are most important. The honour of your children is shown in many ways ; when you leave them to work without supervision or under a young teacher, and when you allow them to mark their own or each other's work. The dishonourable nature of copying should always be placed before the children in the strongest light, and in the case of older children punishment for this offence should never be omitted.

The habit of truthfulness is the most difficult to develop in children, and the readiness with which the untruth comes to their lips would be remarkable were it not so natural for them to try to escape punishment. The value of truth is not evident to very young children, and both parent and teacher will need to use every effort to fight successfully against the natural desire to avoid punishment for faults committed. When a child has reached the age of ten or eleven, however, the value of a character for truth and uprightness should have become to

some degree apparent to him, and illustrations of this value should be repeatedly brought before him.

Finally, therefore, in order to obtain the best work from the children in our schools, good discipline is the great essential. In endeavouring, however, to attain this desirable end we must remember that the methods we use in doing so have a great influence in the formation of each child's character. Where attention is enforced by harsh measures a sullen and deceitful disposition will become general. Where truth, honour, and thoughtfulness for others form the motive powers for attention and obedience, the lesson will not only be better taught, but the truest education will have been given to the children. *Studia abeunt in mores.*

To a teacher interested in his pupils and his work there is no pleasure greater than that he feels when he sees every child wrapped up in eager and intelligent interest of the subject he is teaching, and as he gains in experience the more frequently will that pleasure be given to him.

CHAPTER V

GENERAL PRINCIPLES OF INSTRUCTION

BEFORE dealing in detail with the methods of teaching the various subjects, it is well to consider those fundamental principles which should underlie the teaching of them all.

The student should bear in mind the saying of Pestalozzi that "it is the chief business of education to pass from distinctly perceived individual notions to clear general notions." Now the "clearly perceived individual notions" are mainly acquired by the direct employment of the senses, but the "clear general notions" are the result of mental processes, and Pestalozzi regards the latter as the end and the former as the means. It would, perhaps, be more correct to go a step farther, and say that the object of instruction is not merely to impart the knowledge of generalisations, but also the power to apply them. But it is a great mistake to imagine that we can deal with perceptions in one part of our teaching and conceptions in another; the two must be kept in constant relation: for, by means of conceptions we realise the true relation between perceptions, and cease to regard our experiences as isolated facts. And, on the other hand, unless we associate conceptions with the perceptions from which they arise,

generalisations and vagueness or indefiniteness are apt to become synonymous, which they certainly should not be. It has, therefore, been well said that "Perceptions without conceptions are blind," and "conceptions without perceptions are empty"; and, moreover, conceptions without the power to apply them are vain and useless.

Closely related to the saying of Pestalozzi are a number of rules which have been enunciated for the guidance of teachers in the order of their work. They are enlarged upon in Herbert Spencer's work on "Education," which, although a special plea for science teaching, contains much valuable advice for practical teachers. We will state the rules here, and endeavour by means of a brief explanation to show their true meaning, without which the rules tend to become mere "catch words."

1. Proceed from *indefinite* to *definite* knowledge.
2. Proceed from *individuals* to *classes.*
3. Proceed from the *concrete* to the *abstract.*
4. Proceed from the *known*, or familiar, to the *unknown*, or less familiar.
5. Proceed from the *simple* to the *complex.*
6. Proceed from the empirical and *practical* to the rational and *theoretical.*

1. The first idea that a child has of any subject must necessarily be indefinite, but in imparting fresh knowledge to children we are not required to make that knowledge more indefinite than we can help. Neither should the indefinite stage be made to last an unnecessarily long time; we should make the knowledge definite as soon as possible. The first care must be to give "distinctly perceived individual notions," and to do this we must train the child's powers of *observation*: we must secure his *attention*,

which, to a certain extent, is involuntary. The most effective attention by far is the voluntary attention, the exercise of which becomes a habit; but the formation of this habit requires constant care on the part of the teacher. The attention is secured by interest—the interest a child feels in securing a reward or escaping a punishment is operative to a certain extent, but the truest interest is that which arises within the child's mind from the association of the new knowledge with that which is already there. The lesson should afford *pleasurable excitement combined with mental effort.* It is not enough to work experiments before a class; a firework display is not a lesson, although it affords pleasurable excitement. All children are attracted by "pleasurable excitement"; the art of the teacher consists in using this to secure the mental effort. Intellectual sympathy is another important factor in gaining and maintaining the attention of a class. The teacher should make the children feel that he is with his class on a voyage of discovery, and instead of ordering the pupils to find out, or saying that he will find out for them, his formula should rather be, "Let us find out." The child then feels neither diffidence on the one hand, nor an absence of necessity for his own efforts on the other; but is constrained to keep his attention fixed from a feeling of responsibility for the performance of his own part of the work, and from a confidence in his teacher which assures him that he will be successful.

2. The service rendered to knowledge by classification is so great that teachers and students are apt to forget that the knowledge of a class was first obtained by a knowledge of the individuals in that class. This is aptly illustrated by the methods of studying zoology. After zoologists had classified animals, it

came to be the fashion to begin by attempting to impart to the pupils a general knowledge of the animal kingdom, then of its division into sub-kingdoms, classes, &c.; but the method now adopted is to study in detail individuals which are purposely selected as "types" of their classes, so that the pupil arrives at a knowledge of the class through the individual, and regards a class as formed by a group of individuals, not as a division of the whole kingdom. While admitting that this method is undoubtedly the correct one, we must point out the duty of the teacher to lay special stress on those points—(*a*) In which the individual resembles others which will later on be associated with it in a class; and (*b*) In which it differs from others; otherwise the pupil is not able to take any advantage of the work of the earlier investigators.

3. The third rule is easy to understand, but is often violated. The point, however, is frequently strained, and the teacher is apt to forget that, although the method of working with quantities of which we have only a symbolical knowledge should be taught through the working with those of which we have an intuitive knowledge, yet we soon pass the narrow confines of the latter. Thus a person can form no more real idea of 2,486 cows than of the abstract number 2,486, so that the question, "Find 7 times 2,486 cows" is not really in a more *concrete* form than the question, "Multiply 2,486 by 7."

4. The fourth rule is very frequently misunderstood, and many strange errors are the result. It is often thought to refer simply to order of time. A little consideration will soon show the mistake in this. If the rule referred merely to time, we might well ask ourselves what the teacher has to do with

"the known." Apparently "the known" requires none of his care, his work lies in communicating "the unknown." The teacher has, however, two very important duties connected with "the known." In the first place "the known" is always more or less indefinitely known, and the teacher's duty is to add to the definition of this, and even to correct errors which often form part of it. But he is concerned with the pupil's existing knowledge even more intimately than this, for by means of his previous knowledge, even more than by anything else, does the pupil acquire fresh knowledge. The youngest scholar is already in possession of many concepts, and it is not too much to say that the main part of the teacher's business consists in enlarging the extent of his pupil's concepts. Thus the teacher wishes to give a lesson on the lion, and to teach certain facts, *e.g.*—the lion is a quadruped. Here the children have a conception of quadrupeds which is enlarged by adding "lion" to it, but at the same time the content of the concept is enriched by a more exact knowledge of the individuals included under the term "quadruped." The process by which "the known" is utilised in acquiring "the unknown" is called apperception, the study of which is perhaps, from the teacher's point of view, the most important branch of psychology. For further study of it we must refer the student to works on psychology.

5. The fifth rule is often broken by young teachers, although they quote it in support of their procedure. They go astray through not realising what is meant by "the simple." In this connection we do not mean that which is incapable of any further analysis, but that which the child accepts as a whole and has never thought about analysing. To the child a flower such as a daisy is "simple." He has to make

some advance in botany before he is aware that it is a "compound flower." Or again, a wallflower is to the child a simple object, and it is only after an analytical examination that he regards it as composed of sepals, petals, stamens, and pistil; still later is it before he learns that these parts are themselves composed of cells, and it requires an advanced student of chemistry to recognise it as composed of certain bodies which he regards as elements. The teacher must therefore find out what the pupil regards as simple, and must remember that a child will consider anything as "simple," even a locomotive, if he has not analysed it or learned to recognise its parts. Failing this, he will think the rule enjoins him to give lessons on oxygen and hydrogen to the "babies'" class, and reserve the object lesson on water for a later stage.

6. Lastly, as visible and tangible things make a much stronger impression on the mind than the abstract and imaginary, it is advisable to deal with facts empirically, that is to say, to study the results first and work out their causes from them, and to take the practical before the theoretical.

It will be seen that in the above we are recommending that the individual should acquire his knowledge in substantially the same manner as the mass of knowledge has been acquired by the race, and the teacher will always find a very valuable guide for the steps of his teaching in the study of the history of his subject. The knowledge of the fact that primitive men counted on their fingers, teaches him the foundation of decimal arithmetic, and the history of the discovery of the great laws in chemistry is a safe guide to the best order of teaching them, although such matters as the erroneous theory of combustion need not be touched

upon. We do not say that in every case the teaching should follow the historical development, indeed we think that in view of the present position of the science of electricity it is decidedly unwise to begin to teach it by rubbing amber or sealing wax, but we do think that the teacher who has studied the history of his subject is in a far better position for developing a series of lessons than the one who has not.

Methods. Perhaps the most generally deserved criticism of modern methods of teaching is the one which asserts that the teachers do too much work for their pupils. This state of things is partly a reaction from the former condition—and it is one that still prevails in some secondary schools—under which the teacher was looked upon simply as a task-master whose duty was merely to allot the amount of work to be prepared and insist on its being done. It is also in a large measure due to over anxiety on the part of the teacher. Recent Codes required the elementary teacher to produce certain results and he spared himself no pains to produce them. His credit is often staked upon the scholarships and distinctions which his pupils are expected to gain. Now in order to prepare the child for the future, when he will have to depend upon his own powers and resources, the teacher should set the child to *investigate* and acquire knowledge, reserving for himself the part of *guide*. He should direct the way, and show the child the steps to take in order to surmount difficulties, but should not carry him over them.

In selecting his methods the teacher must make allowance for the age and capacity of his pupils. The chief object with young children is to develop the intelligence, with older students the chief object

is to utilise the intelligence for the acquisition of knowledge. This consideration leads us to see that the "lecturing" method, although suitable for adults, is not to be generally used with children. It makes too great a demand on the attention. A child's attention is not capable of long-continued concentration. It affords no real indication of the moment when the attention ceases, particularly if the "apple pie order" is the rule in the class. Finally, the teacher who adopts the "lecturing" method generally covers too much ground, so that a great deal of his teaching is quite lost, and the rest is grasped only in a superficial manner by the children, whose receptivity is overtaxed while their other mental powers are not called into action at all.

Lecturing.

A good preacher or a good lecturer, whose desire is to really teach his audience, often wishes that he could put questions to his hearers. In virtue of his power to put questions, the teacher holds a better position. By means of questioning, the teacher is enabled to find out what the child knows and what he requires to be taught. He is able to test the child's grasp of the lesson as it proceeds, step by step, and by debating points that are doubtful he can afford scope for the child's reasoning powers and lead him into the way of acquiring knowledge for himself. The most successful plan, however, is to combine the two methods, each lesson should be partly expository and partly conversational, the proportion between the two varying with the ages of the pupils. We have purposely used the word "conversational" rather than "catechetical," because the latter term seems to imply that the teacher puts all the questions, and the children give all the answers; and while most of the books on the subject of teaching give elaborate classifications of questions

Conversation Lessons.

and hints on the method of putting questions, they generally lose sight of the fact that in the natural order of things, the *learner* seeks for information and *asks* questions, while the *teacher answers* them. The teacher's skill is shown far more in the development of this "inquiring mind" than in arranging a series of questions.

Questions. Questions used in teaching may be arranged in two main classes (*a*) "Test" questions and (*b*) "Instructional" questions. The names are sufficiently indicative of their purpose, but as some questions answer both purposes the division is not a strict one.

(*a*) Test questions may advantageously be employed (1) at the beginning of a lesson to ascertain the amount of knowledge bearing on the lesson that the children already possess. The so-called "introductory" questions serve another important purpose:—to marshal up the facts already known and prepare them to join with and apperceive the new knowledge. (See above, page 72.) In this light they must be regarded as instructional questions. The "introductory" questions are very frequently the weakest part of a young teacher's lesson. Too often they are mere invitations to the children to guess the name of the subject of the lesson. Of a number of notes of a lesson on "Tea" prepared by a class of pupil-teachers recently, twenty-five per cent. recommended that the lesson should be introduced by asking the children what their mothers drank when they were thirsty. This was not only a weak way of introducing the lesson, but was a breach of a very important rule that teachers should observe in questioning, viz.:—except in the case of strict test questions, *it is a bad plan for a teacher to put a question of which he does not know the probable answer.* In some schools unfortunately an announce-

ment of the parent's favourite beverage might afford an extremely bad introduction to a lesson on "Tea."

2. At the end of each section of the lesson questions should be put (i) to ensure that the children have thoroughly mastered that section; and (ii) to summarise the main points of the section so as to enable it to assimilate the next.

3. To recall previous work and test the accuracy of the knowledge acquired, it is necessary to set examinations of a more or less formal kind.

(*b*) Instructional questions are of use—(1) throughout the lesson to ensure mental activity on the part of the pupil, who by the mere fact of being made to answer is obliged to keep his thoughts on the lesson. This purpose is therefore served by all forms of question, even elliptical questions, which in general are to be avoided, because they do not afford the pupil much opportunity of exercising his judgment although they keep his attention on the lesson. (2) Questions should not merely serve as a means of keeping the attention fixed, but should also call into play the child's mental activities, and the more mental work the child has to perform the better the question will be for the training of his reasoning powers. Leading questions—those in which the child is practically told the answer and is merely required to assent to the teacher's proposition—are to be avoided because they fail in that respect.

Questions used in teaching are often rather loosely spoken of as Socratic questions, but the student who is familiar with any of the works describing the life and teaching of Socrates will remember that the great teacher was in general dealing with individual adults and not with large classes of children.[1] The

[1] The student is strongly recommended to read a good translation of Xenophon's *Memorabilia*.

most noticeable feature about the questioning of Socrates was the manner in which he confused a conceited pupil and forced him to admit that he knew nothing. In doing this he often accepted faulty definitions and employed logical equivocations. The following portion of his conversation with Euthydemus (*Memorabilia*, Bk. iv. ch. 2) will illustrate the method :—

Socrates. "As you wish to be the head of a democratic government you doubtless know what a democracy is?"

"Certainly," said he.

"Do you think it possible to know what a democracy is without knowing what the common people (Demos) is?"

"No, indeed."

"And what do you consider the Demos to be?"

"I consider it to be the poorer class of citizens."

"Do you know, then, who are the poor?"

"How can I help knowing that?"

"You also know who are the rich?"

"Just as well as I know who are the poor."

"Which sort of persons do you call poor and which sort rich?"

"I consider as poor those who have not the things which are necessary for life; those who have more than sufficient I consider rich."

"Have you ever noticed that to some who have very small means, those means are not only sufficient but that they even save from them, while to others very large fortunes are not sufficient?"

"I have indeed noticed it," said Euthydemus, "for I have known some princes who have been driven by poverty to commit injustice like the poorest people."

"Then," said Socrates, "if such is the case we must place such princes among the Demos, and those who have but little, if they are good managers, we must place among the rich."

"My own ignorance," said Euthydemus, "forces me to admit even this; and I am considering whether I had not better be silent; for I seem to know absolutely nothing."

. . . . .

When Socrates saw that he was thus disposed, he no longer puzzled him with questions, but explained to him, in the simplest and clearest manner, what he thought he ought to know, and what he thought it would be best for him to study.

The other point that the teacher should notice in the questioning of Socrates is the fine analysis he makes of the subject. Each question covers but little ground, but yet is of great importance from its relation to the whole series.

In addition to this power of analysis, good questions also require :— **Characters of Good Questions.**

1. Ready knowledge on the part of the teacher.

2. A correct and readily intelligible mode of expression.

3. A sympathetic and stimulating manner.

4. An adaptation of the question to the needs and ability of the pupils.

5. Tact and judgment so that a due proportion may be observed between the time devoted to them and that devoted to lecturing.

Each question should have a definite object in view. The teacher must be careful on the one hand that his questions are not so difficult as to dishearten the child and make him think that the subject is altogether beyond him, and on the other he should not keep asking questions on points that are too familiar, lest the pupil becomes conceited and thinks there is nothing more for him to learn.

Great as is the importance of good questioning, **Answering.** the importance of good answering is certainly not less. The answer is complementary to the question. An answer may be judged from two different points, —its matter and its form. The essential feature of the matter is that it should be (*a*) correct, (*b*) sufficient, (*c*) free from excess.

"Though deep yet clear, without o'erflowing full."

The correctness of an answer to a test question **Matter.** will depend upon the accuracy of the pupil's knowledge, while that to an instructional question will

depend upon the pupil's judgment, since he is required to reason or draw an inference from what his teacher has set before him. If the answer is not complete, the incompleteness should be pointed out, and the rest of the answer obtained either from the same child or from another. Should a child attempt to supply more information than the question demands the excess should be rigidly but kindly rejected. In speaking of the matter of an answer as distinct from its form, we mean by the term the thought that the child has in his mind when making the answer. But even when the child's thought is correct, all the faults which are met with in the composition lesson may come in to prevent the answer given from accurately expressing that thought. Now as we have already stated, the answer is a complement to the question, and hence it must be judged by certain considerations peculiar to itself, and which are not taught in the ordinary composition lesson. Some young teachers think that they should teach ordinary composition through the answers they receive, forgetful of the fact that the latter have special rules of their own. Hence arises the craving for "all answers in complete sentences." Such teachers demand a complete sentence when they themselves would not think of using one. Thus the whole answer to such a question as "Have you put away your books?" is "Yes, sir." If the child adds, "I have put away my books," he has either been badly taught the art of answering or is impudent, and the general inference would be the latter. So the answer to the question "Where have you put them?" should be "In the cupboard." This is all that is required to make a complete statement when joined to the question. On the other hand, some children have a tendency to omit the preposition, and

say simply "The cupboard," which does not serve as a complement to the question. Children can readily be taught to examine their questions and find the phrase upon which the interrogation hinges; they will then see the kind of answer they should give—questions asking Where? When? How? require the statement of a place, time, and manner respectively, while a question "Why....?" demands a reason—"Because ..."

It is a good plan to allow the children at times to put questions to test their fellow pupils. The practice improves their powers of expression, and when it has become established in the class has a great effect upon the attention, as each pupil is anxious to gain credit for remembering points which he may embody in questions which he is allowed to ask the class.

Text-books.

As the pupils advance in age and ability the part which a text-book plays in their education becomes increasingly important. It therefore behoves the teacher to exercise due care in the choice of text-books for his class. It goes without saying that the first quality required in a text-book is *accuracy*. The information must be correct, and the book should not be a mere collection of tables. It should be written in an *interesting and attractive style*. This will secure the attention of the pupil, at any rate for the time being, but unlike a large amount of the lighter kind of literature which may justly be described as interesting, text-books have to produce no mere evanescent pleasure, but a permanent effect. Hence their subject-matter should be arranged so that it is *easy of analysis*, and there is a suggestive relation between the parts which will make it *easy of retention and reproduction*. These points indicate the ways in which a good text-book differs from a "cram-book," on the one hand, and a wide and discursive treatise, on the other.

CHAPTER VI

NOTES OF LESSONS

No matter how thoroughly the teacher may be acquainted with his subject, he should never attempt to give a lesson without preparation. If there is anything in the subject which is at all fresh to the teacher or which is not vividly present in his mind, the first step in the preparation is to make sure of the subject-matter. Having decided upon the amount of matter required in the lesson, the next step is to analyse it and arrange the parts in logical sequence, and decide upon the method of teaching each part. Some experienced teachers are able to retain in their minds the scheme of the lesson thus worked out, but they are few, and as a general rule it is best for any teacher to set down his scheme on paper in the form of notes of lessons. It will thus be seen that the primary object of notes is to enable the teacher during the lesson to keep to the lines he has previously laid down for himself. Most of our readers will, however, be sometimes called upon to draw up notes of lessons to indicate to an examiner how they would handle a particular subject in teaching a class. Now although the notes that a teacher draws up for his own use should be no less thorough than those which he submits to an examiner, yet

there are one or two points in which the two sets will differ. As the treatment of a subject must vary considerably with the age and attainments of the pupils, it is evident that an examiner may form a very wrong idea of a teacher's power from notes which give no indication of the class for which the lesson is intended, but in notes drawn up for the teacher's own private use it is quite unnecessary to insert a reminder of which class he teaches. So also with regard to time, an outsider must be informed of the length of time in which the teacher expects to cover his ground, but the teacher is generally sufficiently familiar with his time-table to render a reference to time on the notes unnecessary, although if he finds that he habitually attempts more than the time allows, he may break himself of the habit by entering the time on his notes, and keeping it steadily before him.

If the lesson has a special object in view, reference to it should be made in the notes. In every case the teacher should ask himself what effect he hopes to produce by his lesson. Criticism notes are often found to contain very vague generalities under the head of "Object." No reference is needed to objects which are common to all teaching, such as "To improve the children's minds," "To develop the children's intelligence," nor is it necessary to state an object which is implied in the title; it is taken for granted that the object of a reading lesson is to teach reading, and of a writing lesson to teach writing. When the teacher intends to give exercise to a particular faculty he should say so, and *state how it is to be done;* thus in a lesson on the chief sea-ports of England he should endeavour "to train the *reasoning powers* by leading the children to

deduce the kind of trade from the position of the port," and in a lesson on the ancient Britons he should have for his object "to exercise the children's *imagination* by getting them to picture the conditions under which the ancient Britons lived."

In preparing a lesson requiring any apparatus beyond pens, blackboard, and such things as are constantly in front of the class, the teacher should run mentally through the illustrations and experiments he intends to use, and note down the name of every piece of apparatus and material he will require. A list of "Apparatus required" will in such cases appear at the head of the notes of the lesson, and the teacher must be sure that everything is to hand before he begins to give the lesson. A vast amount of harm is done when the continuity of the lesson is broken by the teacher having to send out for such things as a jug of water or a box of matches and wait till they are brought.

Having disposed of the above preliminary questions, the student may now proceed to arrange in parallel columns (i) an *Outline of the Matter* he intends to impart, and (ii) hints of the *Methods* he intends to employ in imparting it. The relative fulness of the entries in these two columns is a matter requiring great discretion on the part of the teacher. Speaking generally, we may say that the younger the children the smaller should be the amount of information to be given, and the greater the amount of attention to be directed to the methods of instilling it. But even with the same class the proportion between "Matter" and "Method" must vary with the subject. In a writing lesson the amount of actual information is small—consisting only of one or two short rules—but the method of teaching the

rules, and of making the children put them into practice is the part that calls for most careful consideration. In a history lesson, on the other hand, a considerable quantity of information has to be given, the statement of it duly analysed, and the parts arranged in logical sequence. This requires a considerable amount of space, and as the method consists mainly of exposition there will be very little to set in the "Method" column.

It is really surprising to find how many young teachers are unable to distinguish matter from method; hence facts are entered in the "Method" column, and suggested methods of teaching are found among the "Matter." The "Outline of Matter" column should be reserved exclusively for a statement of the facts that the children should carry away with them. It is even advisable not to set down the facts in subordinate sentences governed by "Tell the children that..." The fact is best stated as a fact, while the way of teaching it can be indicated by setting the word "Exposition" in the "Method" column. Others again show very little discretion in the amount that is put in the notes, which are either so bald as to be useless or else inordinately amplified. Some teachers insert not only the actual words of the questions they intend to put, but also the answers they expect the children will give, and thus the notes develop into a catechism.

A common practice is to begin with what is called an "Introduction," which consists of anything which leads up more or less directly to the lesson in hand, but beyond "opening the subject" seems to have no real purpose. A better plan is to begin with a *Preparation* section, the objects of which are:—

(*a*) To recall previous knowledge so as to bring

the children into a condition to link the new knowledge with the old; this is done mainly by questioning.

(*b*) To evince to the children their need of further knowledge of the subject, and

(*c*) To indicate the subject and purpose of the lesson so that the children may know what is expected of them, and so to awaken their curiosity and arouse their attention that they may be eager to perform their part.

The several divisions of the new matter then follow in logical order; each should contain as much as the children can clearly grasp at once and join on to their previous knowledge; and in the "Method" column should be indicated how each is to be taught, whether through observation, statement, explanation, or inference from facts given. After each section the "Method" column should indicate that test questions will be put to ascertain whether the teacher and class have succeeded in their efforts, and to prepare for the next section.

The whole should conclude with a *Recapitulation*, which we must impress upon our readers is not the same as a *repetition*. As the name indicates, a recapitulation is a revision of the *heads*. The object of this should therefore be to put the lesson in its true perspective, hence all details should either be suppressed or relegated to their relative and subordinate position, and explanations and illustrations which were necessary to drive the facts home in the first place should now be dispensed with.

The reader should remember that the working of an experiment is a *method* of teaching a fact; hence the fact should be stated in the "Outline of

Matter" column, and the reference to the experiment put in the "Method" column, thus :—

Outline of Matter.	Method. [1]
(*a*) A candle will burn for only a short time in a limited quantity of air.	(*a*) Prove by burning a candle under a glass jar (or stoppered bell-jar), inverted in a dish of water.
(*b*) It will burn indefinitely if a constant supply of fresh air be furnished.	(*b*) Repeat (*a*) with stopper out and a tube leading under the jar.

The results of many lessons are greatly enhanced by sketches on the blackboard, the object of which is not to produce a finished work of art, but to impress upon the children through the eye the essentials which the teacher has endeavoured to describe; hence in the blackboard sketch it is as important to omit some points as it is to insert others, and it is advisable for the teacher to first draw on his notes the sketches he intends in the lesson to put on the board. Unless he is a good blackboard draughtsman he should also practise the sketches privately before he gives the lesson.

Whether pictorial illustrations are set upon the blackboard or not, the teacher should endeavour after each section of the lesson to help the children to state the point of the section in the crispest possible way. These statements will be found invaluable in recapitulating the lesson as a whole, and showing the relation between its several parts. As clear and concise statements are not easily drawn up on the spur of the moment, the teacher should work out this *Blackboard Summary* beforehand, and make an entry of it on his notes.

[1] In the above chapter we have used the term "Method" to denote the contents of this column. It is sanctioned by custom, but a much better term is "Treatment."

CHAPTER VII

READING

Objects of the Teaching.

THE objects which the teacher should have in view in dealing with this subject are more frequently lost sight of than is the case with any other subject in the school curriculum. The reason for this seems to be that there is such a large amount of machinery to be used before the objects can be gained. Now our primary aim in teaching a child to read should be to enable him to *understand the written thoughts of others.* This is an essential in all reading, and in nine-tenths of the reading that is done it constitutes the whole process; one kind of reading, however—reading aloud—not only includes this, but also embraces *the art of adequately interpreting those thoughts to others.* The most fruitful source of failure in reading aloud is the endeavour to accomplish the second without the first. We must therefore remember that children are required to read aloud in school not so much because they will be required to read aloud out of school—for the amount of audible reading a person does is comparatively small—but because this should be the readiest method of testing whether they have understood the meaning or not. Excellence in audible reading is undoubtedly the goal we must endeavour to reach,

but if teachers and examiners of reading would only bear in mind that reading is an intensely mental act they would consider that reading best which showed the clearest grasp of the author's meaning, and this remark applies to reading of the most elementary character as well as of the most advanced. It should be considered a much more serious error for a child to say "poor" for "door" than to call it "gate," because although in the first case there is a resemblance in the *forms* of the words, the *meanings* of the two words are utterly unlike.

Qualifications of the Teacher.

It is important that a teacher of reading should be a good reader himself. He must be of quick intelligence and ready with the help of synonyms and short paraphrases to make the meaning of difficult words and passages clear to his pupils; his own speech must be free from impurities and inaccuracies, whether peculiar to himself or held in common with others, such as cockneyisms or provincialisms, or those affectations sometimes adopted by people of one class to mark their superiority—or inferiority—to those of other classes. He should possess a sound working knowledge of the physiology of the vocal organs, and of the classification of sounds based on the manner of their production.

In deciding on the best method of teaching we have to inquire how we can best enable the child (i) to connect the printed signs with words, the use or meaning of which he is already familiar with, or with new words, the use and meaning of which he acquires by context or explanation at the time of reading; and (ii) to communicate their meaning orally with the least effort to himself and the greatest pleasure to his hearers.

We shall deal with (i) first, as that requires most effort and persevering labour on the part of the

teacher. There are several methods advocated, but they can be arranged in two classes, according to whether they are based upon the analysis or synthesis of the words. The "Look and Say" and the "Syllabic" methods are analytical, while the "Alphabetic," "Phonetic," and "Phonic" methods are synthetical.

Classification of Methods.

Look and Say Method.

The first of these takes its name from the fact that the child is required to *look* at the word and then *say* it. Thus the word is acquired as a whole, and should be as easily recognised as if it had been acquired in any other way; at the same time the acquisition of this one word does not seem to afford much help in the acquisition of others. The experience, however, of those who teach entirely on this method is that the child makes a sort of mental analysis for himself which does enable him to grapple with new words. This intuition might be greatly aided by presenting groups of similar words at the same time. Consciously, or unconsciously, this is the method we all adopt in our reading later in life. The speed at which a person can read depends upon his readiness in recognising whole words, not on his familiarity with their elements or letters. The difficulty which a person ignorant of chemistry finds in reading a passage containing the names of organic compounds is not so much due to the number or irregularity of the syllables as to the unfamiliar (uncanny) look of the whole word. But on the other hand, if the word as a whole is familiar, we frequently pass over misprints without noticing them. It is a fact well-known to psychologists that we readily perceive that which we expect will be presented to us.

The English language contains a large number of very irregular words which cannot be regarded as

built up by any systematic combination of their elements, and these words are of such common occurrence that it is impossible to delay the child's introduction to them.

In making an analysis a child's mind is much more ready to recognise the form of the parts than their arrangements. Thus a child learning his letters would not hesitate to call either T, ⊥ or ⊢ a letter T, and if asked to print E and N, would be as likely to represent them thus Ǝ and И respectively, as to set them down correctly. Hence, in teaching reading by any method, but particularly by the "Look and Say" method, it is of extreme importance to make the child observe the arrangement of the letters, so as to avoid such mistakes as "on" for "no," and "from" for "form."

Syllabic Method.

The "Syllabic" method is closely allied to the above, but the words are analysed into syllables for the child, who is then required to *look* and *say* the syllables; later on, the child analyses the polysyllables for himself. Most of the remarks on the "Look and Say" method apply to this.

Alphabetic Method.

Of all methods of teaching reading the "Alphabetic" has been most widely employed. The system is based on the notion that as written words are formed by various combinations of the six-and-twenty characters of the alphabet, so spoken words must be formed by similar combinations of their names. This entirely loses sight of the fact that our alphabet is not a phonetic one. It falls short of the ideal in three respects: (i) there is a wide difference between the name of a letter and its sound; (ii) the same letter may represent a variety of sounds; and (iii) several letters may represent the same sound. By this method the children are first taught the *names* of the letters, generally in the

conventional order of the alphabet, and with mnemonic aids in the shape of pictures of objects whose names begin with the several letters. Next, children are taught to name the letters and say the word they compose. The system has achieved a certain amount of success from the fact that there is commonly a fairly close connection between the name of a letter and its phonetic value; and there can be no doubt that constant repetition of the component letters of a word is a valuable aid to correct spelling.

Phonic Method.

A reaction against the preceding system, which taught the *names* of the letters instead of their *values*, led to the "Phonic Method," which teaches the values of the letters instead of their names. The child is taught to associate each letter with its sound, and thus put the word together. It is true that the *elements* of the words can offer very little of interest to the child, but the interest comes when the word has been built up. With regular words the plan is eminently simple and successful, but it affords no assistance in dealing with the irregular words, and it is said that the practice of making ever so slight a pause between an initial letter and the body of a word tends to make children stammer. There is hardly any letter which can be said to have only one sound value, and hence the system can never have more than a certain measure of success.

To obviate this deficiency of the alphabet, recourse must be had to an alphabet in which the different values are represented by different type, *i.e.*, to a 'Phonetic" alphabet.

Phonetic Method

The objections to the "Phonetic system" of teaching to read are (*a*) that the phonetic alphabet differs so widely from the ordinary one that there is as much labour involved in passing from one to the

other as in teaching directly by the ordinary letters, and (*b*) that we have not yet arrived at a uniform standard of pronunciation for all branches of the English-speaking race. There is often a marked difference in the pronunciation of the same word in different parts of Great Britain and of the United States, each being considered correct according to the local standard.

While the true phonetic alphabet, for the first of the above reasons, is hardly suitable for teaching children to read, still it is very important that teachers should be familiar with the principles of phonetics, and should be able to apply them where they help, without burdening the children with the terminology. A series of books applying the princi ples in this way has been drawn up by Miss Dale, and illustrated by Mr. Walter Crane ("the Walter Crane Readers"). The system is fully explained in the volume "On the Teaching of English Reading, with a Running Commentary on the Walter Crane Readers." Another excellent application is W. L. Robinson's Phonic System.

Combined Method recommended.

The intelligent teacher having studied the good and bad points in each system, will be able to adopt the good points in each, and will follow a system which is a combination of the good points in each method, and discard those points which are weak.

The question has often been raised whether we should teach children the names of the letters or not. Now we cannot consider that we have given a child a very complete idea of anything until he knows its name. The knowledge of the names of the letters is indispensable later on, and even in the earliest stages the name of a letter offers the easiest way of referring to it.

It is a matter of comparatively small moment

Teaching the Letters.

whether we teach the small letters or the capitals first. Both have to be mastered, and while the capitals are perhaps easier from the greater simplicity of their forms, the small letters have a strong claim to precedence on account of their more frequent use. Having chosen the forms we shall begin with, two considerations, again, appeal to us in deciding the order in which we shall teach the letters. Our ultimate object is to establish a connection between sign and sound, and we may either present the sign first and teach its sound, or call the attention first to the sound and then show how it is represented. In either case we should begin with the simplest letters, and as the simplest forms do not represent the simplest sounds, it is evident that there must be a material difference between the two orders.

Let us suppose that it has been decided to present the sign first and to begin with the capitals, then it is best to classify them according to the elements from which they are formed, thus :—

- Letters formed of straight lines
  - (*a*) Horizontal and vertical, I, T, L, E, F, H.
  - (*b*) Horizontal, vertical and oblique, A, V, W, M, N, Z, X, K, Y.
- (*c*) Letters formed of curved lines only — O, Q, C, G, S.
- (*d*) Letters formed of curved and straight lines — D, B, P, R, U, J.

In the above list the letters are not merely classified according to their elements, but in each group the letters are arranged so that, as far as possible, the form of each letter may be taught by comparison

with the one preceding it ; thus in (*c*) starting with the " round O " we form Q by putting on a tail, and C by making a gap in the side, G is formed from C by modifying the lower part, the upper part of S turns in the same direction as that of C or G.

In teaching the small letters it is best to begin with those whose form is the same as that of the corresponding capital.

(*a*) c, o, s, v, w, x, z.

(*b*) Those whose form can be easily derived from the corresponding capital :—F, f, begin at the right hand side of the stroke, write quickly, and the angle becomes rounded off, draw the bar right through. H, h, omit the upper half of the right-hand stroke and form by making the left-hand stroke, retracing the lower half and drawing the bar and lower half of the right-hand vertical line, the angles get rounded off and the small h is the result. The small letters i, j, k, l, y, are easily taught from their relation to I, J, K, L and Y.

(*c*) The group formed of O and a vertical line b, d, p, q. Confusion can be avoided here only by teaching by contrast.

(*d*) The group m, n and u requires similar treatment.

(*e*) The irregular letters a, e, g, r and t.

Plan of a lesson on letter G.

1. Teacher prints in the top line on blackboard O and C, and recalls what has been previously taught—O the round letter, C like O with piece left out on right-hand side.

2. In the next line teacher prints G, tells its name, and makes children repeat it after him, looking at it and imitating the teacher as he traces G in the air. (N.B. The teacher must either face the same way as the children, or else trace in negative.)

3. Its shape is then compared with the O and C on the blackboard.

4. The children pick out examples of letter G on a card of printed letters and practice forming it on their slates.

5. The letter is reproduced in kinder-garten materials.

Familiar words formed by combinations of the letters already mastered should be introduced as soon as possible. This will impart a little interest to what must otherwise be a painfully dry subject for the little ones.

It is probable that given an average child and an average teacher the actual forms of the letters will be more quickly mastered if taught in the above order, but although more time may be required to master the forms of the letters if presented in their phonetic order, the children master their value more thoroughly, lay a surer foundation for their reading, and are more interested in the work.

The arrangement of the letters in order of phonetic difficulty is much less simple than their arrangement according to form. We must in the first place arrange the consonants and vowels in two independent groups, any attempt to compare the difficulty of a vowel with a consonant being altogether futile. The best arrangement of the consonants is, perhaps, p, b; t, d; f, v; s, z; k, g; c; m, n, ng; l, r; h, w, y; th, sh. This arrangement depends upon the organs employed in pronouncing the letters. In learning to speak children begin with the labials and dentals, and thus we have a key to the order of difficulty of the consonants, although we must bear in mind that as speech is largely a matter of imitation, children acquire most readily the letters produced by the organs whose action is most evident to them.

The vowels may be introduced as soon as p and b have been taught, or at the latest after t and d, and it is advisable to begin with the short vowels.

The following are suggested as the steps to take in teaching the letters on this plan.

1. The children *know* that they are able to put questions and give answers orally to persons actually present, hence lead them to feel the necessity for a means of communicating with those at a *distance*, and with those who will be in the same place at a *future time*.

2. Let them imagine that they have to reply say to a relative at a distance who has asked (by letter) what they would like from his garden; e. g. *p*ears, *p*lums, *p*eaches, *p*eas, *p*otatoes.

3. Let them isolate the initial and notice how it is produced.

4. Tell them that in this lesson they will learn to write p, the first letter, and will learn the others later on.

5. Write p on the blackboard, let children repeat the name after the teacher, describe its shape, and let children trace it in the air.

6. Set p as copy on slate, and form it with kinder garten materials.

In the next lesson the children are led to feel the need of a letter to represent the initial letter of *b*oy, *b*read, *b*un, or some other familiar word beginning with b. They are then led to compare the sound of b with that of p,—they may be made to put their fingers to their throats to feel the vibration,—and to contrast the forms, the lesson being in other respects similar to the former.

After t and d have been taught in this way the short vowels a and e may be introduced, followed soon by the others, and the children will have the

delight of associating the printed words, pet, bud, top, bed, etc., with their appropriate sounds, and with the notions they represent.

Intelligent Reading in the Infant Stage.

If our definition of reading be accepted, it follows that every new printed word introduced to children should be at once associated with its meaning or use. Thus *cow* already forms part of the child's vocabulary, but *ox* probably does not, and when the latter form is first presented to the child its meaning should be taught either by a picture or by reference to the cow. Similarly the child's vocabulary contains the word *donkey*, but the word *ass* which he meets with in his early lessons requires to be associated with his conception "donkey." It further follows that while notional words may be taught as isolated forms, relational words should be taught in their context.

We now reach the stage in which the instruction is based upon cards and primers. The lessons supplied by these aids, generally assume that the letters have been taught by presenting the sign first and then the sound, and begin with an amount of uninteresting constructive combination of letters leading up to the words contained in the lesson, as :—

at, f-at, c-at, b-at, r-at, m-at.

followed by,—

The fat cat sat on the mat.

Now although a large amount of drill is necessary in teaching the force of the letters in combination, it is doubtful whether the present tendency is not to over-do this part of the work, even to the extent of obscuring the very first aim of reading, viz. :—to convey thoughts by means of the printed signs, and however accurately the child may orally reproduce the individual words in the above sentence, he is not

reading the sentence unless he feels that these seven words give him some information about the cat. Some teachers seem to have such a dread of the child who is able to "say off the whole piece as soon as he sees the first word," that they rather overlook the necessity of the child grasping the meaning of the passage, and confine their attention to making him recognise the individual words. The proper remedy for this tendency is to increase the supply of reading books.

The objection to a child being able "to say off the whole sentence without looking at the book" is altogether unreasonable; indeed, as this ability may generally be regarded as a proof that he understands the sentence,

"'Tis a consummation devoutly to be wished."

If the child is ever to become an *expressive* reader it is at this stage that the training must begin, and if we are content to allow the child to merely connect sign with sound, all the "pattern reading" in the world will be so much wasted effort on the part of the teacher. Assistance with individual words the child will undoubtedly need, but this should be given him as a means to an end—the comprehension of the sentence. When the sentence is grasped the child should *tell* it to the teacher, sometimes with closed book, not in a monotonous sing-song, nor with a spasmodic effort to reproduce the *words* of the book, but with that charming simplicity which always characterizes a child's narration of something he understands. It is far better that the child should say "the fat cat sat on the hearth-rug," than that he should give the seven words of our specimen sentence accurately, but without having a mental picture of the fact they state. The following practice is

Plan for ensuring Grasp of Meaning.

strongly recommended throughout the school as a means of securing intelligence in reading. The books are served out and the place found, the children are then required to read the first sentence to themselves. Any child seeing a word he cannot pronounce, or one which precludes him from grasping the meaning of the whole sentence, must hold up his hand and ask for the necessary help. The teacher then names one child who must either read the sentence aloud with the book open, or give the meaning with the book closed, as the teacher may then decide :—the teacher might indicate which he desires by the words "Open" or "Shut" after the pupil's name, or simply by holding his own book open or shut as the case may be. The advantages of this plan are obvious. It trains children in the habit

(*a*) Of associating sign with sound.
(*b*) Of getting the meaning from the sign.
(*c*) Of realising where their difficulties come, and asking for help.

With the children who have begun the study of grammar this practice should be associated with the analysis of sentences. Children too often regard grammar as an isolated subject and "analysis" as an exercise to be restricted to grammar lessons, and whose only function is to oblige them to fill in certain neatly ruled rectangles. As a variety of the above reading practice, children instead of being asked for the meaning of the whole sentence may be asked for the "Subject," or "what the statement is about."

We have endeavoured to show that the natural way of teaching reading is to start with what the children already know :—to base our teaching on the vocabulary and powers of expression the children

have when they first come to school; so the natural process is to teach spelling through reading and not reading through spelling. After the sentence has been read it should form the material for a severe drill on the construction of its component words. These should be analysed by the teacher and class, and the similar parts compared. Words may be isolated (by covering up the others) in order to be identified by their form apart from the context, and the whole of a sentence should be written from memory after it has been the subject of such a drill. As a practice in word identification there is no objection to taking the words of a sentence in their inverse order, *i.e.* beginning at the end, only we must insist on the fact that this is not *reading*. We shall deal more fully with spelling later on. **Word Drill.**

We now have to deal more particularly with that reading which goes beyond the comprehension of the writer's meaning by the reader, viz. audible reading or the art of reading so as to communicate the writer's thoughts to a third party. This kind of reading is closely allied to speaking, more closely indeed than most people think, for we must here enter a protest against the frequent misuse by teachers and examiners of the phrase "In your own words." The words of a language are the common property of all who speak that language, and no one can claim a monopoly over a particular set of words; so that if a reader has really mastered a writer's meaning through a particular set of words, and feels that those words are the best he can find to express the thoughts he has acquired, those words become *ipso facto* "his words." He is not, as some teachers of paraphrasing would have us believe, under an obligation to discover a totally different set of words in attempting to reproduce the meaning.

Voice Production.

The public in general, and teachers in particular, are at length waking up to a sense of the importance of the subject of "voice production." Not only is it impossible to obtain good oral work from children who are allowed to use their voices improperly, but teachers frequently pay a very heavy penalty for their neglect in this respect. Every teacher should therefore make a careful study of the structure and use of the vocal organs, and *determine to profit by the knowledge thus acquired;* but it is not desirable to press much of the theory upon children, the practice will be sufficient for them.

We may lay it down as our first general rule that the special organs of the body are affected by whatever affects the system as a whole, so the efficiency of the vocal organs will depend largely upon the measures taken to ensure a healthy tone in the body as a whole. Among these we may enumerate scrupulous cleanliness—the cold bath producing this as well as tone,—sufficient and appropriate physical exercise, suitability of dress, and wholesome, but plain, food. Gymnastics practised indoors are a poor substitute for good outdoor games; children when in the open air should be encouraged to shout and call to one another at a distance. Any one who has travelled in an ocean liner and compared the sailors with the stewards, will have had an object lesson on the effect of fresh air, even when combined with inferior food, and the superior voices of the Italians are no doubt due to the fact that they spend so much time out of doors. Milton, in his Tractate on Education, refers to this,[1] and numerous other writers

[1] We Englishmen being farre northerly doe not open our mouthes in the cold air, wide enough to grace a Southern tongue, but are observed by all other nations to speak exceeding close and inward.

testify to the beneficial effects of outdoor exercises on the voice. The absurdity of allowing any article of clothing to interfere with the free action of the lungs is so palpable as to call for no remark here; but the relation between the vocal organs and digestion is often lost sight of. Not only does faulty digestion affect the vocal organs indirectly by depriving the system of the nourishment it should receive, but it frequently sets up a state of congestion and inflammation, which spreads up the œsophagus and directly troubles the larynx and pharynx themselves. Resonance.

Our readers know that the voice is caused by the vibration of the vocal chords, and these vibrations are taken up by the air and produce waves of sound. We have to consider how we can produce these sounds with the greatest effect and the least exertion. The vocal chords by themselves would produce but feeble waves were there not means of strengthening or reinforcing them. One means of reinforcing the sound waves is by "resonance." In order to make quite clear what is meant by resonance, let the reader take a tuning fork, C, and a tall jar or cylinder, about twelve inches high, and a jug of water. If the fork be struck and held in the air, the sound is scarcely audible; but if held over the jar it may produce a slightly louder sound. Repeat this several times, adding a little water to the jar each time. It will be found that the sound gradually becomes louder and louder till the maximum is reached, when the water is $6\frac{1}{2}$ inches from the top of the jar, and then it dies away. The length of the column of air which gives the greatest resonance is one quarter of the length of the wave produced by the fork.[1] This same column will not resound to a note of another

[1] The reader is strongly advised to further study this subject in a text-book on sound.

pitch; each note must have its appropriate column. In the case of the human voice resonance is produced by the lungs, trachea, pharynx, and nasal cavity. The resonance in the first three is best acquired by trying to copy the effect of the resonance jar on the vibrations of the tuning fork. On the western side of the Atlantic nasal resonance is the rule; sometimes it is accompanied by a nasality of tone, but when free from this, American voices are pure and telling, owing to the use of nasal resonance. In order to cultivate this nasal resonance the student should practise the word "boom" on a note one or two tones higher than his usual speech, and, contrary to the usage in correct singing or speaking, pass from the vowel to the final consonant as soon as possible. The sound should be sustained for about 10 seconds at a time with the mouth open; if the placing of the hand over the mouth makes practically no difference in the sound, the student has acquired nasal resonance, and should endeavour to extend its use.

Sounding Boards.

There is another means of reinforcing the vibrations of the vocal chords which is frequently confused with "resonance." After striking the tuning-fork, press the end of it on the top of a table; the difference is very marked, but the increase is not due to resonance. In order to produce sound effectually the vibrating body must throw the whole of the surrounding air into a state of vibration; but when the tuning fork is vibrating, owing to the extreme mobility of the air, many particles simply slip round the prongs of the fork instead of being pressed forward and communicating their motion to other particles. When, however, the fork is pressed on the table, the top of the table is made to vibrate at the same rate as the fork, and as its surface is so

much larger only a small proportion of the particles of air on its surface can escape pressure. Unlike the resonance jar, the table top will augment a note of any pitch. Next try the effect of pressing the fork on a sponge, a cushion, and a distended bladder. In the first and second cases, owing to the want of elasticity of the inner parts, the surface cannot act as a sounding board, but the bladder is effective. We see then that when the lungs are filled they will increase the effect of the vocal chords in two ways: first, by supplying an appropriate resonator for certain sounds; and secondly, because the walls of the chest will then act as a sounding board for all sounds. Place the hands on the sides of the chest and observe how the amount of vibration is increased when the lungs are well filled.

Respiration.

In dealing with the important question of respiration, we must first note that it is of two kinds, conscious and unconscious. Unconscious respiration is a purely automatic or reflex act, and is not a result of any teacher's efforts. The teacher should, however, understand the physiology of it and recognise the three types:—

(*a*) The Abdominal type; the characteristic type in all children under three, and in adult males; most of the work is done by the diaphragm.

(*b*) The Costo-inferior type; the common type among boys of school age, and one that occurs in some adult males; the work is divided between the diaphragm and the lower ribs.

(*c*) The Costo-superior type, which is the normal type with adult women; the diaphragm acts but slightly or not at all, the work being principally performed by the upper ribs.

The object of conscious breathing is either to fill the lungs so as to form a sort of "base of opera-

tions" when the arms are about to exert an effort, or to enable the vocal organs to exert themselves. Although we recognise a difference in the types of unconscious breathing, all persons alike may follow the same exercises in conscious respiration. Respiratory exercises should aim at expanding the thorax in *all* directions, and it is necessary for the teacher to explain where the lungs are, the ignorance of many on this point being shown by their endeavours to deal with a cold on the lungs by the application of a narrow mustard plaster to the sternum and over the heart.

Breathing Exercises.

A set of breathing exercises, serviceable for both reading and singing, will be found in Appendix.

Having gone through a silent course of pulmonary and buccal gymnastics, we next consider the production of sounds; and it is in dealing with the production of correct vowel sounds that the study of resonance and quality, as depending on overtones, is useful to the teacher. For all vowels are produced by similar vibrations of the glottis, but their individual characters are due to different overtones being reinforced by the different forms of the mouth and pharynx. For example, in sounding ē we must bring into prominence the highest overtones, and consequently require to shorten our resonance tube as much as possible.

Vowel Sounds.

If this fact be mastered, the teacher will be able to arrange the vowels in serial order for himself, taking first the long, then the short, vowels. Beyond this we can only say that the acquisition of pure vowel sounds is chiefly a matter of imitation. The teacher should therefore endeavour to imitate those whom he considers the most correct speakers, and then set himself as a pattern for his pupils, giving them such hints on the disposition of their vocal

organs as he may base on experience with his own.

If the alphabet has been taught in the first place on the phonetic plan we have recommended, much will have been done towards ensuring the correct production of the consonants. The most important thing is to aim at producing them with the least expenditure of breath. By insisting on the difference between "voiced" and "voiceless" consonants, much may be done to gain this end. Thus, in sounding p the lips are pressed together, and then opened as soon as a puff of air is ready to come out; but for b the vocal chords are made to vibrate before the lips are opened. The children should be made to practise this with their fingers lightly pressing on their throats, when they will realise the vibration in the case of b, and its absence in the case of p. Consonants.

The following are the most frequent mistakes that the teacher will have to deal with :—

1. For the reasons given on page 97, p, b, t, and d are generally correct.

2. If v has been taught in connection with f, there is seldom a mistake; the substitution of w for v can easily be cured; the teacher must insist on the top front teeth being placed on the lower lip, and not allow the lips to be pursed together.

3. F and v are frequently substituted for hard and soft th respectively, *e.g.* "fing" for "thing," "raver" for "rather"; and sometimes, in his desire to cure himself of this fault, the little child will make the inverse substitution, and say "thinger" for "finger," particularly in the case of words requiring a conscious effort to pronounce.

4. Th is substituted for s. "Thomerthet" for "Somerset."

5. T and d are given for k (or guttural c) and g,

respectively. This is easily corrected by making the children "feel for the letter" in their throat, by placing the hand on the front of the neck, at the same time keeping down the tip of the tongue—with the finger, if necessary.

6. Children sometimes miss the nasal resonance in m, n, and ng, which then become b and d. Adults suffering from "cold in the head" are often guilty of the same fault.

7. In pronouncing l the tongue should be pointed and the tip only allowed to come in contact with the palate; sometimes the tongue is allowed to become so flat that it touches the side teeth, and the air makes a very unpleasant sound in escaping between the teeth and cheeks. This is sometimes due to malformation or excessive size of the tongue, but generally it is the result of habit, and can be cured by the tongue-pointing exercise.

8. In the south of Great Britain there is a tendency to shirk the trill of the r, so that "lord" becomes "laud," and "culture" becomes "culchah." It is much to be regretted that phoneticians follow this faulty pronunciation, instead of endeavouring to correct it. In North Britain the trill is perhaps sometimes carried to excess.

9. The substitution of w (and sometimes y) for r, is generally a vicious habit.

10. The same may generally be said of the substitution of th for r. Some, who do not say "vethy" for "very," use th for r after a consonant, as "pthetty" for "pretty"; and when the r should follow th, this leads to the substitution of f for the th, as "fthough" for "through."

11. Although, as in 8, r is often omitted, yet the people who talk of their "deah friends," often insert an r unnecessarily to avoid a hiatus, as in "Maria(r)

Ann," "Africa(r)" and "America." Nos. 8 to 11 can generally be cured by practice in trilling the r.

12. The aspirate is a fertile source of trouble to the illiterate; from the 'bus conductor who drops his h in "'Igh 'Olborn" and picks it up in "Hoxford Street," to the parvenu whose education is in inverse proportion to his wealth. The power to aspirate in the right place, and there only, can be acquired only by practice.

NOTE.—It may here be remarked that in polysyllables, the initial h should generally be aspirated when there is an accent on the first syllable, and is often treated as mute when the accent comes later on, *e.g.*, a history, but an historian.

13. Much breath is frequently wasted in aspirating the h. To avoid this the pupil should practise treating the h as a stop, shutting off the air current by closing the glottis before pronouncing such a word as hen, just as it would be shut off by closing the lips in pronouncing pen.

NOTE 1.—The replacement of Anglo-Saxon h by the modern g, and of hs by x seems to indicate that "h" had originally a strongly guttural character, which justifies the above method of practising its pronunciation.

NOTE 2.—Sentences with several initial h's should be given for practice:—Hold Henry Harvey's horse's head. He hath not hid His face from him, but when he called unto Him He heard him.

14. We still have Ephraimites among us who say "Sibboleth" for "Shibboleth." The fault is more noticeable when sh is followed by r. "Children should not shrink from shrieking shrilly at the shrine of a shrimp in a shrubbery on Shrove Tuesday."

Having dealt with the training of the vocal mechanism and its use in pronouncing individual words, attention is needed to difficult combinations. We cannot here afford space for lists of exercises, but the teacher will readily prepare exercises for his

pupils which will vary so as to meet the individual difficulty. A general practice will improve even those members of the class who show no especial weakness. The chief difficulties may be arranged in the following classes :—

(*a*) Repetition of the same initial.

"Peter Piper," and other nursery catches, afford useful practice.

(*b*) Sequence of similar initials,—see above for those which are confused. Practise such exercises as—

A sieve full of sifted thistles, a sieve full of unsifted thistles, think what a thoughtful sort of thistle sifters.

I saw Esau, he saw me, and she saw I saw Esau.

(*c*) Difficult groups of consonants in the same word, po*sts*, distinc*t*ness, subtra*ct*ion.

NOTE.—Children commonly insert an s between the first and second syllables of this word, which is compounded in violation of phonetic laws.

(*d*) Final consonants before initial vowels—

A single egg, not a singleleg.

(*e*) Final vowels before initial consonants—

"A stray traveller," not "a straight raveller."

(*f*) Final consonant before the same initial consonant.

A light transparent cloak.

The last three require to be practised with a slight pause between the words, and a deliberate effort to make the sounds distinct. The singing lesson should afford good opportunities for acquiring distinctness of enunciation.

We have seen that the two objects to set before us in teaching reading are to enable the child to understand the passage himself and then to make others understand it, and have just been studying the mechanism by which this latter object in particular

is to be gained. Experience shows us, however, that it is necessary to insist that the reading lesson should be devoted to instruction in reading. Attempts have been made to combine the teaching of reading with that in Geography, &c., and hence we have Geographical Readers, Historical Readers, and even Object Lesson Readers, and Science Readers. Now a passage of History, &c., may afford as good practice in reading as a passage dealing with any ordinary descriptive subject, but it is of the highest importance that teachers should not be tempted to digress into a lesson on History, &c. The explanations given in a reading lesson should be just sufficient to enable the pupil to understand the meaning of what he is reading, and should not aim at storing his mind with knowledge which should be imparted in other lessons.

Acquisition of Information to be quite subordinate to Reading.

An important question arises in considering the advantages and disadvantages of "simultaneous reading." By adopting the plan of simultaneous reading the teacher can undoubtedly give a much larger amount of practice to every pupil. With the large classes that have—even to the present day—been placed under the care of a single teacher, simultaneous reading has been a matter of necessity and has led to abuse and vigorous condemnation. It is possible to condemn the abuses without bringing a wholesale condemnation on the plan. The charge laid against it is that it leads to a monotonous drawl, but the monotonous drawl is not unknown among people who have been taught reading entirely on the "individual" plan. It is urged that the adoption of a common pitch by a class reading simultaneously is a proof of absence of intelligence and interest; but surely the argument has no weight with any one who has heard a crowd give three cheers. If reading be

Advantages and Disadvantages of Simultaneous Reading.

supposed to consist of the shouting of sounds to correspond with printed marks it must be unintelligent whether it be "simultaneous" or "individual," but if it be the expression of thoughts conveyed to the mind by the book it will be intelligent in both cases. This is one abuse which is charged against this practice. Another is the frequent custom of requiring the children to imitate the teacher's pattern reading. The custom of supplying "pattern reading" in season and out of season is a very deplorable one, but it is equally so whether the teacher be imitated by fifty pupils or by one. The supposed object is to get the children to read with "expression." Now "expression" is literally "the *pressing out* into palpable form that which is already within us,"[1] and few persons could wish for prettier modes of expression than those which come naturally to a child who has thoughts within him; so if we wish a child to read with expression we must first ensure that the writer's thoughts have entered into his mind.

In the hands of a good teacher, then, we may consider that simultaneous reading not only affords more practice to each pupil, but it has a good moral effect in exemplifying the effect of united effort, it encourages the faint-hearted who have not sufficient courage to read out alone; it enables the teacher to apply a standard of pace—restraining the quick and accelerating the slow; and if the teacher insists on distinctness, it necessitates greater care in pronunciation than would suffice to make an individual reader understood.

The real objections are (1) that it is noisy, and consequently it should *never* take place in one of those rooms which unfortunately have to accommo-

[1] Charles Kingsley. Introductory Lectures given at Queen's College, London, 1848.

date two or three classes; (2) it necessitates very great vigilance to ensure that there is no shirking, and that each child is conscientiously making efforts to read; (3) it is difficult, even when the teacher endeavours to obtain distinctness, to ensure that the reading is not "invested with artistic merit" by a few leading children while the others merely add to the volume of sound. The principal part of the reading lesson should therefore consist of individual reading, but the teacher should feel no hesitation, especially if he has a large class, in resorting to simultaneous reading by the whole class, or better still by rows or sections.

The Reading Lesson.

The reading lesson should consist of a judicious admixture of the following, and the teacher must use great discretion in the amount of time he allows to each section. (1) Breathing exercises and buccal gymnastics; (2) drill in correct pronunciation of sounds; (3) silent reading either of the whole passage at once or of separate sentences; (4) instruction on pronunciation of words or of their meanings; these should be asked for by the pupils and briefly given by the teacher; (5) reading by individual pupils, in the selection of whom the teacher requires to exercise great tact, so as to give most practice to the backward readers without allowing the good ones to lose interest, and so as not to make a backward reader lose heart by calling upon him immediately after one who is immensely his superior; (6) instruction in the technicalities of reading such as (*a*) phrasing, (*b*) emphasis, and (*c*) modulation of the voice.

(*a*) The words denoting a single idea should be said off together; children are easily taught to make a slight pause after each group of words which gives them something fresh to think about, and after

words signifying that something important is to follow. *E.g.* :—

"The old gentleman / is an early riser / , because / he intends to live / at least twenty years longer / ."

This rule associates the pauses with the meaning, and is far superior to the usual plan of teaching children to depend on the printed stops and count one, two, three and four, for the comma, semi-colon, colon and full stop respectively, and make no pause elsewhere.

Phrasing should be taught in the earliest reading lessons, children being required to say "ă cow," not "a cow."

(*b*) Children must be taught to recognise which are the most important words in a sentence and to lay stress upon those; they should be shown how to bring out the contrast in an antithesis.

(*c*) This is the place at which "pattern reading" should come in. The teacher must explain the principles underlying the phrasing of a particular passage, and illustrate his remarks by reading it himself. He may then require the pupils to read the same passage, but he should not persistently read the part selected for the lesson sentence by sentence and make the children imitate like parrots. He should also occasionally read a long passage to the class as a model of continuous reading.

It is a good plan occasionally to allow only the reader—and perhaps the next pupil—to have the book open, the others being required to listen with closed books, for if they have their books open it is difficult to determine whether they can really understand the reader or are getting the sense through the eye and not through the ear. The teacher should frequently hear the reading with his own book closed.

Reading Books.

We will now conclude with a few remarks on the features which should be found in reading books, and as we cannot prescribe books for children of each age, we will simply deal with the books as though intended for two classes—junior and senior, and leave the teacher to see how the characters of the one should merge into those of the other. The junior books have to help children mainly over the mechanical difficulties, and wide differences will be found in the arrangements of two equally good books, according to the system adopted; the junior books should make free use of pictures as a means to enable the pupil to understand the meaning of the text. Pictures become of less service as the pupil acquires a larger vocabulary, as new words can be explained through those already learnt. The language in all reading books should be correct English, and while simplicity should characterise the books for juniors, style should mark those for seniors. We need hardly say that the books should be progressive, but in the primers it is a mistake to introduce unusual words simply because they are short, the unfamiliarity of such words as yak, yew, fez, and other three-letter words found in some primers makes them really harder than the more common words of four, five, or six letters. The printing should be clear and the binding strong. The subject-matter should be interesting and also instructive; although here it should be noticed that a child is receiving instruction of the highest kind, if he is taught through examples to love our great masterpieces of literature and to appreciate their forms, while the dangers of attempting to crowd instruction in geographical, historical, and scientific facts into the reading lesson have already been pointed out.

The question has often been raised whether fables

and fairy tales ought to be allowed to appear in reading books for children. It is urged that they make the child's imagination run wild, and lead to that sort of greensickness that unfits a man for his duties in life. On the other hand scarcely a child believes in the reality of the talking animals and fairy personages, so that the imagination is disciplined, and importance is attached to those parts only at which the fairy tale comes into contact with, or runs parallel to, real life, and a real moral purpose is served by a good fairy tale; the ethical teaching does not become the less real because it is based upon allegorical beings and is not obtruded. On the other hand we cannot help condemning a large class of stories found in reading books which are manifestly untrue, and in which the moral that naturally springs from the tale is quite different from that which the writer desires to point. We might quote as cases in point the stories of icebergs of which the part above the water remains suspended in the air, while the rest melts away and then suddenly falls down upon some unfortunate ship which comes underneath. Such stories are the work of people who have not only had no experience with the conditions they attempt to describe, but are ignorant of the laws of floating bodies. A writer who was totally ignorant of the construction of the dykes in Holland, and imagined that they were like half-inch wooden partitions, introduced a story into school literature of a "brave little Hollander" who stopped up a hole in a dyke with his finger, and the readers are expected to admire his patience and courage in stopping there all night, whereas in fact they should blame the boy for keeping his parents in a state of needless alarm, and for not having sense enough to stop up the hole with a pebble instead of using his finger for a cork.

CHAPTER VIII

SPELLING

Its Importance.

Such is the importance attached to correct spelling at the present day that any person receiving a communication containing errors in spelling feels at once a prejudice against the writer. In spite of all the excuses that may be put forth on behalf of the bad speller, this prejudice is not altogether unreasonable.

Bad spelling shows in the first place a lack of literary culture, and indicates that its author can have read but little, or cannot have read carefully. But since, as we shall show presently, spelling is a matter of observation, this failing suggests that the person's general powers of observation have not been trained. A person who has not observed the proper spelling of words that must have come before him may be unreliable in other observations he is required to make. The teacher should impress upon his children the serious disadvantage they will labour under in whatever calling they may adopt if they commit gross errors in spelling.

Sometimes it happens that a word wrongly spelt gives quite a different meaning to the sentence in which it stands. The comic papers supply abundant examples of this fact.

Relation to other Studies.

The power of spelling correctly is the result of accurately observing the words when they are met with—a process which includes concentrating the attention on them, noting their resemblances to certain words, and their differences from others previously known, so that by these associations they may be correctly recalled when required. It will thus be seen that a good observer is likely to be a good speller, and consequently every lesson which leads a child to adopt correct methods of observation must indirectly have a good effect upon his spelling.

In the reading lesson the material set before the child's observation consists mainly of words. These are the models for the child's spelling, and if we could suppose the child a trained observer before he began to learn to read, he would require no teaching of spelling beyond that which came intuitively in the reading lessons.

But unfortunately the beginner in reading is not a trained observer, and requires a great deal of help in associating words on a scientific plan, apart from the difficulty which arises from the fact that the associable words have a habit of occurring at very wide intervals. In reading, also, we have shown that the word is regarded as a whole, and the *order* of the letters does not obtrude itself on the reader, so that many a child who can give the correct value of a word which he sees as a whole, is unable to give the component letters one by one in their proper order. The context, moreover, is a valuable aid in recognising a word in a sentence, but it gives no aid in analysing a word into its constituent letters. The correctness of the observations made on a printed word may be tested by reproducing the word either immediately or after an interval, and thus spelling

is brought into connection with all kinds of written exercises, particularly transcription and dictation.

Systematic lessons in "word building" are powerful factors in the teaching of spelling, because they enable the teacher to point out to the children relations between words which they would not discover for themselves.

In every lesson mistakes made in spelling should be corrected, and the teacher might incidentally direct the attention of the class to a new and characteristic word; but it is a great mistake to make the teaching of spelling one of the principal objects of every lesson. We sometimes come across object lessons in which the main purpose seems to be to teach the spelling of such words as "porosity," "malleability"; and even in Scripture lessons a large portion of the time is frequently devoted to the spelling of long Hebrew names.

Difficulties.

(i) *From the Alphabet.*

The chief difficulty in the way of teaching spelling arises from the fact that our alphabet is not a phonetic one. This has already been discussed in the chapter on Reading (page 91).

(ii) *From requiring Synthesis.*

But even if our alphabet were perfect from a phonetic point of view, the teacher of spelling would still have difficulties to overcome. This is illustrated by the confusion between such words as "from" and "form," which are quite phonetic (except for the length of the "o"). Such confusion shows that while the acquisition of the words through reading is an analytical process, the analysis is not sufficient to enable the pupil to remember the *order* of the parts. Hence when the word is recalled and set down by the synthetic process of spelling, the young pupil will often give the correct parts, but will put them in the wrong order.

The indistinctness with which many words are

(iii) *Indistinct Articulation.*

uttered greatly increases the difficulty of the child who endeavours to spell them. Under this head we refer to

a. The elementary vowel, which is represented indiscriminately by *a*, *e*, *i*, *o*, and *u*, and which leads to confusion in the spelling of such words as port*a*ble, cred*i*ble, sol*u*ble, dependent.

The writers would here like to express their disagreement with most of the writers on phonetics, for the spelling of a word should indicate rather the pronunciation to be aimed at than the one popularly adopted.

b. Mispronunciation by children. Several words are almost invariably pronounced incorrectly by certain classes of children, who consequently have a strong tendency to spell them incorrectly, even after the teacher has pronounced them correctly; such mistakes arise in *engine*, *celery*, *potato*.

c. Provincialisms also cause difficulties in the teaching of spelling.

Aids to Teaching.
(i) *Transcription.*

It is often assumed that transcription is merely a method of securing practice in writing; it is also a very important aid to the teaching of spelling. When the teacher has this object in view, he must exercise great diligence in conducting the lesson, and should not regard the work as a means of keeping the boys quiet while he does his own clerical work. The first essential is that the boys should accurately observe each word before beginning to write it; they must not be allowed to stop in the middle of a word to look up the letters in the second half, and they should always associate the meaning with the form of the word. This will counteract the tendency that transcription has to become a merely mechanical exercise. Still more intelligence will be brought to bear upon the work if the children are made to

acquire the habit of phrasing the passage they are writing, so that they refrain from looking at their books during the writing, not merely of a word, but of a whole phrase. This leads up to a very valuable exercise which may be regarded as intermediate between transcription, dictation and composition, viz., *memory writing*. The younger children should frequently be required to observe a short sentence written on the blackboard—the spelling of the new and difficult words being pointed out, and the meaning of individual words and of the whole passage explained. The board is then turned over and the children are required to write the passage from memory. With practice the length of the passage may be increased, and finally the piece should be studied from the books and not from the blackboard. As the length of the passage is increased so textual accuracy should be less insisted upon, and thus the work may lead up on the one hand to free composition or paraphrase, although here we are dealing with it as an aid to spelling by teaching the children to observe and remember the forms of words.

(ii) *Preparation of Lists of Words.*

Children are often set to prepare lists of words, generally as homework. It is, however, a very questionable plan to set a child to study the dry bones of a set of words which are void of meaning to him. The objection is diminished if the meaning of each word is previously explained, while the best plan of all is to set for study a connected passage in which the context drives home the teacher's explanation of the meaning of the words. The difficulty of finding passages containing words whose spelling is related, and which it is desirable to teach at the same time, often makes it necessary, however, to resort to lists, in which case the teacher must make sure that the meanings are understood.

(iii) *Dictation.*

Few terms connected with the work in school are more frequently misused than the name "dictation lesson." Very frequently the dictation lesson is not a lesson at all, inasmuch as nothing is taught, and in a good lesson practically the whole of the teaching comes in the preparation and not in the actual dictation. Strictly speaking, dictation should serve as a *test* and not as a *lesson.*

The dictation test forms a valuable part of a general examination in the school, but like the other parts of an examination its value is diminished by too frequent use. We shall apply the term dictation lesson to a spelling lesson given in connection with a passage which is dictated during the lesson. Such a lesson should consist of three parts :—(a) Preparation, (b) Actual Dictation, (c) Correction.

(a) *Preparation.*—Various plans may be adopted in this stage—the teacher may put on the blackboard all the words he thinks likely to present any difficulty, or he may distribute the reading books and direct the class to study the passage, in which case he should call special attention to the difficult words, and by comparing them with words previously learnt should help the pupils to remember them. The blackboard is perhaps more useful with the junior classes and the reading books with the senior classes. With the senior classes it is advisable to set considerably more to be prepared than time will allow to be dictated; a whole page may be set for preparation, and five or six lines selected by the teacher may be considered a sufficient test of the way in which the work has been prepared.

(b) *Actual Dictation.*—In dictating a test passage it is absolutely essential that it should be read straight through first so that the general meaning may be grasped. Even the most experienced scholar will

often need the context to enable him to decide which of two words or phrases he should write, e.g. *the boy's father*, or *the boys' father*. Care should be taken to divide the passage into intelligible phrases, and young teachers are advised to mark off the passage into phrases before beginning to dictate it. Each phrase should be given out but once, unless it has been obscured by such an accident as a sudden noise outside the room, or an unavoidable cough. The practice of repeating a phrase an indefinite number of times has a bad effect upon the discipline by removing the necessity for attention.

(c) *Correction.*—The ideal method of correcting dictation exercises is for each pupil to mark his own either by comparison with the book or from the teacher's oral spelling of the words. This is open to two objections, (i) the same mental process which made the child observe the word incorrectly in the first place will prevent him from seeing the error afterwards; (ii) few children can be relied upon to exercise impartiality in marking their own work. Sometimes this is due to deliberate dishonesty, and in such cases it is well to keep temptation from the children's way. In other cases children with quite honest intentions are more indulgent towards their own errors than they would be towards those of their neighbours. They will pass a word plainly misspelt, telling their consciences that they *meant* to put other letters. Where this method can be carried out it forms a good moral training for the boys.

The next best method is for the teacher to mark each boy's work. This in any case demands a large amount of time and is quite impracticable with a large class. Where it is practicable it impresses the pupils with the importance of doing the work well as it comes under the teacher's careful scrutiny; the

teacher also becomes more impressed with the weaknesses of individual boys in spelling. The teacher may sometimes delegate the marking to a monitor or pupil-teacher, but even if the teacher succeeds in persuading the monitor that the office is a reward for good work, the correction presses unduly upon the monitor and may even result in a disastrous confusion of his own spelling.

The usual plan is the mutual arrangement. The books are changed and each boy marks another one's book. This method may tempt boys to mark dishonestly—either passing over mistakes made by friends or in return for similar treatment of their own, or by captiousness towards those with whom they are not friendly. Children, also, have not the same confidence in each other's marking as they have in that of their teacher. The teacher should vary the method of exchanging books, sometimes having them passed to the right, sometimes to the left, and at other times towards the front. He should also mark one of the books himself, choosing it either promiscuously, or from a pupil whom he has noted as diligent (or the reverse) in the preparation, in which case the moral effect of stating the reason for his selection is a salutary one.

Whichever method of correction is adopted the teacher is always responsible for the exercise of diligent supervision.

There will generally be errors in a few words, which should be written out correctly three or more times and again tested. If the number is large the teacher must consider that his lesson is a failure on account of insufficient preparation.

The passages for dictation even in the upper classes should not always be taken from the reading book. A pleasing variety may be introduced in the form of

sentences prepared or collected by the teacher to illustrate some particular point, *e. g.* words pronounced alike but spelt differently. In dealing with these the characteristic words only need be written on the board, and it is advisable to associate each form with its meaning and dissociate it from its order in the sentence. Thus if the teacher wished to illustrate the homonyms, *pear*, *pare*, and *pair*, he might take the sentence—"Did you ever *pare* an apple or a *pear* with a *pair* of scissors?" But if he adopts a constant plan of explaining the words in the order in which they stand in the sentence he is about to dictate, some of the children will write the correct form in each case not because they have troubled to associate a different meaning with each form, but simply because the words came in the order *pare*, *pear*, and *pair* on the blackboard. Some of Hood's verses supply and suggest capital exercises of this kind.

(iv) *Spelling Bees.*

Some years ago public spelling competitions, under the name of "Spelling Bees" had a considerable vogue. It is a good thing to have such a competition in class occasionally, but it is desirable to limit the words asked to those that have been previously set for preparation. A "bee" once a month on the spellings learned during the month does a great deal to keep up the interest in the subject.

(v) *Word Building.*

Systematic attempts to teach spelling are now often referred to as "Word-building." It is usual to build up words either in accordance with their *form* or with their *meaning*. The first of these lines on which word-building may be taught is therefore really phonic spelling. It proceeds sometimes by taking a simple combination and prefixing different consonants, *e.g.*, *at*, *b-at*, *c-at*, *f-at*, *h-at*, *m-at*, *p-at*, *r-at*, *s-at*, *t-at*, *v-at*; at other times it takes a

simple form and develops much more complicated ones from it by constant addition—

at, rat, grat, grat-i, grat-i-tude.

The plan does not, however, excite the children's attention very keenly, because some of the forms introduced have no meaning, and those that have are not related through their meaning, but simply through their form.

In the upper standards, when the children are studying not only inflexions, but also prefixes and suffixes, the systematic teaching of spelling becomes more interesting because it makes more appeal to the intelligence. The number of c's in "accommodate" and "recommend" respectively, is easily remembered through a knowledge of prefixes, but proves a fruitful source of error without. A knowledge of prefixes would often save people from mistakes in such words as "withhold, misspelt, misshapen, immediate, addition."

It is impossible here to give details which shall be applicable to every class—in fact, children vary so much in their powers of grappling with the intricacies of English spelling that each teacher should work out a scheme for his own class. In doing this he should keep a book in which to enter the words which his pupils find difficult or which they misspell. These should not be entered promiscuously, but in classes, either directly or from a sort of day-book.

(vi) *Record of Words Misspelt.*

(vii) *Classification of Difficulties.* The following is suggested as a suitable classification, but it need not be rigidly followed, and may be amplified.

1. Difficulties arising from addition of inflexions and suffixes.

(*a*) Double consonant required after *short, accented*

vowel before adding -ed or -ing, *e.g. referred, forgetting, beginning,* contrast with *appeared, cheating, opening.*

(*b*) Omission of final -e of root word before an inflexion or suffix beginning with a vowel, *e.g., compar(e)ing, compar(e)able, compar(e)ison.* Add to these cases in which it is also dropped before a consonant, as—

aw(e)ful, whol(e)ly, tru(e)th, judg(e)ment.[1] Here teach by contrast words in which it is not dropped, and explain the reason ;

e.g., changeable, singeing, dyeing.

(*c*) Alteration of final y, preceded by a consonant, *e.g.*, in plurals, comparatives, &c.—*ladies, mercies, holier, steadier, said, paid, dried* ; but contrast,

boys, days, delayed, annoyed.

2. Words with silent letters : *g*nat, *k*night, colum*n*, tho*ugh*.

3. Words from which letters are often omitted : descend, temptation, possession, carriage.

4. Words in which letters are often inserted : light ning, sub traction, umb rella.

5. Words in which wrong vowels are used : gram*m*ar, doct*o*r, tail*o*r, d*i*vide.

6. Words in which wrong consonants are used : medicine, expense, cupboard.

7. Words in which the order of letters is reversed : height, violet, piece, deceive, seize, siege, niece.

8. Homonyms : see above.

9. Very irregular words : colonel, plague, ague, mnemonic.

[1] But see Dr. Murray's Dictionary.

In his note-book the teacher should reserve a column for remarks on the treatment of the words in teaching. This, of course, must vary with the class. For little children such a mnemonic as "A *piece* of *pie*," may be allowed to fix the spelling of "piece." If the pupils are learning French the spelling and pronunciation of *nièce* and *siège* will help with the spelling of the English words. Children often confuse "seize" and "siege" in spelling. They remember that the order is *ei* in one case and *ie* in the other,[1] but fail to distinguish.

[1] When asking the difference between two things teachers should never accept the answer that one means one thing and one another; *e.g.*, if in explaining the difference between *le livre* and *la livre*, the pupil says that "one" means "the book" and the other "the pound," he has no right to require his questioner to give the right value to "one." The questioner is justified in saying that "one" stands for "*la livre*," and calling the answer wrong.

CHAPTER IX

THE TEACHING OF LANGUAGES, INCLUDING GRAMMAR, COMPOSITION AND LITERATURE

Introductory.

THE study of language in schools stands quite apart from all other studies, inasmuch as it is concerned with the manner of expressing our thoughts rather than with the thoughts themselves. Hence, every consideration of the advantages to be derived from linguistic studies, as well as the methods to be employed in them, must be based upon those properties which are inherent in language itself. Now a knowledge of language is of use to enable us (i) to express our thoughts, and (ii) to take into our own minds the thoughts expressed by other people. Whatever other advantages are derived from the study of language—and they are many—can only accrue to those who recognise that the fundamental purpose of language is to be a vehicle for thoughts.

The above remarks apply to all languages, whether ancient or modern, foreign or vernacular, and we shall just mention the various reasons that are adduced for the study of language in some form or other, in order to show that they are all dependent upon the recognition of the fundamental property of language named above.

Objects.

(i) To enable us to express our thoughts correctly.

(ii) To train (*a*) the memory, (*b*) the judgment, (*c*) the æsthetic faculty, (*d*) the imagination.

(iii) To open the door for all the other studies.

(iv) To exercise the reasoning powers.

(v) To afford a mental discipline, by the consideration of the *words* apart from the *things* they symbolise.

(vi) To develop habits of exactness and precision.

The dependence in the case of (i) and (iii) is obvious. But language can be an effective instrument for training the mental powers only when it is regarded as a vehicle of thought. Even in the case of memory, although that faculty may seem to be trained by reciting declensions and conjugations without understanding them, yet this is only the mechanical memory which benefits, and this form of memory would be cultivated equally well by reciting mathematical formulæ which were not understood. If the memory is to gain any advantage at all it must be from the association of sound and sign with sense, whether by the observance of the true signification of inflexions in the study of accidence, or by realising the full meaning of passages of literature committed to memory.

The study of the relation between the thing and the word that denotes it affords valuable training for both the judgment and the æsthetic faculty; for unlike mathematical symbols which are either correct or incorrect representations, words admit of degree in their appropriateness to the things they represent, so that the judgment is not only exercised in choosing the right and rejecting the wrong, but in selecting from the numerous permissible terms the one that is most suitable; and further the study of language in its best forms supplies a standard by which to criticise.

The imagination is also largely dependent upon language, and that not merely for a means of setting forth the results obtained, but more particularly for suggestions which set it to work.

But the study of words necessitates practice in classification, and hence the mind is exercised in the two great logical processes of induction and deduction, and finally the study of the words apart from the things they symbolise, leads us to regard them as quasi-abstract in their nature, and it supplies the same kind of discipline for the minds of children as is furnished by the purely abstract sciences to the minds of those of riper years.

Having thus briefly demonstrated the supreme importance of language and its vast influences as a subject of instruction, we have next to consider *which* language, or languages, we shall teach in order to secure the greatest benefit for our pupils. Now all the reasons given above point to the absolute necessity that exists for each child acquiring what we may call a "good working knowledge of his mother tongue," that is a knowledge that will enable him to express his thoughts with accuracy and precision, and to derive pleasure from the perusal of the literature of his country. There are many reasons why a person should learn another language *besides his own*, but none for studying another language *instead of his own*. If circumstances will permit of the study of only one other language it is difficult to decide whether that one should be a modern foreign language or one of the dead languages—Latin and Greek. The principal reason for studying a modern foreign language is its practical utility. The knowledge of a foreign language is of enormous advantage to almost anybody, especially to those who travel or are engaged

Modern Languages *v.* Latin and Greek.

in commerce. The student must be able both (*a*) to express his thoughts in it, and also (*b*) to understand the thoughts of others, and this double requirement should be borne in mind from the very first lesson. In days long gone by when Latin was regarded as the means of communication between learned men of the different European nations, this language was studied from the above double point of view; but now it can hardly be pretended that a person who expresses his thoughts in Latin or Greek does so with the object of imparting information or affording pleasure to his fellow men, or if so it is only to a very limited number. Thus one very important reason for the study of a language is taken away. There still remains the second, viz. ;—to understand the thoughts which have been expressed in that language. There is, however, very little of either Latin or Greek which has not been well translated into English, and while we admit that to the scholar the pleasure is greater and the perception of the meaning more clear if the work is studied in the original than if it is read through a translation, yet the difference is so small as to be a negligible quantity if it were the only benefit derived from the large amount of labour necessary to arrive at the required state of proficiency, and it must be admitted that only a very small percentage of those who begin the study of Latin and Greek ever make so much progress that they derive more benefit from reading an original work than they would from reading a good translation. The proportion of the untranslated to the translated is much greater in the modern foreign languages than in the ancient, and the aggregate amount of pleasure derived from reading original modern works is undoubtedly greater than is the case with the ancient authors. In fact the

advocates of the importance of Latin and Greek as instruments of education admit that their superiority does not lie in this direction but in the mental gymnastics they afford.[1] And here no doubt they are right, but at the same time they practically abandon the claim of Latin and Greek to the essential character of languages.

The mental discipline afforded by a study of Latin and Greek is undoubtedly great. The very fact of taking exercise in any strange language has a strengthening influence on the mind more particularly when that language belongs to a group different from our own (*i.e.* synthetic instead of analytic). The very use of another language to express even a single thought is a beneficial change, just as a visit to the country is beneficial to the mind of a townsman, and a visit to town beneficial to the mind of a countryman. M. Michel Bréal well says:—"Le profit inestimable qui réside dans l'étude d'une langue morte, c'est qu'elle dépayse l'esprit et l'oblige à entrer dans une autre manière de penser et de parler."[2]

The dead languages must afford the best training for the memory, since their association with the environment of the pupil is more remote than is the case with modern languages, especially the vernacular, and their study makes a greater demand on the voluntary efforts to recall. And so also, as the subject-matter dealt with is more remote than that of most modern writings greater play is given to the imagination in picturing the scenes described in the former case; thus in picturing a battle fought by the Romans the pupil has not that assistance which is afforded to him when endeavouring

[1] See "Classical Teaching," by Rev. E. Lyttelton in *Teaching and Organisation.*

[2] *Quelques mots sur l'instruction publique* (p. 164).

to picture a modern battle by the recollection of uniforms, arms and armour which he has himself seen. The very struggle with the difficulties of construction in a Latin sentence is a training of the boy's perseverance and determination, and those who resist the temptation to use illicit assistance in their difficulties also come out of the struggle with their moral character strengthened.

The Teaching of English.

In our schools we have to deal with the English language under three principal aspects :—as Grammar, Composition and Literature; and although these seem at first sight widely distinct they have many points in common, including their main aim, viz. :— to enable our English pupils to obtain a mastery over their mother tongue.

English Grammar.

The time-honoured definition of grammar is that it is the "art of speaking and writing correctly." As, however, no more suitable definition can be found for composition, we must admit either that grammar and composition are one and the same thing, or that the definition is at fault. The fact is that grammar can hardly be regarded as an art, but rather as a science.

Composition, on the other hand, is certainly an art, and it bears just the same relation to the science of grammar, as the art of medicine does to the science of physiology or the art of surgery to the science of anatomy, or the art of photography to the sciences of optics and chemistry.

This view of the relation between grammar and composition should be of very material assistance to

the teacher, who will thus regard grammar as a study, the principal object of which is to acquire such knowledge as will enable us "to speak and write correctly." The old division of grammar into orthography, etymology, syntax and prosody is now seldom attended to; orthography or spelling is regarded as a thing apart, or taught in connection with reading, &c., while prosody, whether in its simpler or more advanced forms, is more commonly studied in connection with literature. Under the head of etymology, more time is devoted to derivation than was formerly the case, but the object is still the same, since a knowledge of the derivation of a word is a good general guide to its correct use, and the knowledge of the meaning of one word gained through a study of its separate parts is of great use in discovering the meaning of a similar word in which the prefix and suffix may be detached from the root-syllable.

Uses of Grammar.

(1) Although it may be urged that many people speak well and correctly who have never studied formal grammar, while mistakes are frequently made by those who have, still we are quite safe in asserting that the study of grammar does exert a powerful influence for good upon the correctness of one's speech, because *it furnishes a criterion in judging correctness of expression in ourselves and others.*

(2) *The mental discipline* which we referred to above as attendant on the study of languages depends largely on the study of their grammar, *i.e.* on the study of words apart from the things they represent. Unfortunately the importance of this aspect of grammar is too often neglected, and teachers allow a hopeless confusion to exist in the minds of their pupils between words and things.

(3) We have already stated that the study of derivation *enlarges the vocabulary*, and by increasing the store of words *it gives a readiness as well as a correctness* to the speech and writing.

(4) The study also *affords pleasure and interest* to the pupil (although not so much as it might in all cases), and not only opens the door to other subjects by making clearer the meaning of the statements in which the information about them is conveyed, but the study of the history of the words throws much light on the history of the people.

Difficulties in Teaching.

There are many difficulties inherent in this subject itself, and these are often greatly increased, and new difficulties are created, by faulty methods of teaching. We will consider these two classes together.

(a) *Irregularities.*

Language being a thing which has been evolved by the joint action of many people in many ages, it would be indeed remarkable if one of its chief features were not its irregularity. And not only do we find many departures from its general rules, but we find those departures most frequent in the parts of it which are in most common use. Irregular verbs in all languages are those in most frequent use, contracted words and sentences are more common in the spoken language than in the written, and many idioms and constructions pass for correct when spoken that present far greater difficulties to the grammarian than anything to be found in the higher forms of literature.

(b) *Confusion between Words and Things.*

One of the great difficulties in teaching grammar arises from the frequent confusion between words and things. We have already stated that the wrestling with this difficulty constitutes a valuable mental discipline, and although the difficulty is great, yet the effect of successfully grappling with it makes

it worth while for the teacher to devote considerable attention to it. The mistake of holding up a book and allowing the class to call the book itself a noun has frequently been pointed out, and is perhaps not often made now. But similar mistakes are of frequent occurrence. *Sex* is confused with *gender;* men are said to belong to the masculine gender, not as the result of a poor attempt at wit, but with all the seriousness a teacher is capable of. It is important to make clear to children that gender is a character of words only. Again, in parsing such a phrase as "This man's house," the word "man's" is often said to be in the Possessive Case, "*possessing* 'house.'" This again shows confusion between the man himself and the word "man," for the latter cannot possess the house.

Verbs are frequently confused with *actions*, not so much in the naming of the verb itself as in its relations. The distinction between transitive and intransitive verbs is often made to depend upon the effects produced by the action instead of on the governing power of the verb itself. The same confusion is shown in defining *tense*, which is commonly stated to depend upon the time *at which the action takes place*, instead of the time to which *the statement* refers. Hence children are at a loss to understand why "I *have written*" is not in the past tense. Of course it denotes an action which took place in past time; but we must call it present tense (perfect form), because the statement refers to the present time. In the sentence "I *shall have written* all my letters before five o'clock," we make a statement with reference to the future, and *therefore* the verb is in the future tense. We have in this case absolutely no guide as to the time at which the *action* of writing takes place. Some of

the letters may already have been finished, and I may, or may not, be writing one now.

In the parsing of adjectives the same kind of confusion is often met with. Adjectives are often said to "describe" nouns instead of qualifying them. The teacher must take pains to show that the latter term is applied to the relation between the adjective and the *noun*, while "to describe" indicates what is done to the *thing* it represents. For example in the phrase, "a long pen," we say that the adjective long describes the pen itself, but it does not describe the noun, the noun *pen* is not "long," it has only three letters.

(c) *Temptation to become Dogmatic.*

Grammar has been very fitly described as "the Euclid of the elementary school," and although we must admit that as a subject for training in *deductive* reasoning it is far inferior to Euclid, mainly on account of its irregularities, yet there is some compensation for this in the practice in *induction* that it affords. Unfortunately, instead of proceeding in this subject from first principles, the tendency is to rely on the authority of text-books and dogmatic statements made by the teacher. When this is the case the subject is quite useless as a means of training the reasoning powers. In the division of the subject which treats of derivation it is necessary to rely upon the authority of those who have searched out the old forms of the word and traced its history. But in such exercises as parsing and analysis children should be taught to deduce their results from a few fundamental principles which they have been made to understand. They should never be allowed to work on such catch phrases as "The verb 'to be' never stands alone." A teacher should always feel that if an examiner asked the class why they parsed a certain word as a verb, and they replied that the teacher had

told them to call it a verb, then his teaching of grammar has been a vain thing; but if the children have a clear conception of what a verb is, and can show that the word in question tallies with that conception, then the teaching has been on sound lines.

(d) *Transference of Function.*

A living language is subject to incessant changes, and the fact that a word may perform a function which was not its original one causes considerable difficulty in teaching. This is increased in the case of those words which have a derivative capable of performing the new function; *e. g.* "*Swift* sailed the bark." Children experience a difficulty here because (a) "swift," which was originally an adjective, is in this case an adverb, and (b) the proper adverbial form "swiftly" is not used.

Many conjunctions were originally prepositions, cf. "He went before sunrise," with "He went before the sun rose." So in the following sentence from Hood—

"So take a few promiscuous hints to warn you in advance *Of* how a little English girl will perhaps be served in France," the word "of" must be considered either a conjunction analogous to "before" in the preceding example, or as a preposition governing a noun sentence.

(e) *Ambiguity.*

Another difficulty that exists in the teaching of grammar springs from a weakness in the language itself. Whereas in geometry the same figure cannot be considered as a square and a triangle, it is sometimes possible in grammar to consider a word to be either a noun or a verb with equal propriety. Consider the word *blossoms* in the following passage.

"This is the state of man: to-day he puts forth the tender leaves of hopes; to-morrow *blossoms*." In any case we must supply the ellipses in order to complete the sense, and with equal justice we may take the

passage to mean "to-morrow he blossoms" or "to-morrow he puts forth blossoms." Yet from the former point of view we are obliged to consider "blossoms" as a *verb* and from the latter as a *noun*.

Scope in Teaching in the Lower Classes.

Grammatical definitions do not form a good test of a child's knowledge of the principles of grammar, as they may be learnt by rote without any exercise of the intelligence. On the other hand a discussion of principles is generally beyond the powers of school children, as it demands a readiness and exactitude of expression which can be expected only in those of riper years. Consequently exercises in parsing and analysis afford in general the best means of testing the knowledge which the children possess, as well as their power of applying it. But in spite of this we must avoid the common mistake of supposing that the teaching of parsing and analysis constitutes the whole of the teaching of grammar. Another common mistake is the neglect to utilise in other lessons—particularly those in which the information is acquired by reading—the power that analysis gives the pupil of grappling with the meaning of a sentence. Children are often under the impression that the only use of their knowledge of analysis is to enable them to work exercises in the grammar lesson. Many, who pick out the subjects of their sentences with success in the grammar lesson, are utterly unable to state "what the sentence is about" when called upon to do so after reading a simple sentence in history.

Order of the Teaching

Supposing that the knowledge of formal grammar is to be associated with the exercises in parsing and analysis which serve as a test of its acquisition and also as a basis for the teaching, the question next arises whether we should begin with parsing or with analysis. There is a great deal to be said on both sides. On the one hand it must be

admitted that young children acquire the names of things before they attempt to make statements about them, and what is true of the individual has undoubtedly been true of the race. There is consequently much to be said in favour of following this historical method. Dr. Abbott has sketched a very sound course in suggesting that the teacher and class should imagine that they are in the condition of primitive man without speech. They then feel the necessity of a *name* by which one can indicate a thing to the others. This enables them to appreciate the difference between the thing and its name—the thing was in existence before the name was given to it, and moreover the same thing is known to different people under different names. In the same way the child is made to feel the need of an inflexion to distinguish the name denoting one thing from that denoting a number. In the hands of an intelligent and resourceful teacher this method is bound to produce excellent results.

The objection raised against beginning with analysis is, that it violates the principle of proceeding from the simple to the complex. The objection, however, is more apparent than real (see page 72), for to the child who has not learned that a sentence consists of a number of words with different functions, a sentence is a *simple* thing, and it is only when he has made a study of the differences between its component parts that he recognises that it is complex. It is neither necessary nor possible to go far in analysis before taking up parsing ; for as soon as we have resolved a simple sentence into its component parts, we find ourselves dealing with "parts of speech."

The following scheme is based on analysis and

parsing combined, and we venture to trust it will be found as useful as any in giving a sound knowledge of the principles of grammar, and in offering at the same time a thorough mental training on account of the logical sequence of its various parts.

1. The analysis of a simple sentence into (*a*) Subject, and (*b*) Predicate.

2. Resolution of the subject into (*a*) Nominative, and (*b*) Enlargement.

3. Resolution of the predicate into (*a*) Finite Verb, (*b*) Completion, (*c*) Extensions.

4. The parts of speech (based on the knowledge of the functions of words in the simple sentence) in the following order—Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction (joining words).

5. The inflexions, based mainly on the relations between words as shown in the analysis.

6. Phrases, as substitutes for the different parts of speech.

7. Clauses, as substitutes for the Noun, Verb, and Adverb, Subordinative Conjunctions.

8. Principles of derivation. Previous work to be kept up by means of exercises in full analysis of sentences and parsing.

9. Enlargement of the vocabulary by exercises in (*a*) contraries, (*b*) related words—synonyms, (*c*) metaphors.

10. Punctuation and other details not included above, but which are of importance in teaching composition.

Hints on Teaching the above Scheme.

(1) Any one who carefully considers the definitions of subject and predicate cannot fail to see that these two must include everything in the sentence. Consequently it is useless to spend one year in teaching children to point out the subject of a sentence,

and then another in teaching them to point out the predicate. The two should be taught simultaneously —what is not subject is predicate. The future work consists in the sub-division of these two parts. Unfortunately many grammar books which start by setting out this fact are inconsistent enough in their subsequent chapters to speak of "Objects" and "Extensions" as though they were *not* parts of the predicate. They add another stumbling block by so restricting the meaning of the term "Predicate" as to make it synonymous with "finite verb."

(2) The next step consists in teaching the children to subdivide the subject. By taking a number of sentences children can be made to notice that there is always one word in the subject which is more closely related to the predicate than any other. *e.g.*

(*a*) The *light* of the ship *was* visible.

(*b*) The *lights* of the ship *were* visible.

This word is called the "nominative of the subject," because it is in a special sense the naming word.

We should like to call attention to the great looseness which prevails in stating the first law of Syntax. It should be—"The finite verb agrees with the nominative of its subject in number and person." It is often said that the verb agrees "with its subject," but this is not sufficiently exact, as in (*b*) there are two nouns of different number in the subject. Neither is it correct to say merely that it agrees "with its nominative," for in such a sentence as "It is I" there are two nominatives, one of the complement and another of the subject, and it is with the latter that the verb agrees.

(3) The subdivision of the Predicate is not so simple. The first point is the recognition of the finite verb. The general plan in teaching verbs is

to give a sort of provisional definition and let the pupils muddle along until the true idea begins to dawn on their minds. A satisfactory definition of a verb, one that shall include all its parts, is not easy to find. The generally accepted one, viz. :—"A verb is a word which shows what a thing does, what it suffers, or in what state it exists," is not true to itself, for if it were applied rigidly, we should have to parse as verbs the words in italic in the following sentences : "The boy does his *home lessons.*" "The girl suffers *pain,*" and "The parcel is *in an uninjured condition.*" We doubt whether it is possible to give a better definition of a verb than the one which is based upon the German name for a verb—Zeitwort—time-word. "A verb is a word which may be inflected to show the time to which it refers." This is applicable not only to the verb finite but to the infinitives as well.

Having shown the children how to pick out the verb, it is next necessary to explain the difference between (*a*) verbs of complete predication and (*b*) verbs of incomplete predication, *e.g.*

(*a*) It *rains*, I *sleep*, he *walks.*

(*b*) He *planted* a rosebush ; John *is* a painter ;

At first, the pupils will simply write the completion in its appointed column and make no further remarks. Afterwards they will be taught to indicate whether the completion is a "complement" or a "direct object," or an "indirect object," by writing after the completion (complement), (direct obj.) or (ind. obj.) as the case may be. Extensions present little or no difficulty, but the teacher must carefully insist on the fact that both completions and extensions are parts of the predicate.

Nouns. If the preceding sections of the subject have been

carefully taught, little difficulty will be experienced in teaching the parts of speech, and their classification. The following points sometimes cause a certain amount of trouble. The rule that nouns derived from proper nouns begin with a capital, often leads children to assume that such common nouns as "Englishman and American" are themselves proper nouns.

Abstract nouns are *not* to be defined as the names of things which cannot be seen; *greenness*, *whiteness* can be seen, yet the names of these colours are abstract nouns; so the nouns *air* and *hydrogen* are names of things which cannot be seen, yet they are common nouns.

Pronouns.

It is rather difficult to give a satisfactory definition of "Personal Pronouns," but as the number is limited this is not much felt. The use of the plural form "you" to denote one person requires a word of explanation. The children must be taught to distinguish a "Possessive Pronoun" from a "Personal Pronoun in the Possessive Case." The former stands for the thing possessed and the latter for the possessor; *e.g.* *your* writing is good but *mine* is better. The teacher must show that "mine" is in the third person, as proved by the verb that agrees with it. Relative Pronouns should be taught as pronouns which relate sentences together, and no reference should be made to agreement with an antecedent, as they do not differ from other pronouns in this respect; *e.g.* I saw a man and *he* was blind. The Pronoun "he" is in the third person, Singular Number, Masculine Gender, because it agrees with its antecedent "man." Sometimes, however, relative pronouns have no antecedent; *e.g.* Give me *what* I want. The assumption that a relative pro-

noun must have an antecedent leads those who make it to substitute "that which" for "what" in parsing such sentences. This is a serious error, for not only is it an unjustifiable proceeding to parse other words than those given, but the construction is altogether different in the two cases. Let us suppose that "the book" is "what I want," then the clause "what I want" is a Noun Clause, but if the substitution be made, an unnecessary demonstrative pronoun is introduced and the subordinate clause becomes an adjectival one.

Adjectives. Adjectives in attributive relation to their nouns are easily mastered, but children are apt to confuse adjectives which form part of the predicate with adverbs. This point requires a little care; but by contrasting two such sentences as—(*a*) "I painted the door *brown*," and (*b*) "I painted the door *quickly*," the children will understand that the last word of the first sentence describes the door, *i.e.* it qualifies the noun "door," and therefore is an adjective, while the last word of the second sentence shows the manner of painting, and hence is an adverb of manner modifying the verb "painted." Numerous examples should be used in teaching this difference, but of course it will not be brought before the children's notice until they have gained good general ideas of adverbs.

The Verb. We have already advised the teacher to base his definition of the verb on the German name for it—the "time-word."

We should strongly advise all teachers to omit the reference to conjugation of verbs in parsing. In no other case does parsing include a reference to accidence; it is surely inconsistent to parse verbs as regular and irregular or strong and weak, and not to

parse nouns as regular and irregular (*boy, boys*, but *phenomenon, phenomena*) or strong (*man, men; goose, geese*) and weak (*fox, foxes*). If, however, out of fear of examiners, teachers should decide to let their parsing scheme include conjugation, they should avoid the use of the terms "regular" and "irregular." The plain meaning of the word "regular" is "according to rule," and it is ridiculous to make it mean anything else in grammar; that being so it is evidently wrong to parse such verbs as *ring, sing*, as irregular, seeing that they form their past tense and past participle according to a rule, though not the same rule as *want*, and *love*. The large amount of inconsistency which has existed in the past makes it advisable to abandon altogether the use of the words "regular and irregular." On the other hand we think that children derive very little educational benefit from being taught to describe verbs as 'strong and weak." The classification according to conjugation is not true to itself—some verbs are in a transition state and are passing from the strong into the weak, or living, conjugation, or may be conjugated in both ways. In fact many grammarians after giving a definition of strong verbs, exclude from their lists certain verbs which are covered by the definition, but which were weak in the oldest forms of English. Now, as we have said before, the value of parsing lies in its ability to develop the power of making inferences, and not in requiring lists of verbs to be committed to memory from text-books.

We have already warned the reader of the danger of confusing verbs and actions in dealing with tense. The tenses of English verbs are very difficult to tabulate, but we venture to recommend the

recognition of only three tenses, but of five forms in each tense, *e.g.* —

Tense.	Form.				
	Indefinite.	Progressive.	Perfect.	Perfect Progressive.	Emphatic.
Present.	I write.	I am writing.	I have written.	I have been writing.	I do write.
Past.....	I wrote.	I was writing.	I had written.	I had been writing.	I did write.
Future.	I shall write.	I shall be writing.	I shall have written.	I shall have been writing.	*

* In the expression "*I will write,*" we must regard "*will*" as having a separate meaning (wish, desire), and hence must parse "*will*" and "write" as two separate verbs.

Beginners often find it hard to distinguish between a mere auxiliary verb and a principal verb that governs another in the infinitive. Teachers should endeavour to get their pupils to decide whether the verb in question has an independent meaning, *e.g.* I *can* write. Here "can" means I "am able"—a meaning which is independent of that of the other verb. This independence can be still further impressed on the children's minds by showing that we may introduce an adverb which modifies one verb without affecting the other; *e.g.* I can not write. Here "not" modifies "can" alone, and the sentence means "I *am not able* to write," the negative meaning pertains only to the first verb, the second retains its positive force; the sentence does not mean "I am able *not to write.*" But in the sentence "I can write legibly" the adverb modifies

the last verb—the legibility referring to the writing and not to the power.

It is a great pity that some teachers should make a point of using cross classification or double names such as "adverbial conjunction," "conjunctive adverb," and "prepositional verb." If such names occur in the text-book the teacher should point out their inconsistency. Why should "where" in the sentence "He stood *where* the fight was raging most fiercely" be called an adverbial conjunction? There is nothing adverbial about the word itself as it does not show "place"—the whole subordinate sentence does that—but simply joins the subordinate sentence to its principal one. It might be put forward as a reason that it joins an *adverbial* sentence to its principal; but then a similar argument would make us call the word an "adjectival conjunction" in the sentence "He stood in the place *where* the fight was thickest," and call "that" a "noun conjunction" in the sentence "He said *that* he was ready," which is absurd.

The English idiom allows the word governed by a preposition after a verb in the active voice to be used as the subject of the same verb in the passive voice, while the preposition remains in the sentence but changes its nature and becomes an adverb; *e.g.* (*a*) They laughed *at* him. (*b*) He was laughed *at*. Some grammarians assume that because in such idioms the verb (usually considered as intransitive) is used in the passive voice that therefore the preposition (or adverb) forms a part of the verb, and so they have invented the name "Prepositional Verbs" for verbs of this class. The same test, however, applies to many other examples: *e.g.*

(*a*) The inhabitants of the village made frequent use of the footpath.

(*b*) The footpath *was made frequent use of* by the inhabitants of the village.

To be consistent we should have to adopt the term Adjectival-Noun-Prepositional-Verb in parsing sentence (*b*), which again is absurd.

Phrases. In teaching analysis no difficulty is experienced in showing that a phrase may be substituted for a single word. It is very desirable, however, to adopt a consistent plan of nomenclature, and nothing can be simpler than to name a phrase after the word of which it takes the place; thus a phrase taking the place (*a*) of an adverb is an adverbial phrase, (*b*) of an adjective an adjectival phrase, and (*c*) of a preposition a prepositional phrase.

(*a*) He ran *very rapidly.*
(*a*) He ran *with rapid strides.*
(*b*) He felt *a never to be forgotten* sensation.
(*b*) He saw a ship *laden with coal.*
(*b*) He saw a ship *with a cargo of coal.*
(*c*) He went *in the place of* his brother.
(*c*) His room is *immediately over* mine.

This system is simple enough, but yet some teachers prefer to follow text-books which inconsistently name some phrases after the words they are substituted for, and others after the words they contain. So that they would call not only the phrases in the last two sentences Prepositional Phrases, but also those in the second, fifth, and perhaps also the fourth. Now unless the teaching of grammar is logical children will derive very little intellectual benefit from it, and unless we name phrases in accordance with their function we might just as well call "with rapid strides" a "noun phrase" as a "prepositional phrase," seeing that it contains a noun as well as a preposition.

Sub-ordinate Clauses. These are most effectively taught by the method

of substitution. The teacher should take a simple sentence and show how clauses (or sentences) may be substituted for the nouns, adjectives and adverbs in them : *e.g.*

(*a*) The trembling slave at once confessed the truth.

(*b*) The slave, *who trembled,* at once confessed the truth.

(*c*) The trembling slave, *before he did anything else,* confessed the truth.

(*d*) The trembling slave at once confessed *that he had stolen the gold.*

These exercises in substitutions are of great value in teaching composition.

The only other difficulty in the analysis of complex sentences is the method of showing the relation of subordinate clauses. One column is sufficient for "Kind and Relation," and since a noun clause takes the place of a noun, we must always say that a noun clause is (*a*) subject, (*b*) object, or (*c*) complement of a verb.

(*a*) It added to our enjoyment *that the weather was bright.* (*Subject in app. with "it."*)

(*b*) He told me *that the weather was bright.* (*Object of "told."*)

(*c*) The fact is *that the weather was bright.* (*Complement of "is."*)

So also the relation of adjectival and adverbial sentences are the same as the relation of the words in place of which they stand, and if the children have been taught by the method of substitution as recommended above they will easily recognise the relation of subordinate clauses. The subordination of sentences often extends to three or four degrees, *i.e.* clauses are subordinate to others which are subordinate themselves, and so on. It is advisable for

the teacher to adopt a system of numbering which shall take this into account, *e.g.* Roman numerals for principal sentences, capital letters for sentences subordinate to principal ones, small letters for sentences subordinate to these; and should occasion require these might be followed by Arabic numerals and small Roman numerals. The analysis on the following page of the following passage is given as a guide :—

"I have often wondered with what words the men who accused Socrates could have persuaded the Athenians that he was worthy of death."

By teaching the children on this system we enable them to show what is not generally made clear, *viz.* that (*a*) and (*b*) are parts of (A), and that the whole of (A) forms the object of the principal sentence.

It should be noticed that connecting words do not really form part of either of the two sentences which they join, and hence had better be bracketed off. It is not advisable to provide a special column for them.

In learning analysis children have an opportunity of acquiring habits of neatness and of exercising their foresight, since sentences vary greatly in the proportions between their several parts. Children should therefore be required to make a preliminary mental analysis before ruling their paper so as to avoid the preparation of wide columns for parts which are wholly or nearly absent in their particular exercise, and so that the more lengthy parts may have "ample room and verge enough." The due relation between the spaces and their contents may well be a subject for praise or blame when the exercises are presented for marking.

Derivation. We have already spoken of the value of instruction in the elements of philology. In the hands of a

teacher who is fond of the subject it is full of interest, and dealing largely with matter of fact there is little

No.	Sentence.	Kind and Relation.	Subject.		Predicate.		
			Nominative.	Enlargement.	Finite Verb.	Completion.	Extension.
I	I have often wondered (A)	Principal	I		have wondered	(A) (dir. obj.)	often (time)
A	With what words the men (*a*) could have persuaded the Athenians (*b*)	Noun. Object of "have wondered"	Men	the (*a*)	could	have persuaded the Athenians (*b*) (dir. obj.)	with what words (instr.)
a	Who accused Socrates	Adjectival qual. "men"	Who		accused	Socrates (dir. obj.)	
b	[that] he was worthy of death	Noun. Obj. of "persuaded"	he		was	worthy of death (complement)	

need to enlarge upon the methods of teaching. The chief danger arises from assuming that the children

know a good deal about the languages from which modern English words are derived. The teacher cannot do better than follow the order of the grammar book and take English, Latin and Greek prefixes and suffixes separately, but after this it is advisable to treat them comparatively, *i.e.* take the same form and show its different uses according to its origin; *e.g.* compare Eng. *a* in a-shore, with Lat. *a* in avert, and Gr. *a* in atheism.

In taking Latin roots with children who know no Latin, care should be taken that they do not give the English infinitive as the equivalent of the Lat. First Person, Sing. Pres. Ind. Thus *amo* does not mean *to love*, but *I love*. Again it is usual in lists of Latin verbal roots to give the present and the supine, *scribo*, *scriptum*. The teacher should point out that as a rule our English verbs come from the present and our adjectives and nouns from the supine; *e.g. inscribe*, *subscribe*, but *inscription*, *subscription*.

Study of Language from the Reading Books.

When a certain amount of progress has been made in this part of the subject the reading books should be called into use during a part of the grammar lesson so that the children may study the structure of words in relation to their use. A great deal may be done to enlarge the vocabulary of the children in this way. They should be asked to give not only the parts of the words they come across and derivatives of these words, but their knowledge of the meaning will be intensified by calling upon them for words having the opposite meaning, and for synonyms, in which case the shade of difference in meaning or use which generally exists should be noticed. The teacher who studies the language with his class in this way will realise what a fascinating subject it is, and will understand our object in recom-

mending that it should be confined to the grammar lesson or allowed to intrude into the reading lesson only so far as it may be necessary in order to enable the children to grasp the full meaning of the passage read. The object of the reading lesson is to teach reading.

Composition.

"The art of writing English is, I should say, the art of speaking English, and speech may be used for any one of three purposes: to conceal thought, as the French diplomatist defined its use; to conceal the want of thought, as the majority of popular writers and orators seem nowadays to employ it; or, again, to express thought, which would seem to have been the original destination of the gift of language."[1]

We earnestly commend the lecture from which the above extract is taken to the careful perusal of all teachers of composition.

We have defined composition as the art of speaking and writing correctly; or since language is the vehicle of thought, we might say that composition is the art of correctly expressing our thoughts. This definition suggests the two classes of difficulties which are found to exist in the practical teaching of the subject to children:—(*a*) deficiency in power of thought, and (*b*) deficiency in power of setting out the thoughts that are present. Difficulties.

The remedy of the first should be the object of all branches of teaching, and it chiefly concerns the teacher of composition in making his choice of subject matter:—he must not set his pupils to produce composition exercises on unfamiliar subjects. They cannot produce their tale of bricks without straw.

[1] Kingsley's "Lecture on English Composition," given at Queen's College, London, 1848.

But given a supply of straw and other requisites, it is not every one who can turn them into bricks of any kind, still less ornamental bricks.

Many teachers and others who from long practice are able to set down their thoughts without difficulty, seem to imagine that if a child knows a subject he must of necessity experience no trouble in writing about it. This wrong impression is often confirmed by the practice of limiting composition exercises to the reproduction of subject matter that has been communicated verbally to the pupils. In this case the teacher is unable to discriminate between that part of the result which is directly due to the help supplied and that which results from the pupil's own intellectual efforts :—not only are many words and phrases directly supplied by the text (and we find no fault with the pupil's use of them if they are the best means of expressing thoughts which he has made his own) but others are suggested by the words of the text. Moreover, whether an analysis of the model passage be made or not, the model saves the pupil the trouble of arranging his thoughts, and the pupil receives very little training in this most important side of the subject. The teacher who has restricted his composition exercises to the reproduction of thoughts acquired by the pupil *through words*, will soon be convinced of the error of his ways if he will set a chair or some other familiar object before his pupils and require them to describe it, or to describe in detail the way a boy spins his top or ties his neck-tie in a sailor's knot. The vast influence of words upon the expression of thoughts which they have been even partly instrumental in forming is shown in the description of experiments worked by the boys themselves. Thus boys often carry out a series of experiments from directions which correctly enough make

use of the imperative mood, but if after such a lesson (say on hydrogen) they are asked to write a description of the work they themselves have done, it is a matter of extreme difficulty to prevent them from falling into the imperative and so commanding the teacher (or whoever corrects the exercise) to "fit a Woulff's bottle with a thistle funnel and delivery tube, &c."

Another difficulty in teaching composition arises from the fact that correction of the exercises and explanation necessitated by errors made in them demands close individual attention. The work of no two boys will be the same; or if it is, it is the result of a common, or a mutual, inspiration. It is therefore practically impossible to teach composition effectively to a large class.

Scheme for Teaching.

Owing to the intimate relation between grammar and composition it is desirable to teach them concurrently, and we recommend the following scheme for teaching composition as a companion to the scheme for teaching grammar.

1. Observation of the structure of the simple sentence :—its division into (*a*) subject and (*b*) predicate. Exercises on supplying an appropriate predicate to a given subject, and *vice versa*, the former being more important.

2. Exercises on supplying appropriate adjectives.

3. Exercises on extensions.

4. Substitution of phrases for words, and *vice versa*.

5. Variation and expansion of phrases.

6. Exercises on finding (*a*) synonyms, (*b*) contraries.

7. Substitution of clauses for words.

8. Study of the relation between clauses such as (*a*) temporal, (*b*) causal, (*c*) adversative.

9. Conversion from direct to oblique narration, and *vice versa*.

10. Descriptions—order and arrangement. Sentences and paragraphs. Punctuation.

11. Idiomatic phrases and idiomatic uses of words.

12. Systematic study of figures and ornament.

Hints on its Teaching.

The following hints will perhaps make the above outline scheme more clear and serve as a guide in teaching. Systematic instruction in composition should begin in the lower classes. If it is left till the children reach the upper part of the school good results will be obtained only in the case of those children who have acquired a fairly correct manner of speaking through their home surroundings, while those who are most in need of the teaching will hardly be affected by it, even supposing that they have remained in school long enough to reach the upper classes.

1. By studying simple sentences the children are made to recognise that each must contain (i) a subject, or name of the thing spoken about, (ii) a predicate, that which is asserted of the subject. They are then called upon to give a subject. Different children will suggest different "things to talk about," *e.g.* (*a*) the cow, (*b*) the apple-tree, (*c*) the school, (*d*) England ; and as each one is elicited, either the child who has suggested it, or another, should be asked what he would like to say about it.

(*a*) The cow gives us milk.
(*b*) The apple-tree stands in the garden.
(*c*) The school opens at nine o'clock.
(*d*) England has a large navy.

Occasionally predicates may be given and appropriate subjects may be asked for, but less benefit is derived than from the converse exercise.

2. The second step leads the child to think more closely of the subject of his statement, and to form a more exact perception, so that the choice of a suitable epithet may be regarded both as a cause and a result of an exact way of thinking. The statements made by uneducated people are generally very much at fault in this respect, and adjectives are used which do not apply. Very frequently the uneducated well-to-do describe everything as "awful" or "chronic,' and the lowest classes use other adjectives not out of profanity but from precisely the same cause, viz.:— a neglect of training in the use of suitable adjectives. The teacher should show an object, or refer to some well-known one, and exercise the children in the most suitable words to describe it. At other times a passage may be read and the applicability of the adjectives discussed with the children.

3. A similar method should be adopted in dealing with the extensions.

4. 5. These two sections have a wonderful effect in widening the children's vocabulary, and at the same time producing readiness of expression. The practice of making these substitutions will prevent the children from falling into a monotonous style, the result of always forming their sentences and phrases on the same plan.

6. The teaching in this section is intended as a safeguard to the advanced part of the previous section. Children have very little difficulty in substituting a phrase for an equivalent word, but they must be warned that it is seldom possible to find one single word with exactly the same meaning as another. Hence careful attention is needed to the different shades of meaning and different uses of words that are generally described as synonyms. The meaning of a word is made much more clear if it

is contrasted with a word having the contrary meaning, *e.g. deep* with *shallow*, *tall* with *short*.

7. In studying the grammar of subordinate clauses the best method is to substitute clauses for words in a given simple sentence. Reading books may be used and a converse substitution made.

8. Exercises should be given in joining together sentences so as to show the desired relation. This is a useful plan and impresses strongly upon the children the fact that the connecting words are really conjunctions and not adverbs. We might give two such sentences as "I did my home lessons" and "I went out to play," and require the class to take the latter as the principal sentence and use the other to indicate the time; *e.g.*, "I went out to play *before* I did my home lessons;" or take the former as principal, "I did my home lessons *before* I went to play." Again we might set one as the cause of the other—"I went out to play *because* I did my home lessons." We might have put the two sentences in copulative relation. "I did my home lessons *and* went out to play;" or if one sentence were negative and the other positive we should put them in adversitive relation: "I did my home lessons *but* did not go out to play."

9. Very careful teaching is required in order to make children report a speech in the indirect manner. In Latin grammar this is often arrived at through the mechanical application of a set of rules. A child in relating what some one has said naturally endeavours to reproduce the actual words. The method of indirect reporting must be carefully taught by example, taking first of all statements of facts, varying the person, the best order being *third*, *second*, *first*. The first person is the most difficult owing to the change to the third in indirect report. The

next step is to deal with indirect questions; this does not present much difficulty after the first has been dealt with, but it is desirable to combat the tendency to use "if" instead of "whether" in indirect questions. "If" should be used in conditional sentences, and implies that if the condition is not fulfilled the opposite of the principal statement is the case; *e.g.* "If I find the book I will lend it you." This implies that I will *not* lend it if I do not find it. But we should say "He asked me *whether* I had found the book," not "*if* I had found it," as the latter implies that if I had not found the book, he did not ask me.

Indirect commands require still more care. The inverse change may be made, and the children set to write out the actual words employed by a speaker whose remarks are indirectly reported.

10. Although our direct instruction hitherto has been based upon isolated sentences, it must not be supposed that we recommend the withholding of connected prose until this point. Simple descriptions may be required at a very early stage, and in connection with them attention must be paid to the train of thought. The pupil should be taught to view the subject as a whole and then analyse it, and treat each section exhaustively before proceeding to the next. On this plan the teacher is able to give plain instructions on the subject of arrangement into sentences and paragraphs, each sentence being a complete statement about a certain subject, but a fresh paragraph should be used to introduce a new subject.

11. Idioms may be dealt with as they occur, and with the elder pupils it is advisable to use the reading books as the basis of lessons on the idiomatic uses of words. The teacher should carefully go through the passage before the lesson and think out the different

uses of words that occur in it. Under this head attention must be paid to such matters as :—

(*a*) The proper preposition to use after a compound word, *e.g.* different *from*, conformably *with*.

(*b*) The difference in meaning resulting from the use of different prepositions ; *e.g.* He is tired *of* rowing ; he is tired *with* rowing.

(*c*) The different meanings a given form will bear. These should be illustrated by context ; *e.g.*

(*a*) The hoop is *round*.
(*b*) Let us sing a *round*.
(*c*) We will buy a *round* of beef.
(*d*) The soldiers fired ten *rounds* of blank cartridge.
(*e*) The sentry walks his lonely *rounds*.
(*f*) He stood on the lowest *round* of the ladder.
(*g*) Hand the biscuits *round*.
(*h*) Drake sailed *round* the world.

12. As a rule the teacher should think himself fortunate if he can secure a clear, plain prose style of composition from school children. In any case that should always be secured before any attempt is made at ornament. In teaching ornament in composition it is desirable to set the children to study the ornaments in the writing of others before they attempt to introduce them into their own. Generally speaking, children should write as they would talk, and the figures of speech knowingly introduced into a child's speech are very few. They frequently endeavour to make their meaning clearer by a *simile*, and the circumstances under which this figure may be introduced into their composition should be pointed out. With regard to the *metaphor*, it is very difficult to say in many cases where the literal use of a word ends and its metaphorical use begins.

Thus "to arrive" means literally "to come to the bank or shore;" but we should hardly say now that its application to the end of a land journey was metaphorical. The literal element is less strong in the terms "*leaf* of paper," the "*head* of the class," and in many other expressions that children habitually employ. We think the best plan is to allow all such expressions, but to check any efforts to search for metaphors, as these attempts generally lead to an artificial style. Children may be exercised in converting the similes in a given passage into metaphors, and *vice versa*; this practice will be very beneficial as it increases the literary apparatus at the child's disposal. An occasional lesson on the simpler figures of speech found in the reading books will be very profitable, but it is a great mistake to try and force children into figurative expression at too early an age.

13. An occasional lesson in letter-writing should be given in all classes above Standard II, in order to familiarise the children with the forms that should be observed. In the lower classes these exercises might be restricted to letters to parents and teachers, but in the upper classes should embrace various kinds of commercial correspondence.

14. Another very useful exercise in composition in the upper classes is *précis* writing and note-taking, the object being to condense the subject matter into as small a space as possible consistent with clearness. Children might try to find the cheapest form in which to telegraph the substance of a paragraph. It is a good plan to preserve the *précis* or notes, and require the children to expand them after an interval of a week or two.

Among the most commonly occurring faults which the teacher will find in the work are:— **Faults.**

(i) *Incorrect use of Pronouns.*—Children should

be told never to use a pronoun if there is likely to be the least doubt as to what it stands for.

(ii) *Unwarranted change of Tense.*—Children's thoughts travel far more rapidly than their pens, and they are apt to forget the tense used in one sentence by the time they reach the next.

(iii) *Stiffness.*—This is generally to be found in the work of children who have been taught to write single sentences correctly, but have not been taught how to throw them into their proper relation. The teacher should point out that all the statements are not of equal importance, and that smoothness is gained by converting one sentence into an adjectival sentence and another into an adverbial one, &c.

(iv) *Excess or deficiency of Connectives.*—Deficiency in the use of connectives generally leads to stiffness spoken of above; but children are prone to use connectives in excess—sentences are made to begin with unnecessary conjunctions, and conjunctions are used in front of relative pronouns which would themselves suffice to join the sentences.

(v) *Tautology.*—This fault generally springs from the keen memory of children, who remember and recall the smallest details of an incident and frequently repeat their mental picture of them.

(vi) *Disorder.*—The same cause probably leads to disorder in children's composition. To their vivid memory and imagination so many details are present at the same time that they are unable to make an ordered selection of them; a feature of one image forces itself into the description of another so as to produce many parallels to the advertisement of the "dining-room table for sale, the property of a lady going abroad with mahogany legs."

(vii) *Incorrect use of Long Words.*—Children are often tempted to show their learning by introducing

long words. This proceeding is always dangerous if the meaning of the word is not accurately known. The fault is by no means confined to children—Mrs. Malaprop was no child, neither are those journalists who write that "the regiment was nearly *decimated*" to describe a loss of about seventy-five per cent.; but it is particularly common among children owing to their limited vocabulary and their laudable desire to increase their stock of words.

Paraphrasing.

The value of paraphrasing in teaching composition has, we think, been greatly overestimated. It is not necessary to set a pupil to paraphrase the whole of a passage in order to ascertain whether he has mastered the meaning of it as a whole, and the exact force of its several parts. The pupil naturally thinks that to prove his knowledge of the meaning of the piece he must find a totally different set of words to express the same thoughts. Now the life work of the poet is to clothe noble thoughts in the best possible language, and in the case of many familiar passages the thoughts and the words are so closely associated that it seems almost a desecration to attempt to set the same thoughts to other words. Certainly paraphrasing forms a most unsatisfactory examination test, as it is most unreasonable to expect a student in the pressure of an examination to make changes in the expressions that the poet has spent perhaps months of leisure time in bringing to perfection. Such changes can be only for the worse. The best way of testing a pupil's grasp of a passage is to set him to give a very free rendering of the whole—so free that it can hardly be called a paraphrase—together with *explanatory notes* on the difficulties.

Poetry.

It is much to be regretted that in our schools poetry should be so treated as to be regarded by the pupils as a storehouse of difficulties from which to

draw exercises to cause trouble and annoyance in the grammar lessons.

Objects.

It is a far better plan to use conversational sentences as examples for parsing and analysis, and keep poetry for the admiration of the pupils. When poetry is wisely taught it provides valuable material for training (*a*) the imagination, (*b*) the memory, and (*c*) the æsthetic faculty. Unfortunately teachers seldom invite the pupils to search for the elements of beauty in a poem, hence children of both sexes, and particularly boys, come to regard poetry as an intolerable "bore" in their school days, and in far too many cases this repugnance is never overcome in after life.

Treatment of a Poem.

We suggest the following as the steps by which the study of a poem may best be conducted, and will take Byron's "Sennacherib" as an illustration.

1. The poem to be read carefully through two or three times; children should then, with the teacher's help, analyse the subject matter. In this case we find three beautiful word pictures.

(*a*) The splendid Assyrian host making the attack.

(*b*) The stricken host on the morrow.

(*c*) The desolation in the Assyrian homes.

As a test of the comprehension of the subject matter the children may write prose descriptions of these three scenes; this is a much better composition exercise than paraphrasing would be.

2. *Memory work.* As soon as the general meaning of the poem has been grasped, portions, or the whole, of it should be committed to memory. The total amount to be learnt, as well as the amount set each time, must be left to the discretion of the teacher, who will take into account (*a*) the age of the children; (*b*) the time at their disposal; (*c*) whether the whole poem is too long or not. In this

case the whole should be learnt by suitable instalments.

3. *Prosody.*—Without troubling young children with technical terms, the teacher should call attention to (*a*) the number of lines in each stanza.

(*b*) „ „ „ feet „ „ line.

(*c*) „ „ and arrangement of the syllables in each foot.

Exceptional feet should be pointed out and the children made to realise the strength and emphasis gained by the variation. Compare with the usual ⏑ ⏑ — the first foot in the second and fourth lines of the second stanza "That host." Show how the word "there" (second word in stanzas 4 and 5) becomes emphatic by the alteration, and how much more descriptive the word "cold" becomes through a similar change.

4. *Diction.*—Point out the use of elevated terms instead of the trivial words that would be used in prose—*sheen, strown, blast, waxed, steed, breath of his pride, rock-beating surf, unsmote*, and also the form *broke*, which would be considered incorrect in prose.

5. *Figures.*—The teacher should then call attention to the figures and show their appropriateness.

(*a*) The beautiful similes :—*like the wolf on the fold ; like stars . . . . Galilee* (why is Galilee selected in this poem ?) ; *like the leaves . . . green ; cold as the spray . . . surf.*

(*b*) Metaphors, *wings, breathed in the face of the foe.*

(*c*) The grand contrast between one picture and another, especially marked between the first two and the last two lines of verse two.

(*d*) The suggested relation between the wailing of the widows and the destruction of the host. It is not difficult to get children to see how much more beautiful it is to leave something for the imagination

to fill in than to describe the relation in detail or attempt a logical proof. Similar instances may be given; the children will remember the verse in "Lucy Gray"—

> They followed from the snowy bank
> Those footmarks, one by one,
> Into the middle of the plank;
> And further there were none.

The children cannot fail to see how far exceeding a prose account in beauty is the description of the parents tracing the poor little girl's footprints as far as the middle of the plank bridge, when the mind is led to infer the reason that they went no further.

(*e*) The allusions can now be studied; in this case the Biblical account should be read. A short account of the author should be given, and if any facts of his life bear on the poem the relation should be carefully pointed out.

(*f*) Lastly, the poem may be associated with formal grammar. But instead of using the poem to support the contentions of grammarians, let us employ the rules of grammar to elucidate the poem. The poem must be the mistress, not the handmaid, of grammar.

Old English.

We would particularly like to recommend the study of Early English in schools. In elementary schools the pressure of other subjects will not allow of much time being devoted to it, but the children might well be allowed the opportunity of making the acquaintance of Chaucer's Prologue. In secondary schools the subject may well be carried further. The study of the earlier forms of the language throws a light on many points in modern English which are generally misunderstood by those whose ideas of grammatical constructions are drawn exclusively from Latin and Greek.

Modern Languages.

Languages are chiefly studied for utilitarian reasons (see p. 129), and although this is hardly true now of the dead languages, it was true formerly in the days when men saw in Latin a means of universal communication. We have seen that in those days men learnt Latin to enable them to convey their thoughts to those whom they could reach by no other means, for few men then studied a living language besides their own. The change of purpose which set in when men merely studied Latin to enable them to understand the written thoughts of others brought about a change of method in teaching. Scholastic traditions retained Latin in the school curriculum after the practical reasons for teaching it had passed away, and arrogated to Latin and Greek the title of "classics" or "the classical languages" as though they were the only languages deserving of study in our classes.

Faults in the Methods.

To the methods which were sufficient for teaching the dead languages under these altered conditions we may trace the faulty methods which have so long hampered the teaching of modern foreign languages. We are glad to notice the great improvements which have been made, particularly in Germany, and which are rapidly gaining ground. The faults we refer to are—

1. The excessive importance attached to the visual as opposed to the oral acquisition of languages.
2. The failure to put language into direct relation with thought.
3. The scanty attention paid to pronunciation.

Evil Effects of Examinations.

In their endeavours to introduce improved methods teachers are seriously hindered by the action of the public examining bodies who are allowed to shape

the course of school studies. Thus teachers have to prepare pupils for examinations which generally consist of (*a*) a passage to translate *into English* from a set French book; (*b*) sometimes translation *into English* of unseen French passages; (*c*) translation into French of English sentences; (*d*) minutiæ of grammar; (*e*) very rarely of an oral test.

(*a*) The ability to translate a passage from a set book is a very poor test of the student's power over the language, although a skilful teacher can make the preparation of such a book fruitful in benefits to his class.

(*b*) The translation of unseen passages is a far more valuable test, but it is a test of one power only—viz.: what we might call the receptive power. It is quite possible to combine considerable skill in understanding the meaning of a printed passage with very feeble powers of expression.

(*c*) The power of expressing one's thoughts in the language studied should be the chief object aimed at. Unfortunately examinations intended for beginners contain expressions which aim rather at illustrating recondite points of grammar than at dealing with the thoughts commonly occurring in the minds of the pupils, and too frequently the questions are based upon lists of proverbs which must be "crammed" up from a text-book.

(*d*) The value of the grammar questions is often in direct proportion to their uselessness. To meet the demands of the examiners (not to teach French) numerous "Grammars," "Handbooks" and "Guides" have been produced which inform the student that *un interligne* means "an interline," while *une interligne* means a "rule" (a technical word in the printing trade), and other facts equally insignificant.

(*e*) Very few examinations in modern languages

seek to impress upon the candidate the fact that the language is *spoken*. Of course it is much easier for an examiner to mark a set of papers than to take the candidates individually and test their powers of conversation.

Reforms.

It will be seen that in the past teachers and others have lost sight of the real function of language, and consequently bad methods of teaching have been the result. The first reformers argued that as a foreign language was of similar nature to the mother tongue it should be acquired by similar methods. The fallacy in this argument lies in the fact that we are not in the same intellectual condition when we begin the study of our mother tongue as we are when we begin the study of a foreign language. The results achieved in mastering our own language are of immense assistance in acquiring another. This very important fact must be borne in mind, and moreover, its application admits of degrees, so that the method of teaching a foreign language to an adult must differ in some respects from the methods employed in teaching children.

Sound before Sight.

In acquiring our own language the ear is called into operation a long while before the eye, and it should also be first employed in the acquisition of a foreign tongue; but the knowledge of language already gained will enable the ear to be reinforced by the eye at a very early stage, so that the two organs, at any rate in the case of pupils of riper age, may begin almost simultaneously.

Pronunciation.

Every effort should be made to ensure that the pupil's pronunciation is as correct as possible. Without entering into the discussion of the question of phonetic spelling, we should recommend every teacher of languages to master the principles of phonetics and even if he decides not to adopt phonetic spelling,

he should have a chart on which are represented all the sounds to be found in the language he is teaching. To this chart he should refer as a standard; by frequent drill at the commencement the pupils can be made to produce every sound represented on the chart, and whenever a difficulty arises a comparison of the sound required with the standard one represented on the chart will set matters right.

Reading.

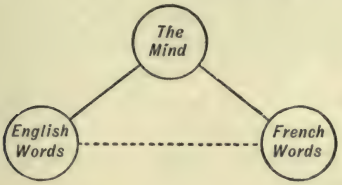
Pupils who have learnt to read in their own language are in a favourable condition for studying other languages. It is advisable to make reading one of the chief foundations of every lesson, and the smaller the number of hours per week at the teacher's disposal the more should he lean upon reading. It is surprising how much really good work can be done even with only one hour per week if the teacher will employ good methods.

"Thinking in French," &c.

The teacher must first impress upon his pupil the fact that there must be a direct connection between the thought and the French word.[1] If the pupil wishes to talk as a Frenchman does he must employ the same processes. The teacher will then point out to the boys that if a Frenchman sees a certain animal trotting along in the street he does not name it "a horse" and then think that the French equivalent for "a horse" is "un cheval," but he names it "un cheval" straight away. So if the pupils want to make progress in French they must at once endeavour to get into the same habit, and apply French names to the things they see as though those objects had no other names than the French ones. From the beginning, therefore, the teacher should aim at making the French words convey a thought directly

[1] For the sake of conciseness we shall speak as though our remarks applied to the teaching of French only, but it will be seen they are equally applicable to other languages.

to the pupil's mind, and at inducing the pupil to express his thoughts directly in French words. Children readily understand what is expected of them if such a diagram as the adjoining be employed. The three circles arranged at the corners



of the triangle represent the mind, English words and French words. The children will admit that when they hear an English sentence the meaning goes direct to the mind, they do not think of the French sentence corresponding, and then let that French sentence convey the thought to the mind; and when they wish to express their thoughts in English they do not first make up a French sentence and then find the English equivalent. So when they hear a French sentence they must not work out its equivalent in English and let that impress the mind, but must let the French sentence do its own work, as it would on a Frenchman's, and conversely their thoughts should be able to find direct expression in French. Some teachers may be saying, "Yes, this is all very well *after* the language has been mastered, but how are the pupils to apply the principle while they are acquiring the language?" There are two answers to this question.

Use of Objects.

(i) As far as possible let notional words be taught directly from the things they symbolise. Starting with the two words "Voici" and "Voilà," the teacher

may give the French names for an immense number of things without once using an English name. Verbs may be acquired in a similar manner; the teacher holds up the chalk and says, "Voici la craie," "Voici la table," "Je *mets* la craie sur la table." Then putting the chalk into the hands of a pupil, he says, "*Mettez* la craie sur la table," or working together, he and the pupil say, "Nous mettons la craie sur la table." Or again, "Voici le tableau noir." "J'*écris* avec la craie sur le tableau noir." The teacher should do his best to help the child to forget for the time being that the articles have English names.

Use of Vocabularies and Dictionaries.

(ii) There is, however, a point beyond which this process cannot be carried with advantage, but it should always be carried as far as it can. Sometimes it is necessary to use the English word as a key to the meaning of the French word, but as soon as the French name is associated with the *idea*, its association with the English word should be broken. For the whole secret of teaching French consists in getting the children to look upon French words as the means of directly expressing their *thoughts*, and not as the equivalents of English *words*. Referring to the diagram (E) is sometimes needed to make the connection between (F) and (M), but when once made, the connection must be maintained as a direct one. Here we see the legitimate use of reference to a dictionary, and here, too, we see the baneful effects of the common practice of "cramming" up vocabularies. When boys are set to prepare a chapter from an author, they make a practice of setting down every new French word with its English equivalent in parallel columns, and by means of frequent repetition the French word acquires the power of suggesting the recall of the

English equivalent, by which, if at all, the thought is conveyed to the mind. Now few people have acquired through a dictionary a knowledge of more than one word in a hundred that they use in speaking their mother tongue; that is, ninety-nine per cent. of the words they have mastered have been acquired through the context of passages in which they occur. This, then, is the natural and most effective way of acquiring and mastering foreign words, which are not acquired by the preceding method. Let the teacher, then, suggest to his boys the following plan. Instead of writing out vocabularies, look carefully at the work sentence by sentence. If the meaning of the first sentence is not clear, underline in pencil the new words and look them out in the dictionary. As soon as the sentence has been mastered, let the pupil say it aloud as though making the statement in French to a friend. He will thus feel that he has *acquired the power of expressing*, at any rate, that *one thought in French words*. The next sentence is to be treated in the same way, and so on. After an interval (two or three days being better than two or three hours), the pupil again studies the chapter, this time with india-rubber in hand instead of pencil, and erases the marks from the words with which his previous study has made him thoroughly familiar, and again tests his power of expressing the thoughts in French words. It will seldom happen that there are any words left underlined after this second attack, but if there are, a third attempt will complete the mastery.

Conducting the Reading Lesson.

The French lesson, based upon reading, will follow pretty closely the lines we have suggested for reading lessons in general. The two chief differences arise from the closer attention required to the pronuncia-

tion, and from the fact that the pupil, when he has mastered the thought, has *two* languages at his service to express that thought. Generally the passage will have been set for home-work, and the preparation of it carried out on the lines suggested above. The first sentence should then be read aloud in French, the teacher giving such help, by pattern or otherwise, as may be necessary to secure a good pronunciation. Any pupil to whom the meaning is not absolutely clear should be required to ask for explanation, and when, if required, this has been given, the books being covered or closed with the fingers in them to keep the place, a pupil should be called upon to express the thought in either English or French. This plan puts the two languages on the same footing as means of expressing thought, and although it is not the most expeditious way of "getting through the book," it is a plan which enables the children to obtain a wonderful power over the language.

Reading "Unseen Passages."

A very similar plan is adopted in treating "unseen passages" in class. The pupils look at the sentence and ask the meaning of any difficult words. The explanation is given, preferably by concrete illustrations, or, failing these, by means of synonyms or paraphrase *in French*, or, in the case of beginners, through the English. The books are then covered and the pupils express the thought they have acquired—not necessarily in English, for the teacher will soon tell whether the pupil uses French words to express a thought that is within his mind, or merely in an attempt to reproduce the words of the book without understanding their meaning.

Composition.

When a passage has been prepared carefully it may be used as the basis of a written exercise. At first this should consist of a reproduction of the subject matter itself, and the words of the original

will in general be closely followed, not from any act of mechanical memory, but from the fact that the limited vocabulary renders it difficult for the pupils to express their thoughts by means of other words than those by which the thoughts were acquired. Soon developments are made in the practice, and after the children have prepared a story of "Les Trois Brigands" they are asked to confine their statements to one of the brigands; or, after studying the adventures of a traveller, to suppose that there were two travellers who went through the same adventures together. The teacher can also draw up an English passage based upon the work, in which the number, person, tense or gender is changed. This we believe to be of much more value than the translation of English sentences at home. In fact, if such sentences are written down word by word as they are ferreted out from the dictionary, they are productive of but little good. If the ordinary type of exercise book is in use, it is better not to have the sentences written at all, but simply prepared. The thoroughness of the preparation can be tested in class by requiring a translation to be written (or better still, *spoken*, if the class is small) immediately the thought is suggested. The suggestion should *not* be given by reading the English sentence if it can be avoided, but by suggesting the circumstances which would lead the pupil to make the remark required; thus, instead of telling the class to write down the French for "Have you some pens, ink and paper?" ask them what they would say in inquiring whether a friend had what he required to write with.

Repetition.

From the beginning it is advisable to set short passages for memory work. The repetition of such passages gives the pupil confidence in speaking, and

is of great use in teaching, provided that the pupil thinks of the meaning of the passage, and regards the words as the natural means of expressing the thoughts.

Use of the Language in Teaching.

In the early lessons it is best to give the instruction in English, but by gradually introducing such words as "continuez," "commencez," the children will be got to understand the teacher when he gives the lesson in French. Much may be done by gesture, repetition, and, above all, by distinct articulation, to assist the child in understanding the remarks made by the teacher in French, but it certainly is unwise to expect too much from the children or to cause them to give up their efforts in despair.

Conversation.

We have dealt at considerable length on the way of teaching French through reading, because where the time is very limited and the class is required to "prepare an author," the best results can be obtained in that way. But even in that case the lesson should include a little conversation on the passage read. The more time that one has at one's disposal for teaching French, the more extensively should the reading be supplemented by practice in conversation. Every article in the room, every movement of the teacher or pupil becomes the subject of a remark. The pupils should be required to perform simple actions and state what they are doing. This enables the teacher to work in the conjugations of the verbs and a large amount of other grammatical teaching inductively and in an interesting way. One pupil shuts the door and says: "Je ferme la porte;" the next, speaking to him, says: "Tu fermes la porte;" the next, announcing the matter to the class, says: "Il ferme la porte," or "M. N. ferme la porte." Two boys then join in shutting

the door and the plural is worked out. The other tenses may be treated in the same way. In every case the boys must state simply what has occurred without reference to any English words—they must, in other words, "think in French."

Avoid Excessive Analysis.

It must, however, be borne in mind that language is the outcome of mental processes and not of physical ones. Now physical dexterity depends largely upon the co-ordination of a great number of movements in such a manner that the mind views them as one movement. Thus the act of throwing a cricket ball at a wicket combines a great number of movements and is extremely complicated, but all these movements are regarded by the mind as *one* act. A cricketer expresses himself completely when he says, "I am throwing the ball at the wicket;" to his mind he has performed a simple act, a very simple act, he would say. The physical movements admit of resolution into many parts, the conscious state does not. No thoughts come into the cricketer's mind which make him say, "I hold the ball, I advance my left foot, I bend my right knee, I slightly lower my body, I raise my left arm to balance myself, I lower my right arm, I draw back my right arm, I advance my right arm suddenly, I open my fingers, I release the ball." Consequently, when the pupil is required to describe in French what he is doing, the teacher should be content with a statement of what the pupil is conscious of doing, and should not require the detailed analysis of his bodily movements.

The Dead Languages.

Most of our general remarks on the teaching of languages apply to the teaching of Latin and Greek, but being synthetical languages their inflexions

largely take the place of separate words used in other languages. Hence the teacher must insist on their share in the work of conveying thought to and from the mind. Results in Latin composition are too often obtained by the method of a + b, and do not express the ideas that have been in the pupil's mind. This is particularly the case when the words are looked out one by one from the dictionary, and their forms are coldly calculated out by rules. Pupils should not be allowed to begin to write a sentence until they have the whole of it in their minds.

We cannot here deal more fully with the teaching of Latin, but would urge the teacher to seize every opportunity of improving his pupil's knowledge of English through the Latin words. The derivation of large numbers of English words can be traced and the changes they have undergone indicated during the Latin lesson, and that without detriment to the Latin, for the knowledge of both the Latin and the English will be increased and made more thorough by their mutual association.

CHAPTER X

HISTORY

Objects and Value.

THE object we have in teaching history in schools is not to make historians any more than we endeavour to train professional singers by means of school music lessons. Many teachers fail in this subject to secure the best results to their efforts from want of appreciation of the aims they ought to have, and of the vast difference between the ways in which the subject should be studied in the elementary school and at the Universities.

(a) *To Impart Information.*

The primary object in the elementary school is to impart useful information, and if this information is imparted by sound methods there must necessarily be associated with the process a discipline of the attention and a general development of the intelligence ; but these, of course, would be associated with the imparting of information on similar lines in other branches of knowledge than history. The information itself, however, tends to a further quickening of the intelligence when it is brought to bear upon the books subsequently read by the pupil, who thus derives a greatly increased pleasure and enjoyment from his reading, as he does also from any visit he may pay to a place of historic interest. It is generally contended that a knowledge of history will

also enable him later on to exercise his political privileges and municipal duties in a more intelligent manner. But the point is not one that should be pressed too far, seeing that of the vast amount of matter covered in a historical course only a small part has a direct bearing on modern citizenship. This fact is practically admitted by the introduction of the subject, "The Life and Duties of the Citizen," in order to make good the deficiency. Where the subject admits of it the teacher may add a little instruction on such matters, but if left to himself the child will find little to guide his future actions, and may even draw inferences from some events which will positively mislead him.

(b) *Memory.* The two faculties that school history tends to train are the memory and the imagination. Both of these are fairly well developed in children of school age, and both require exercise of the right kind in order that they may be made to work efficiently. History lessons afford opportunities for the proper training of the memory, which requires that a fit proportion should be observed between the matters required to be remembered—that the important points should receive due prominence and minor matters be duly relegated to a subordinate position, while trivial details which are meant to afford only a passing interest or to explain more weighty matters should be forgotten altogether. The manner of recalling past instruction to mind by means of appropriate associations may also be taught in connection with the history lessons.

(c) *Imagination.* The powers of imagination are very strong in children, and it is important that they should not be allowed to run wild; and history lessons supply a very suitable means of discipline for this faculty. With careful teaching the child may easily be led to form

very accurate and vivid pictures of past events and circumstances from an observation of the present. But there is always a danger of the teacher assuming that an expression he uses must of necessity call up the same image in the child's mind as it does in his own. A little child after being told that a standard-bearer was a man who carried a flag, replied that he had seen a standard-bearer "*walking in front of the steam-roller.*"

Moral Training.

History presents frequent opportunities for moral training through the biographies of great historical personages. In studying the lives of these men we are able to notice the great effects for good or evil that have followed from their conduct.

> Lives of great men all remind us
> We can make our lives sublime.

The moral teaching is always so much more effective if based upon the lives of real men than if given merely upon the vices and virtues in the abstract;—children's emotions are more deeply stirred, and they are powerfully excited to action when they are taught perseverance from Bruce or Cobden; industry from Foley, Petty, or Strutt; energy from Warren Hastings; devotion to duty from Wellington or Collingwood; philanthropy from the liberators of the slaves; the wisdom of living within one's means from Earl St. Vincent or Sir Charles Napier; or fortitude in time of danger and chivalry towards women and children from the loss of the Birkenhead. The biographical department of school history should have a powerful moral influence upon the pupils by elevating their aims in life and establishing in them a hope that they themselves may do and be what they have been taught that others have done and been.

Patriotism.

The virtue which is most strongly brought out in

the study of historical biographies is that of patriotism. History affords many examples of noble self-sacrifice for one's country, but there is always a danger that the presentation of the grandest examples of patriotism may engender a kind of green-sickness in the pupils which leads to nothing but ineffectual dreams of becoming admirals or generals dying in the defence of the fatherland. The teacher must indicate practical means of giving expression to the patriotic sentiment lest the very boys who dream of emulating Arnold von Winkelreid by gathering a sheaf of the enemy's spear points into their own bosoms, grow into men who cheat their country by making false income-tax returns.

Patriotism must also be free from narrowness, the same obligation which binds us to love our country also binds other people to love theirs. Hence the teacher should take care that the spirit of patriotism which is fostered in his lessons is a broad one, which, while impressing upon the pupil the need of defending the rights of his own country, leads him also to recognise its duties to other countries and to respect their rights.

Training the Judgment.

It is often contended that history is a very valuable means of training the reasoning powers, but as far as school history goes this is true only to a very small extent. It is true that children may be taught to recognise the connection between cause and effect in some cases, but in history we generally find an event surrounded by such a number of attendant circumstances that it is beyond the power of children to discern which is the efficient cause. If the case be closely examined it will be found that children form no opinions of their own from the study of history but merely accept at second hand the opinions of their teachers.

To the advanced study of history, therefore, and not to the school course, belong such matters as the study of original documents, the weighing of evidence, and the formation of opinions. The judgment is one of the latest faculties to develop itself, and in children of school age it is far too weak to be set to do such difficult work.

In spite of the many advantages offered by a course of history lessons it is not taught to any large extent in our schools. The number of children in senior departments who take it as a "class subject" amounts to only about 12 in 10,000. Obviously, then, it presents fewer attractions and more difficulties than the other "class subjects." Difficulties.

One of the chief difficulties seems to be the want of consideration of the kind of history teaching which is most suitable for children of school age. If children are required to study the subject on the same lines as adult teachers and inspectors have followed at their colleges and Universities, the results are bound to be unsatisfactory.

Secondly, history requires special qualifications on the part of the teacher. Such is the unity running through the subject, that a teacher must not depend on his knowledge of the period under immediate consideration; his knowledge must be as wide as possible, and should include a fairly good knowledge of Roman History and of the History of Europe. In order to excite the imagination of his pupils he should be skilful as a word-painter, and should be prepared to explain in simple terms the meaning of terms used in history.

Another difficulty that is often felt in teaching history is the heavy burden sometimes laid upon the memory, especially when the subject is prepared for examination purposes. Many more minute details Cram.

have to be remembered than are requisite for the effective cultivation of the memory, and this leads to "cram."

Stages.

In arranging a course of history lessons for a school the teacher is often at a loss to know which is the best plan to adopt. In any case it is unwise to attempt to bring the work up to a finished state as we go on. History is a subject that admits of frequent revision, and one thing especially necessary is to maintain a due proportion; hence it is advisable to begin with "Outlines," although the term generally has a very indefinite meaning when used in an examination syllabus. A skeleton study should be first undertaken, and when this is revised it should be not only amplified by the addition of more detail, but the subject should be regarded from different points of view. A considerable difference of opinion exists as to whether it is better to begin the study of history with the present day and work backwards, or to begin at the early times and study the subject in chronological order. The advocates of the former method argue that it proceeds "from the known to the unknown." But a consideration of our remarks on the true meaning of this phrase (page 71) will show that the argument is somewhat specious. In the first place the present social and political state of the country can hardly be classed among the things "known" to the child. If we were therefore to "begin with a lesson on the policeman" we might give a good lesson on "citizenship," but the children would know very little about the policeman on which we could base a lesson on the reign of Elizabeth, either directly or indirectly. In the hope of leading up to the "Police Act," the teacher might ask by what nicknames a policeman is called, and among the very numerous replies he

might obtain "Bobby," but it is very unlikely that he would obtain "Peeler," and if he did he would have a very slender thread on which to hang a lesson on the life and work of Sir Robert Peel.

It seems to us that it is better after all to take the subject in its chronological order, and to make first a very rough outline, next to revise and add detail, and then again revise, adding more detail and instituting comparisons and seeking the relations between the events. This arrangement coincides with the development of the three faculties chiefly influenced by the study of history.

1. In the *Preliminary Stage*, we aim chiefly at exercising the *imagination*. The teaching in this stage consists chiefly of stories and descriptions the object of which is to exercise the imagination, work ing the memory as little as possible, but trying to induce the children to picture the circumstances under which the events described later on took place. Thus in this stage we teach them what the country was like when inhabited by the ancient Britons, the manners and customs of the Anglo-Saxons. Ideas of this sort should always precede descriptions of events, otherwise what is to prevent children from picturing Alfred going to Athelney in the west of England *by train*?

The following are suggestive of lessons suitable for this stage.

(*a*) *Descriptions.*—1. Ancient Britons, their manners and customs, warfare, religion. 2. Roman settlements, military colonies, roads, imperial power—the sovereign as the fountain of honour, freemen and slaves. 3. Saxon England, change of religion, manners and customs, representative government, administration of justice. 4. Norman period, outline of feudal relationship, co-

existence and coalition of the two races; serfs. 5. Crusades. 6. Monasteries and ecclesiastic influence. 7. State of the labouring classes after the decay of serfdom. 8. Description of a baronial castle. 9. Outlaws such as Robin Hood. 10. Production of books—printing. 11. A town (*e.g.* London) in the Tudor period. 12. How the different classes lived in the reign of Elizabeth. 13. Dress at different periods. 14. Arms and armour; changes brought about by the invention of gunpowder. 15. Discovery of America and its results.

(*b*) *Biographies.*—1, Boadicea; 2, Alfred the Great; 3, Canute; 4, Harold; 5, William the Conqueror; 6, Becket; 7, Richard Cœur de Lion; 8, Edward I.; 9, Black Prince; 10, Cardinal Wolsey; 11, Raleigh; 12, Drake; 13, Shakespeare; 14, Oliver Cromwell; 15, Marlborough; 16, Clive; 17, Warren Hastings; 18, Captain Cook; 19, Pitt; 20, Nelson; 21, Wellington; 22, Beaconsfield; 23, Gladstone.

(*c*) *Graphic Stories of Interesting Events.*—1, Landing of St. Augustine; 2, Incursions of the Danes; 3, Battle of Hastings; 4, Magna Carta; 5, Bannockburn; 6. Creçy; 7, Poictiers; 8, Agincourt; 9, Wars of the Roses; 10, Spanish Armada; 11, Trial of the Seven Bishops; 12, Monmouth's Rebellion; 13, Battle of Blenheim; 14, American War of Independence; 15, Battle of the Nile; 16, Battle of Trafalgar; 17, Battle of Corunna; 18, Battle of Waterloo; 19, Crimean War; 20, Indian Mutiny; 21, Afghan War, March on Candahar; 22, Egyptian War; 23, Soudan War; 24, South African War.

It is not intended that full instruction should be given on all or any of the above, but they are given in the hope of suggesting lessons which shall offer

real interest to the children and train their imagination. The mental pictures formed will be a great help in fixing the chronological sequence of the events.

2. The next or *matter of fact stage* deals principally with the *memory*. The subject is revised and information of a more definite kind is given, and an attempt should be made at fixing the dates of the leading events. In this stage the subject is perhaps best studied reign by reign. The advantages of this method are, (1) that as our chief object is to learn the facts and not reason out their relations, they can easily be associated with the reign in which they occurred: (2) the end of a reign will be found a convenient place to stop for revision; and (3) there is, especially in the earlier part of the history, a very close connection between the history of a reign and the biography of the king, such was the importance attached to the doings of the king himself.

3. *The Reasoning Stage.*—In the next revision more exercise may be given to the judgment of the pupils. This faculty is getting more developed, and in the upper classes children will be found to take a great interest in connecting causes and effects and in criticising the actions of historical persons. Still further detail can be worked into the scheme, and a new interest is attached to the previous knowledge on account of the new light in which it is regarded. In this stage it is best to study topics rather than reigns.

We do not pretend that it is at all possible to attend exclusively to the imagination, memory, and reasoning powers in these three stages respectively, but we have named the stages in accordance with the faculty that comes most into prominence in each.

General Notes on the Teaching.

1. *Selection of Matter.*—Too much care cannot be exercised in selecting the matter for the history lessons; with the younger children the quality is very important, and with the elder attention should be paid to the quantity, the quality in the latter case being largely determined by the sequence of the subject. As we have already said, in teaching history the method must be largely expository, the matter itself, if carefully selected, arouses an interest which diminishes the need of elaborate methods.

2. *Memory Work.*—A great quantity of matter has to be committed to memory, especially in preparing for examinations. Now the first essential in dealing with this work is that it should be made interesting, but the mere juxtaposition of a name and a date affords no interest whatever, and many a pupil has been filled with disgust for the study of history from being made to sit down and commit to memory a long list of dates. In associating an event with its date, the event should be studied first and a pleasurable interest excited over the event itself. It should then be associated with its period, of which the characteristics have been impressed upon the child's mind through the "imaginative stage," and finally the period should be narrowed down to the year. This corresponds with the intelligent way of teaching the multiplication table, but, like it, requires repetition to facilitate recall. The number of dates to be remembered in each lesson should be small, particularly with the lower classes. The teacher should also make use of any coincidences in fixing the dates, thus Magna Carta, Agincourt and Waterloo are easily associated with their dates, since each date ends in 15.

We cannot recommend the use of mnemonics for dealing with dates, &c., and indeed the amount of

detail to be committed to memory should not be such as to require such aids, the ordinary laws of association, combined with an interesting mode of presenting the subject, should be quite sufficient to meet the case. The system of mnemonics by which numbers are fixed in the mind is based upon a letter-number table in which the different digits are represented by different letters. The pupil then has to form a key-word which includes the letters standing for the digits he wishes to remember; thus in one system

$$sh = 6,\ r = 4,\ p = 9,$$

and the pupil wishing to remember the date of the execution of Charles I., says,

"Charles was beheaded by an axe that was *sharp*," and if he remembers this sentence and refers to his table mentally he has the digits 649, from which he gives the date as 1649.

It is very questionable whether there is any saving of trouble by this system, especially if the pupil himself has to work out the key-word, which is of very little use unless it has some association with the event.

3. *Historical Poetry and Novels.*—A great deal may be done towards exciting the children's interest by the judicious use of historical poetry, particularly in the work of arousing the imagination. By historical poetry we mean pieces of standard poetry on historical subjects, such as "Boadicea," "Ode on the Burial of the Duke of Wellington," and "The Revenge"; not the doggerel which calls itself history in rhyme. The jingle of the latter may aid the memory somewhat, but it is at the expense of the child's æsthetic taste, and its use is more harmful than not. The school library should be

well supplied with historical novels. It will be found that the elder children take to them with avidity, and the history teaching is greatly helped by them.

(*d*) *Association with Geography.*—The close connection which exists between history and geography should not be lost sight of, but should be utilised by the teacher. It should be noticed that history is more dependent on geography than geography is upon history. In the latter connection we have to deal with changes in the political boundaries resulting from wars and other historical events, but these are relatively unimportant compared with the course that a nation's history has been compelled to take as a result of its geographical conditions. Think how the whole course of British history has depended upon the insular character of the country, to mention no other. And not only is this true generally, but it is true in particular cases, *e.g.* the independence of Wales and Scotland was so long maintained owing to the mountainous nature of those parts. In order to follow out the course of a war intelligently it is necessary to follow it on the map, and teachers should make a rule to point out all places mentioned in the history lessons.

(*e*) *Strategical Study of Wars.*—It too often happens that a war is regarded simply as a series of battles which have no other relation than sequence of time. The teacher should endeavour, particularly in dealing with the senior classes, to make clear what was the object that each side endeavoured to accomplish, and how an engagement takes its importance, not from the numbers killed and wounded, but from its effects in enabling the victors to work out their plans. A great deal more interest would be taken in this part of the work if it were treated more on those lines.

CHAPTER XI

GEOGRAPHY

Importance of Subject.—There is probably no other subject taught in schools a knowledge of which is so frequently demanded in the ordinary intercourse of life. Every day, in conversation or in business, questions arise which test our geographical knowledge, and make the study of the subject an essential part of any educational curriculum. **Importance.** (a) *Generally.*

Much more than to others is a knowledge of geography important to the English-speaking race—a nation of shopkeepers who have left the impress of their power and influence upon every continent, who trade with the inhabitants of every quarter of the globe, and who are united to each other by the firm ties of kinship, speech, and mutual advantage. (b) *To the English-speaking Race.*

Objects of Teaching Geography.—The principal object, therefore, in teaching geography would seem to be to give to each pupil as complete an acquaintance as possible with the principal facts of physical and political geography, and so thoroughly to equip him for the needs of ordinary intercourse and business. **Objects.** (a) *To Improve General Knowledge.*

It is impossible, however, to obtain this thorough knowledge of the "facts" of geography without searching more deeply for the general principles (b) *To Develop the powers of the mind.*

which govern them, and no teaching of geography is worthy of the name which does not bring to its pupils a thorough acquaintance with the science of earth-knowledge or physiography. The teaching of geography then ceases to be mere parrot-work, and becomes far more worthy of its place in the curriculum as an instrument for training and developing the faculties of the mind.

It affords a splendid training for the *memory*, which has to be exercised in the recall of facts imparted. Formerly undue prominence was given to this aspect of the subject, and the study of geography was made to consist of the mere committal to memory of bare facts, and sometimes even of mere lists of names which were not even associated with facts. As usual a reaction has set in, and there is now a danger of the memory-training being neglected in teaching this subject.

The subject also helps to develop the *imagination*. From their knowledge of the hills and streams of their own neighbourhood children can be taught to form ideas of the mountains and rivers of other countries, and can acquire a real knowledge of the conditions found in other countries by a comparison with those of their own.

Geography also is a first-rate instrument for training the *reasoning powers*, for the skilful teacher will teach his children to connect cause and effect, and having shown what causes produce certain effects in one case will lead his pupils to infer the results that must necessarily follow from similar causes in another, or, having shown the results, will let them seek for the causes. All the branches of geography afford scope for this kind of teaching. In physical geography there are the relations between climate and position, between climates and productions,

and between the configuration of the land and the course of rivers; in political geography we deal mainly with conditions resulting from physical causes, as the relations between productions and trade, between configuration of the land and limits of states, between position and commercial importance.

Kinds of Geography.

Geography is generally classified under the three heads of—

Physiography—Earth Knowledge.
Physical Geography.
Political Geography.

The importance of the last two has always been acknowledged, and in some of our elementary schools for many years no other kind of geography was taught. Strings of names of rivers, capes, and towns were learnt, and the greater or less readiness to reproduce them was considered the mark of success or failure in the teaching of the subject. Automata were produced crammed with the facts of the *Gazetteer*, and the development of the mind was hindered by the injudicious overloading of the memory. A much wiser and more intelligent system now prevails, and the more important points in the study of "Earth Knowledge" are divided amongst the various standards. It is to be doubted whether the scientific knowledge thus taught is utilised by the teacher to the fullest extent. Until this is done the teaching of geography will lack that harmonious perfection and attraction which its proper teaching should present.

It is the more important that the scientific principles which underlie all geographical facts should be taught in school, because it is precisely these which

are less likely to be learnt in after life, while a knowledge of them will enable the student to fill up intelligently from his general reading any gaps left in his ordinary geographical knowledge during his school course.

Aids to Teaching Geography.

There is no subject taught in schools where more outside agencies can be brought in as helps, or where the general apparatus and curriculum of the school can more frequently be pressed into service.

The Child's own Observation.

Thus in the first instance many of the more elementary notions of physical geography have been impressed upon the child's mind by his own daily experience. The alternation of heat and cold, the rising and setting of the sun, &c., inequalities of the earth's surface, &c., are obvious to every child, and it is from this knowledge that the teaching of geography should begin. Unfortunately the manner of living in towns prevents the acquirement of a knowledge of the movement of the heavenly bodies, but careful encouragement of the child's curiosity, and careful seizure of all opportunities offered by the playground and school, will do much to remedy this misfortune. The varying altitude of the sun in summer and winter, the idea of direction, N., S., E. and W., and the varying length of shadows, will afford a means of developing in the child's mind the scientific habit of observation.

As a slight recompense to the town boy for the previous disadvantage, he is enabled to glean much information as to the place of origin of many articles by the displays of goods and advertisements thrust before his eyes in every shop in the principal streets,

and thus unconsciously he acquires a knowledge of some of the facts of commercial geography. The teacher must take care that the children who have these opportunities thrust before them do not let them slip by.

School and other Libraries.

The fondness which nearly all boys show for books of travel gives also a useful aid to the acquirement of geographical knowledge. It is probably by this kind of literature that the reading habit is first encouraged, and there is no doubt that all children will read eagerly any book of adventure referring to a country whose geography they have studied, and will show increased interest in the geography of any country referred to in a book of adventure or travel previously read. How much geography has been pleasantly and unconsciously acquired from such books as *Treasure Island*, *The Last of the Mohicans*, *In the Far, Far North*, *Robbery under Arms*, Jules Verne's novels, and many others any teacher can readily call to mind! The geography lesson should be varied occasionally by the reading of selections from such books, and the children should be encouraged to read all books of travel or adventure likely to prove interesting to them and indirectly useful in increasing their geographical knowledge. The *kind* of geographical knowledge thus insensibly acquired is most likely to be retained in the memory, and is undoubtedly much more useful than many of the dry facts we painfully drill into the children.

The School Museum.

The school museum may also prove useful as an aid to the teaching of geography. In some schools the material of the museum is classified according to its place of origin by continents and divisions of continents. In others large maps are drawn, and the objects are placed over the places where they are

grown, found, or manufactured.[1] The children may be encouraged to make similar maps themselves, or to arrange the products on these maps when required. Lists of objects required to illustrate the geography of any country should be drawn up, and the interest of the whole school should be engaged in obtaining them. A collection of objects so selected and classified will prove of perpetual use to the school, and will be far preferable to the congeries of strange and useless oddities which usually find themselves together in the school museum.

Clay and other Modelling.

In many elementary schools modelling in clay is taught, and the modelling board can help considerably in giving clear ideas of what are known as the geographical definitions. But in every school, whether modelling in clay is taught or not, there should be a board and a supply of sand, sawdust, or clay ready for the teacher's use. This should be used largely, as mentioned above, to give to the children a thorough knowledge of what is meant by such terms as island, lake, peninsula, mountain chain and range, volcano, river-basin, &c. Not only should the teacher construct models of these before the class, but the children themselves must be encouraged to do the same. We remember no teaching less scientific and more wearisome than the repetition of such facts as "a mountain is a high hill," whilst the delighted interest which a child shows when he is constructing hills and mountains for himself is a sure proof of successful method.

History and Newspapers.

The close alliance between history and geography renders it impossible to teach either thoroughly without the aid of the other, and indeed if it were

[1] Or small outline maps of the world on Mercator's projection are reproduced with the copying apparatus, and the place of origin coloured.

possible so to do it would be unwise to dispense with any help which adds interest to the subject taught. The political geography of many countries, particularly of those whose history is yet short, can frequently be well described in a few lessons linked in historical sequence. In the countries of Europe, too, where civilisation is of older growth, the geography of the continent cannot be said to be intelligently taught unless some slight knowledge has been obtained of the Greek and Roman periods, the rise of the German nation, the coming of the Moslem, the Napoleonic Wars, the struggle for naval supremacy—Venice, Genoa, Dutch-English, and the rise of the Russian empire. Indeed the danger to an enthusiastic teacher is that he may enlarge too much upon these engrossing subjects, and omit the drier but most necessary skeleton of routine geography.

With older boys current history as given in the newspapers should not be neglected. All voyages or journeys of discovery such as those of Nansen and Borchgrevink should be carefully followed, and any maps or interesting descriptions published should be posted in school and discussed whenever possible. The various wars which unfortunately take place seize strongly in many cases upon the boys' imagination, and the opportunities of geographical teaching which they give should not be wasted. What better opportunity for teaching the geography of the colonies could be afforded than that offered by the deep enthusiasm and intense patriotism developed in all branches of our common race by the recent war in South Africa?

Even the apparently dry column of *Shipping Intelligence* may be made the basis of many an interesting lesson on the routes and probable cargoes of the vessels named in it.

The Reading Lesson.

The Code at present prescribes either two or three sets of readers for each standard, and insists that one must be a Geographical Reader. The value of these Readers in teaching reading may possibly in many cases be questionable, but there is no doubt that, judged from the geographical aspect, the better type of them are excellent in matter and arrangement, and are calculated to awaken the interest of the pupil, and give valuable hints to the young teacher as to what is essential or inessential in the subject. The right time to take them is not in the reading lesson, when either there must be too little reading or too little geography, but in the geography lesson itself, and the object of the lesson should be geographical, not literary. The character of the lesson should determine whether the Reader should precede or follow an oral lesson on the same subject. In the lower Readers the more interesting lessons may well be utilised as exercises in silent reading, such exercise developing gradually into the habit of private study among the older children, a habit unfortunately too little cultivated in the modern elementary school.

Geographical Illustrations.

There is probably no branch of school equipment where more advance has been made or more ingenuity shown than in the art of geographical illustration. Most prominent among these are the various series of school-room maps. Almost every country in the world is now shown by means of Physical or Political maps, and some of the more important ones in the more expensive form of relief-maps. The Germans have shown us that a *physical map* should include much more than the obvious physical features of a country, and we are enabled principally by their efforts to make use of splendid maps showing by various colourings and contour lines the variations in height and depth of land and sea.

The *political maps* now obtainable are also produced much more in accordance with the purpose for which they are intended. The older style of map was crude in colouring, and was crowded with as many names as the cartographer could enter. The newer ones are beautifully coloured, and contain only those names which are likely to be needed in the teaching of school geography. Some publishers issue series of maps arranged in groups as required for the various standards, and admirably adapted for class work.

Blank or test maps are also obtainable, but are much less used now than in the days of examination. They are hardly necessary, and their use has a tendency to rote or mechanical teaching.

Undoubtedly the most useful of the various kinds of maps published are the relief maps. These give at a glance the more important variations in the surface of the land, and in the hands of a skilful teacher the intelligence of the boys can be directed upon them with excellent results. Unfortunately they are very expensive, and of course the fact that they must of necessity exaggerate the variation in height, and so convey false impressions on this point, has to be guarded against.

Of *small maps* and *atlases* for the use of the children there are numbers published, and it is an advantage if every boy can have a map of the country he is studying.

Excellent diagrams and models are sold illustrating such physical phenomena as glaciers, avalanches, volcanoes, &c.; and these have of late taken the form of *chromographs* or *photographs* from nature. The best of these are not only useful geographical aids, but mark a distinct advance in school-room decoration.

The *globe* and the *compass* are essential parts of the geographical equipment. The globe is far from sufficiently used in the majority of schools.

The more elaborate apparatus advertised, such as *tellurians*, *orreries*, &c., are very costly, and can be dispensed with without much loss. In some of our best schools the *magic lantern* has been used to develop interest in geography, and much good has doubtless in many cases resulted therefrom. Such interest is, however, to some extent artificial, and there is danger, firstly, that the ordinary lessons may suffer in interest by contrast with them; and secondly, that the number of pictures shown may tend rather to confusion of memory. With a few well-chosen slides, linked together in sequence and graphically described, magic-lantern lessons may prove of great benefit, if they do not occur too frequently.

Maps Drawn by the Teachers and Pupils.

All these aids to geographical teaching deserve nothing but praise if they are properly used, but in the multitude of these illustrations, &c., the main idea must be borne in mind that our object is not only to interest the children by showing pretty pictures or beautiful maps but to develop their minds and improve their intelligence by a scientific treatment of this interesting subject. There is a great danger that the subject may be "over-staged," and that the excellence of the acting may suffer in the elaboration of the scenery. Many good teachers wisely dispense with many of these adjuncts, and draw their own maps upon the black-board, filling up the details as the lesson proceeds, and making their children follow the same course. There is no need in this for great skill,—a rough outline is quickly sketched, and the bolder physical features are rapidly added. Slate-cloth maps are sold for this purpose. The teacher must remember

that one good illustration is sufficient, and that too many illustrations are worse than too few.

Map Drawing.

It is customary in many schools to devote about one hour per week in the upper standards to the production of carefully-drawn maps, sometimes from memory. Such map-drawing was at one time insisted upon by the compilers of the Code, and three maps were required to be prepared in Standards V. to VII. The ability to produce a fairly correct map from memory is undoubtedly advantageous, but it is questionable whether the time required to obtain this result from young children was adequately repaid by the result. Where the aim is only to copy carefully and neatly from another map, with no intention of reproducing from memory, the lesson is rather a drawing than a geography lesson. The rough sketches drawn by teacher and children during the geography lesson are of much greater value.

Other Aids: Museums, &c.

Teachers have also been much encouraged to take advantage of the opportunities offered by local exhibitions, botanical gardens, museums, zoological gardens, &c. Parties of children may be taken to these with the consent of Her Majesty's Inspector, and the time so occupied may be reckoned towards an attendance in the ordinary school hours. It is clear that such opportunities will be more frequently offered to the children of town schools, but it is precisely to these that they will be most useful, as their opportunities of studying Natural History are much less frequent. Care must be taken that the parties are not too large for the teacher accompanying them, that the children belong as far as possible to the class of the conducting teacher, and that he has previously visited the gardens or exhibition in order to ascertain what points to observe or neglect during

the visit. The elder children should be encouraged to take notes during the visit, and a lesson either as Geography or as Composition should closely follow it.

It is a good plan to indicate the origin of the products shown in the school museum. This is very effectively done by cyclostyling small maps of the world on Mercator's projection ($2\frac{1}{2}'' \times 4''$) and colouring the parts where the objects are found. These small maps may be joined to the descriptive labels.

Teacher's Preparation.

Finally, but most important of all, we come to the teacher himself. In commencing the teaching of this subject to a class, it is most essential that a clear knowledge of the syllabus to be taught should be obtained, and the sequence and scope of the lessons should be thoroughly considered. The greater experience of the head master should prove of great advantage to the class teacher, and he will probably lay down the main lines he wishes to be followed.

The possibilities which the school equipment offer should next be investigated, and museum, library, Readers, &c., should be made to contribute to the interest of the lessons as much as possible.

The teacher should keep a note-book, in which should be jotted down all items of interest he meets with in his general reading, and every holiday should extend his usefulness as a teacher of Geography.

There is no subject in which adequate preparation is more necessary or more requited than it is in this subject of Geography, and notes of every lesson given should be made and kept for future years. It is surprising how often the notes of previous years show us that we have spoilt what might have been a good lesson by the unnecessary emphasis of unimportant points, or by failing to grasp the thread running through the lesson. The knowledge of the

previous failure may lead to present success. It will be necessary to make frequent halts in the series of lessons in order to test the thoroughness of the knowledge given, and the more important points must be kept before the class by frequent revision and questioning.

Brief Hints on the Geographical Syllabus.

Standards I. and II.—The objects of the earlier lessons in Geography should be to make certain that the children have formed clear notions of such natural phenomena as may come within their observation.

These lessons are found to be intensely interesting to the children and are often spoken of as "Object Lessons in Geography." These should be followed by lessons relating to direction or to the points of the compass. The knowledge of local geography should then be made use of and enlarged for the purpose of obtaining some acquaintance with the ordinary geographical definitions, and with the physical geography of hills and rivers. Finally, a sequence of lessons should be given leading through plans and maps to the globe and its zones, continents, and oceans. The following thirty lessons are given merely as an example of such a course :—

A fine day. The sun and its daily course.
A spring day.
A summer day.
An autumn day.
A winter day.
The four seasons compared : Temperature ; Length of daylight ; Position of sun at noon ; Shadows.
The sky in the daytime : Clouds ; Apparent movements of sun ; Noon.

The sky at night: Moon and its changes; Great Bear; Pole star.

How we find our position: Sun at noon; Pole star; Compass. Points of compass.

A walk round the district: Hills, valleys, streams; Direction of principal places.

A neighbouring hill: Base, slope, summit, peak or crest, waterflow, watershed, &c.

Mountains: Chains or groups, passes. (Model in clay.) Point out some on map of England.

A very high mountain: Snow line, glaciers, avalanches. (Pictures. Map of Europe.)

A volcano: Picture. Construct one by throwing sawdust up through a hole.

Heating a flask of water. B.p. = 100° C.

Steam, clouds, rain.

A wet day: What becomes of the rain?

Streams and rivers: An imaginary walk or row down a stream, explaining terms. Examples from map of England.

What rivers do: Drain, wash away land, supply water, serve for navigation. Form river bars and deltas.

A busy seaport: Lighthouses, ships, harbour, piers, docks, railway, &c.

Snowflakes and snow: Shape of crystals.

A piece of ice: F.p. 0° C. Lightness. Expansion on freezing.

Pebbles from a sea beach. The sea coast, tides, cliffs, &c.

The seaside: Bays, islands, capes, &c.

A glass of sea-water: Sea-water and river-water compared.

Plans of school and district: Meaning of scale.

A map of the world: Land and water. Five continents, five oceans.

A sphere: Compare with circle, cube, cylinder.
The Globe: Poles. Equator. Tropics. Circles. Zones.
The Esquimaux and the Arctic region: Ice fields and floes. Icebergs. Whale. Walrus. White bear, &c. Reindeer.
The negro and Equatorial regions.
The five continents: Animals and plants.

Standards III. and IV.—In Standards III. and IV. the series of lessons should be continued, but should include more lessons of a scientific character, treating of those chemical and physical facts bearing more directly upon geographical teaching.

How a poker is heated; how water and air are heated; how a room is heated.
Obvious effects of heat upon bodies: Burn, melt, volatilise or evaporate, make red hot, boil, &c.
Boil water and alcohol: B.p. of each. Boil alcohol in water.
Expansion of air, water, and mercury by heat.
Rate of heating and cooling of water, mercury, brick compared.
Measuring heat: Why mercury is used and not water?
How the sun heats the earth and air: Equatorial, Temperate, and Arctic regions.
Draughts and winds: Land and sea breezes. Trade and return trade winds.
Equatorial and tropical calms: Wind diagram.
Prevalent winds in Britain: W. and S.W. Results therefrom.
A piece of chalk: Microscopical structure. History.
Action of acid on chalk: Chalk gas or carbonic acid gas.
Carbonic acid gas in breath and in air.
Water: F.p. and b.p. Greatest density.

Water as a solvent: Salt and carbonate of lime. Saturation point.
Evaporating solution to dryness: Crystals.
Distillation.
A bottle of soda water: Action of CO_2 in water.
Presence of gases in ordinary water.
Oxygen gas.
Hydrogen gas.
Chemical composition of water.
„ „ air.
Action of plants and animals on air.
Evaporation of water: What happens to vapour.
Clouds and rain: Shapes of clouds.
The snow line: Isothermal lines.
How mountains lose their snow: Glaciers, moraines, avalanches.
What happens to rain water: (*a*) in descending, (*b*) afterwards.
Rocks: Pervious and impervious. Sand and clay.
Surface springs.
Mineral springs and geysers.
Spring, river, and sea water compared with distilled water.
Night and fall of dew.
Height of atmosphere: Air pressure.
The barometer: Force and direction of wind. Gradients, isobars.
Will it rain? The weather-glass.
Rainfall: How measured. Rain gauge.
Mean annual rainfall in different parts of Britain.
Denudation: Rivers—chemical and mechanical; Frost and glaciers; The sea; Sediment, where deposited; Limestone, how removed; Inland seas—low lakes.
How rocks are formed: Shale, sandstone, ooze, chalk, limestone, marble, peat and coal, granite.

Standard V.—In Standard V. the elements of mathematical geography are studied :—

Revise elementary knowledge of Globe : True shape, poles, equator, size.

Standing on the earth's surface : Plumb line, zenith, horizon, antipodes, at various places.

How position is fixed : Two measurements required. Fixing position on blackboard from two lines at right angles (axes and co-ordinates).

above left	above right
below left	below right

Position on sphere : Axes become circles. Equator and meridian of Greenwich as axes (any meridian would do). Co-ordinates also parts of circles. Hence distance from axes *measured in degrees.*

Definition of latitude and longitude. Effect of going 90° N. or S., 180° E. or W. Finding places from given latitude and longitude.

Latitude and longitude (approx.) of London, St. Petersburg, Calcutta, New York.

Great and small circles. Equator and lines of longitude all great circles. Degrees of longitude diminish. Length for equator. Degrees of latitude always about the same. *Why not quite ?*

Walk along a circle of longitude (latitude varies) and a circle of latitude (longitude varies).

The earth and the sun : Comparative size. Distance between them. The sun the source of light and heat. The two movements of the earth.

The daily rotation causes daylight and darkness.

The annual revolution : Path of earth round sun. Plane of the ecliptic, the orbit. Position of

sun. Perihelion and aphelion. We are nearest to the sun in winter. How do we know this?

Effect of direction of the earth's axis upon daylight and darkness. Place axis in various positions, and make class represent the sun. The axis really slopes $23\frac{1}{2}°$ and always points in the same direction. The N.P. points to the sun about aphelion (our summer); the S.P. about perihelion.

Varying length of daylight in the N. and S. hemispheres. Show how Tropics and Arctic and Antarctic circles are fixed. Trace apparent *annual course* of sun in the sky, and explain terms solstice and equinox.

Draw the earth as seen from the sun at the solstices and equinoxes. Position of poles, equator, tropics, and arctic and antarctic circles to be shown.

Altitude of the sun (in degrees) in England (London) at various seasons.

At summer solstice, when N.P. points to the sun, in England,

(*a*) Daylight is longer and darkness short. Earth receives heat a long time and has a short time to lose it.

(*b*) The sun's rays are more vertical, and therefore—

1. They come through less air.
2. We catch more of them.

And therefore summer days are not only long, but hot.

Treat winter days and Australian seasons similarly.

Noon, or mid-day: Meaning. The mid-day or meridian line. Sun as seen from the mid-day line during the day.

Rate of rotation: 1° every 4 minutes. Time, earlier West, later East. The chronometer and Green-

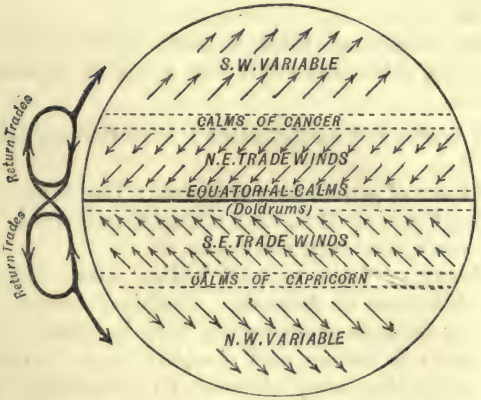
wich time. Calculating time from longitude, and *vice versa.*

N.B.—The whole of these mathematical facts are most easily taught from a globe, *making the class represent the sun*, and they require no elaborate apparatus.

Standard VI.—The earth-knowledge required for Standard VI.—climate—is very simple. Attention is needed only to the following points :—

Revise thoroughly (1) the principles of the barometer (isobars, gradients, cyclones, and anticyclones) and the causes of winds.

(2) The wind diagram, showing N.E. and S.E. trades, and the various calms.



(3) The monsoons of India, N.E. and S.W. Wet and dry seasons (*S. W.—summer, wet*).

(4) Apply the knowledge of latitude gained in Standard V.

(5) Effect of hills.

(6) Effect of the Sea. Insular and Continental climates.

(7) The Gulf Stream. Compare Western Europe with Labrador.

(8) Explain the meaning of *isothermal lines*: Why not parallel to the equator. Trace the isotherm of 0°C. in altitude, in latitude, throughout the year. Follow the isotherm of London, and explain variations.

Standard VII.—The ocean currents present little difficulty. Show that they are due principally to the action of the trade winds and trace them from the Equatorial Current. Show the effects of the Gulf Stream and Labrador Current respectively on the isotherms, and that the fogs of Newfoundland are due to them.

The subject of tides is more difficult, and the following notes may point out a useful sequence of lessons.

Why bodies fall to the earth: Direction and rate of fall.

This force of *gravitation* universal: Two laws.

Sun and moon: Mass and distance compared. *The sun's force very much greater.*

Tendency of force to pull bodies apart, owing to difference of distance. Tendency becomes less as distance of attracting body increases.

The moon is nearer, and therefore tends to separate more than sun, although its attractive force is much less.

Tides are caused by *difference in attraction.*

The two tides caused by moon: Take three bodies in contact, and separate them by moon's difference in pull.

The two tides go round the earth daily in opposite direction to earth's rotation.

But the moon moves about $\frac{1}{28}$ of a circle daily, hence two tides every 24 hours + $\frac{1}{28}$ of 24 hours.

Influence of sun: Spring and neap tides. When shall we have greatest, and when the least, difference between high and low water?

Effect of land and wind on tides: Tidal races and bores. Establishment of a port. Priming and lagging.

The course of tidal wave round British Islands.

For the ordinary physical and political geography an intelligent use of the text-books only is required, with a careful use of the aids to geographical teaching that we have mentioned. As the amount of earth-knowledge is increased, so more and more opportunities of showing its influence upon both physical and political geography will arise. The interdependence of the two must be carefully shown at every step.

The political geography of the newer countries (Australia, the Cape, U.S.A., Canada) can be made most interesting if it is treated from a historical point of view.

CHAPTER XII

THE MATHEMATICAL GROUP OF STUDIES

(*with special reference to Arithmetic*)

General Advantages of this Group.

I. Mental Discipline:

(a) *Attention.*

MATHEMATICAL studies always have occupied and always will occupy a prominent place in every school curriculum, and the reason is not far to seek. They provide a discipline and training for the mind as thorough as that offered by any other group, while at the same time offering a wider range than most. Owing to their general abstract nature they require concentrated attention, and lead to the training of the will in fixing the attention, which is not attracted to the work by the presence of concrete objects. But

(b) *Reasoning Powers.*

it is in the development of the reasoning powers that their pre-eminence lies. The pupil learns the process of *induction* in acquiring new rules. Individual cases are presented to him, and from a study of these a general rule is drawn up. The application of the rule thus acquired affords practice in *deduction*, while the building up of the science of geometry from a few fundamental principles is a piece of deductive reasoning not to be equalled in any other branch of knowledge. Not only is a good introduction to *abstract reasoning* supplied by the study of mathematics, but in this subject the abstract and the concrete are in continual touch one with the other,

so that the student often has the pleasure, after working out a complicated theorem in the abstract, of finding that it has a direct bearing on some important practical question. We must admit, however, that mathematics, affords very little scope for training the imagination. This faculty is brought into operation only in the processes of *abstraction* and *idealisation*. The latter process is frequently required in mathematics, as there is constant occasion to refer to quantities infinitely great or infinitely small. By its aid alone can we conceive of a geometrical point or a line, of a plane surface or of parallel lines. The subject also teaches the student the great importance of rigid definition, without which he soon strikes on the quicksands of fallacies. Mathematics itself makes practically no call on the powers of observation, although it is a necessary adjunct to many subjects, such as physics, which do.

II. **Practical Utility.**

From the utilitarian point of view, some training in mathematics is absolutely necessary for every one; and while the lower branches in particular, such as arithmetic, make an appeal to everybody as being essential to success in life, the work of the surveyor, engineer, &c., is mainly an application of the higher departments of the subject.

(a) *In everyday life.*

The student of science can make but little progress unless he has had a good preliminary training in mathematics, for not only is it necessary to make frequent, and often elaborate, calculations in such subjects as physics and astronomy, but the higher branches of mathematics have played an important part in the investigations of the most difficult parts of chemistry and other subjects which are generally regarded as "sciences of observation."

(b) *In Science.*

Among the many important results arising from even an elementary training in mathematics must be

(c) *In Forming Habits.*

set the development of habits of *accuracy* and of *neatness* in setting out the steps by which the results are obtained, as well as the *sound method* by which the mathematician makes those steps follow one another in logical order.

The infinite variety of exercises and results which can be deduced from a few simple mathematical truths not only affords intellectual pleasure to those who pursue them with any degree of earnestness, but the efforts made to obtain the solution of mathematical problems tend to produce a manly *self-reliance* in all who apply themselves to the task.

A. Arithmetic.

Its Special Advantages.

We have already referred to the extreme importance of every one being equipped with a good knowledge of arithmetic. Children who sometimes show considerable reluctance to apply themselves to a subject the advantages of which are not obvious, require very little persuasion to convince them of the serious disadvantages they will labour under if they do not acquire a fair amount of skill in arithmetic. A good teacher will not hesitate to set this view continually before his class, for while he himself attaches more importance to the educative value than the practical utility of this subject, he must not expect his pupils to regard the matter in the same light. Children are much more disposed to work for what they think will pay than for the improvement of their minds. In fact, it may be said of persons of all ages that the greater the need for the development of one's mind the less disposed is one to recognise that need.

In all cases arithmetic is the earliest form of mathematical study taken up, and indeed for the great

majority of school children it is the only one. It therefore behoves the teacher to consider carefully all the advantages afforded by mathematical studies, and endeavour to press them home in the arithmetic lessons.

The close connection between principles and practice and between the abstract and concrete, makes arithmetic the most useful as well as the most educative subject in the curriculum of the elementary school.

General Considerations in Teaching Arithmetic.

Before proceeding to discuss in detail the methods to be employed in teaching the different rules, it is advisable to consider certain general principles which apply to all of them. Many of these apply to other subjects as well, but are of special importance in the teaching of arithmetic.

(a) *Uniformity of Method.*

It is the duty of the head teacher to see that there is a uniformity of method in the teaching throughout the school. Several parts of the subject admit of treatment in two or three different ways, and the head teacher must see not only that faulty methods are avoided altogether, but that where there is a choice between two methods based on sound principles, the one adopted is in use throughout the whole school, and thus the time of the children will be saved when they pass from one class to another. The periodical meetings of the staff afford a good opportunity for discussing and settling the method to be adopted.

(b) *Shortened Methods.*

Wherever practicable, preference should be given to shortened methods. Not only are they the most economical of time and paper, but it also follows that by reducing the number of figures and operations, there must also be a reduction in the chance of making a "slip in the working." It is greatly to be regretted that such scant attention is paid to con-

tracted methods in decimals. Children should be taught the importance of approximate results, and of recognising an error as a fraction of the whole quantity from which it arises. The practice is a very valuable training, as it forces the children to attach a meaning to each digit, and is besides of extreme importance in all practical calculations later on.

(c) *Checking Results.* Children always seem to show a preference for those subjects which afford them an opportunity of "doing exercises," and wherever possible the teaching of principles should not only be "driven home," but "clenched" by the working of exercises. Now the exercises in such subjects as languages, when completed, have to await the teacher's correction, for even in the case of a retranslated passage, although the pupil may assume that he is correct if he has given the exact words of the original author, it does not follow that he is wrong if he has in some measure departed from the author's phraseology. But in nearly every case the correctness of arithmetical examples admits of easy proof, and children should be taught tests for their rules and encouraged to apply them.

(d) *Plentiful use of Concrete Examples.* In order that the pupil's interest may be sustained, it is advisable to have recourse to abundant examples involving concrete quantities. In the lower classes the questions should almost invariably refer to concrete quantities, and in the infant section numbers of actual objects—marbles, pens, pencils, &c.—should be set before the children.

(e) *A little at a time, and frequently Revise.* The teacher should be careful not to try to teach too much at a time. To the impatient teacher arithmetic is a subject which offers frequent opportunities for wrongly assuming that a rule has been mastered, and for hurrying along to the next, but to the careful teacher the most satisfactory features of the

subject are the clearly defined steps, the frequent landmarks and opportunities offered for revision. The principles underlying a rule are seldom grasped by the whole class at once. The brighter children may grasp them in the first lesson, and these may be set to work examples, and called upon to assist the teacher in his blackboard demonstrations to the others, but the teacher must be careful not to proceed to the next rule until every member of the class has mastered the principles and acquired the power of readily applying them. There is unfortunately a tendency, though less strong now than formerly, to rigidly delimit the work of each standard. Children in Standard VII are often unable to work a sum in practice, not having touched that rule since they were in Standard V. The whole of the previous work should be frequently revised, and this revision should not be undertaken merely to refresh the memories of the children. The revision affords opportunity for amplification in the teaching of the rules. There are many "special methods" which it is not advisable to press upon children studying a rule for the first time, but which are full of interest to children in the upper classes, who derive not only pleasure but great intellectual advantage from the study of them. Thus in revising simple multiplication, children in the upper standards should be taught such special methods, with the theory on which they are based, as :—

(*a*) To multiply by 25 by affixing two noughts and dividing by 4.

(*b*) To multiply by 13, 14 .... 19, or 21, 31 .... 91, in one line by multiplying by 3, &c., and adding in the figure to the right (or left in the second group) to the product at each step.

(*c*) To multiply by 99, 98 (999, 998), &c., by sub-

tracting once (or twice) the multiplicand from 100 (or 1,000) times the multiplicand.

(*d*) To multiply by such numbers as 568 in two lines, or 392,568 in three lines.

(f) *Variety of Form in Problems.* In the upper standards teachers generally have recourse to books for their examples and problems, but in the lower ones teachers have to rely on the fertility of their own brains, and unfortunately many teachers who possess this faculty to a remarkable degree require a good deal to convince them of the necessity for employing it. It is however perfectly astonishing to note how a child's interest is increased by a wide variety in the form of their problems and in the concrete quantities involved in them.

(g) *Copying.* There are few subjects in which copying may be more easily carried on, and is more difficult to detect than in arithmetic. The remedies are :—

(*a*) *Careful, patient teaching.* The child who understands his work and can readily work out the sums feels little temptation to copy.

(*b*) *A good moral tone* in the class and school; should an instance be detected, the seriousness of the dishonesty (the theft of another boy's work) should be pointed out to the class.

(*c*) *Vigilance on the part of the teacher.* Although the teacher should never make children sit in unnatural positions to preclude copying, he must at all times carefully watch the children at work. Those who have finished first may cover their work. Persistent copiers should be set to work in isolated positions. In the lower classes two different sets of work may be set to children in alternate seats, and in the upper classes, test cards, &c., will be found effective in the prevention of copying. In some cases the answers at the end of the books of examples prove fertile sources of temptation to

dishonesty; in fact, if a boy has the free use of an answer book there is absolutely no guarantee that such sums as addition, subtraction, short multiplication and division have been worked at all. In the case of sums in which there is some intermediate work to be shown, this work should be carefully inspected by the teacher, not only to ensure that the result has been honestly obtained, but that the steps are in proper sequence and clearly and neatly set out. The practice of merely checking the answer and allowing full credit for its correctness is a mark of laziness in the teacher and is demoralising to the pupils.

(h) *Sequence in the Teaching.*

Lastly, the teacher must always bear in mind that the part of the subject he is teaching at any moment is to be followed by other parts later on, and this should lead him to lay down a general rule in making choice between two methods of teaching, viz. :—that the preference should be given to that method which will be of most use in the subsequent work, although it may be no easier—or may even be a little more difficult—than another method. This consideration alone should lead us to treat subtraction as complementary addition, quite apart from its inherent superiority over the so-called "borrowing method." A similar consideration is applicable to all arithmetical definitions and conceptions, and will sometimes lead us to modify or even to duplicate our definitions, *e.g.* the symbol $\frac{3}{4}$ may be taken as representing the result obtained by dividing one unit into four equal parts and taking three of them; but just as truly it represents the result of taking three units and dividing that quantity by four. It is advisable that the teacher should impart both these conceptions to his pupils, for some of the rules of fractions are best explained through the one, and some through the other.

For the sake of convenience we propose to group the rules into three sections: Introductory, or Kindergarten Arithmetic, Junior Arithmetic and Senior Arithmetic.

Introductory, or Kindergarten Arithmetic.

The Child's first idea of Number.

Success in the teaching of arithmetic depends upon the recognition throughout of the abstract nature of number, for arithmetic is the science of number, and the acquisition by the little child of a correct idea of number is of fundamental importance.

Any one who has endeavoured to impart the idea of number to young children cannot fail to be impressed with the difficulty of the task. Young teachers frequently err in thinking that if a child can use a numeral adjective as the name of a group of concrete things, that he has grasped the idea of an abstract number; and thus they start by showing the child two red marbles and three white marbles, and telling him to call them in succession "two red marbles and three white marbles," "two reds and three whites," and then "two and three." But this is only teaching a contracted nomenclature, for two and three do not here represent *abstract* numbers but concrete quantities.

The idea of number, like the idea of any other abstract quality, must be imparted by making comparisons. We acquire our idea of greenness (*a*) by comparing a number of things which differ from things of other colours by being all green, and (*b*) by comparing green things among themselves, and eliminating all such properties as hardness, weight, size, in which they differ, so that we have left in our minds only the idea of the colour in which they agree.

It may appear, then, that there are two courses open to us :—(*a*) to familiarise the child with a unit, and then by repeating the unit induce the child to see the *number* of times the unit is repeated to make up the group; (*b*) to present to the child groups containing different numbers of objects, lead him to see that there is a difference between the groups, and that this difference is due to the *number* of times a common unit is contained in the respective groups. In other words, since number is the relation between the unit and the group, we may establish this relation by synthesis—building up the group from the units—or by analysis,—resolving a group into its constituent units. Experience, however, goes to teach that although the synthetic method is most useful in building up large numbers from small, yet the first ideas of number are best acquired by analysis. One reason for this is apparently that children acquire the names before the ideas. Thus the teacher shows a marble to the child and says, "Here is one marble." He then places another by the side and says, "Here are two marbles," and thinks the child has grasped the meaning of "two." But if he directs the child to pick up "one marble," the child picks up the *first* one shown, and when told to pick up "two marbles," he invariably puts down the first and picks up the *second*. The ease with which children confuse "two" with "second" shows at once the advisability of adopting the analytical method. The following sketch of a lesson on the "number two" will serve to illustrate the method.

1. The teacher arranges a few couples of counters, with groups of threes, fours, fives, and a few odd ones.

2. The teacher then shows that a couple consists

of two, by removing it in two steps, or by taking one in each hand, and requires the children to point out the other groups which contain the same number of counters.

3. The above is repeated, but pence, marbles, pencils, &c., are substituted for the counters.

4. Two pennies, marbles, pencils, counters, &c., are then shown together in order to impress the children with the fact that the *number* is quite independent of the other properties of the things.

5. A two-foot line may be drawn on the board, and the children allowed to find the number of times its length contains that of a foot rule.

6. Exercises are then given, such as taking one from two, two from two, adding one to one. The illustrations previously employed should here be used again, and the fact impressed upon the child that the results are independent of the nature of the things.

7. The sign 2 is then associated with the number, and children practise writing it.

We may here remark that the child's fingers are always available as illustrations in teaching number, and it is altogether unreasonable to forbid the use of these convenient illustrations while allowing the use of marbles, &c. Fingers should not be allowed as aids in computations, in which respect marbles are placed under the same restriction, but in teaching numeration, and particularly the *decimal* numeration, which is after all based upon the ancient plan of counting the fingers, their aid is very valuable.

No fresh difficulties will be encountered in teaching the other numbers up to 9. The child should then be taught numeration up to 14 or 15 without taking the corresponding notation. The notation of numbers above 9 is best taught by a group the

members of which can be compared—one ten and one being compared with one ten and two, &c. Numbers involving 20 or higher multiples of 10 present no difficulty when the principle underlying the notation of 10....19 has been mastered.

Composition of High Numbers.

The teacher must remember that large numbers cannot be imaged as distinct groups of units, and we acquire what knowledge we have of them by the association of groups of small numbers, and the plan of presenting numbers of things systematically arranged will be found a great help in teaching the higher numbers to children. For this purpose cards with dots on them arranged as on dominoes or playing cards are very useful in the early stages. The abacus is a well-known and useful piece of apparatus for teaching number, but it would be better if it were provided with ten wires each provided with ten beads, instead of twelve wires, with twelve beads as generally constructed A class might well be supplied with ten such frames; this would provide illustration for all numbers up to 1000.

Junior Arithmetic.

In the "four simple rules" the pupil learns all the operations he is called upon to perform in arithmetic; all the other "rules" are simply applications and combinations of the four simple operations; hence the importance of thorough teaching in these rules. Facility in these rules depends upon the ready recognition of the relation between two or more numbers. In addition and subtraction the pupil must recognise one number as the sum of two others, and in mul tiplication and division he must recognise one number as the product of two others, or sometimes in the latter case as exceeding their product by a fourth

number—the remainder. The child will already have acquired a certain amount of familiarity with the composition of numbers in his early lessons on number, and thus feels a certain continuity in proceeding to simple addition and subtraction. At first the teacher should employ the same methods and use the same illustrations—cubes, marbles, the ball-frame—and having been shown that 3 cubes and 2 cubes make 5 cubes, and 3 marbles and 2 marbles make 5 marbles, &c., the child readily sees that the relationship depends upon the numbers, and is independent of the units employed. The teacher will then give questions requiring the sum of other concrete quantities, not present, such as 3 sheep and 2 sheep, and eventually arrive at the sum of 3 and 2. Some young teachers shrink from asking their children for the sum of 3*d.* and 2*d.*, under the impression that "money sums" belong to "compound rules." This, of course, shows on their part an ignorance of the simple fact that every concrete quantity is expressed by a term consisting of two parts, one a *unit*, or fixed standard by which the given quantity is measured, and a *number*, which shows how many times the unit is contained in the given quantity. A quantity is "compound" if it is expressed in terms of two or more different units, as 3 tons 6 cwt., or £3 6*s.* 2*d.*, but if only one unit is employed the quantity is "simple," and exercises on such quantities belong to the simple rules, and are greatly to be preferred to exercises on abstract numbers.[1]

[1] The student will observe that every number is necessarily abstract; it is a serious mistake to call a concrete quantity a concrete number; *e.g.*, 5 tons is a concrete quantity. Moreover, the term *abstract* is not redundant when applied to "number," if the abstract nature is the particular characteristic we wish to emphasise, any more than it is redundant to speak of a "running stream," although no streams stand still.

Addition of single digit numbers requires nothing but patience and plentiful illustration, and should be taken simultaneously with notation. The difficulty which beginners experience in adding on numbers above 5 is greatly diminished if they are taught to split them into threes; thus $8 = 2$ threes and 2, and $7 + 8$ is performed by "counting by threes" (7, 10, 13) and then adding on 2. At first children may be allowed to put nine dots in a corner of their slates, thus ⁘ to enable them to analyse the numbers. Soon they will be able to visualise the group, and afterwards to add the numbers without decomposition. They should not be allowed to put down and count single dots or strokes. Simple Addition

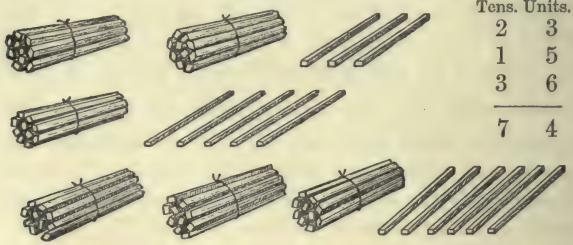
Although to the more advanced student $8 + 3$ is absolutely the same as $3 + 8$, *i.e.* when he is required to find the sum of two numbers it is a matter of perfect indifference which comes first, yet the little child always regards the number given first as a fixed quantity and proceeds to add the second number to it.[1] At first the teacher should put the greater number first in these questions and afterwards reverse them, and impress the identity of the two forms.

The ease with which children will master "carrying" will depend on the thoroughness with which they have been taught notation. Decimal coinage affords a ready means of illustrating the principle in those countries which have been shrewd enough to adopt it, but in Great Britain we must fall back on the ball-frame, or upon marbles and cubes, which show no more fitness for grouping in tens than in elevens; still, although not very convenient, the

[1] A boy of four, on being asked for the sum of 3 and 8, said "Ask me the other way, papa, 8 and 3," and at once gave the correct answer.

teacher can make them serve his purpose. A stock of little sticks, such as match sticks, some loose and others tied in bundles of ten can be used.

The teacher points out the necessity of tying the loose sticks into bundles whenever possible, and



Tens.	Units.
2	3
1	5
3	6
7	4

shows the $(6+5+3)$ loose sticks will form 1 bundle and leave 4 loose sticks (ones). He shows that the number of bundles will consist of the $(3+1+2)$ original bundles together with the one just formed, and shows the importance of "carrying" the one first, lest it should be forgotten.

As the pupil advances he may be shown special methods for making more rapid additions, such as—

(*a*) In adding 9 to increase the tens digit by one, and decrease the units digit by one.

(*b*) To recognise pairs of digits whose sum is 10, and add them in one operation.

$$\overbrace{4+2}+6+\overbrace{7+3}+5=27$$

Mental work. 10, 12, 22, 27.

We stated above that "in addition and subtraction the pupil must recognise one number as the sum

of two others," consequently as both depend on the same relationship, the two rules should be taught simultaneously. Thus a knowledge of the fact $4+5=9$ is all that is required to answer all such questions as—

(*a*)	4 and 5?	Add 4 to 5.
	Add 5 to 4.	Find the sum of 5 and 4.
(*b*)	4 and ( ) make 9.	5 and ( ) make 9.
	4 from 9?	5 from 9?
	Take 5 from 9.	Subtract 5 from 9.

But although all these questions call for a knowledge of the same fact, we have arranged them in two groups. In (*a*) the two smaller numbers are given and their sum is required; in (*b*) the sum and one number are given, and the other number has to be found. Subtraction, then, should be taught by simply modifying the form of question used in addition, and there are four reasons for adopting such a course :— **Subtraction.**

(1) The total amount of labour required to teach the two rules is diminished.

(2) Later rules are more easily acquired.

(3) Arithmetic as a whole is more easily acquired if not regarded as made up of a large number of independent rules.

(4) No special device is needed to obviate the difficulty felt when a digit in the subtrahend is greater than the one above it.

The process which enables us to find a number which will *complete* the sum of two or more numbers is called "Complementary Addition," and it is certainly the best method of teaching what is generally called subtraction. Whatever method be adopted it (a) *Complementary Addition.*

is advisable to arrange the sums at first so that in no case a digit in the subtrahend exceeds the one above it.

	587
The mental work is as follows :—	252
2 and **5** are 7.	—
5 and **3** are 8.	335
2 and **3** are 5, which is precisely the same	═══

work as that required in adding 252 and 335.

When children are able to work sums of this type with ease, it is time to introduce a digit into the lower line which exceeds the one above it. In introducing these it is advisable to work a two-lined addition sum, as (A). The teacher should then point out that the whole answer is the sum of the two whole numbers, but that each digit in it does not represent the sum of the two digits above it, *e.g.*,

(A)	(B)
123	352
229	229
—	—
352	123
═══	═══

the sum of 9 and 3 is not 2. The children will remember the carrying figure. Then, taking the subtraction sum (B), the children will likewise see that if 352 is the sum of 229 and something else, the 2, being itself less than 9, cannot be the whole sum of 9 and something else, but only the units digit of the sum, the whole sum being the next number above 9, which ends in 2, viz., 12.

Mental work.—9 and **3** are 12, carry 1.
[1] and 2 are 3 ; [3] and **2** are 5
2 and **1** are 3.

N.B. The numbers in [ ] are omitted in actual working.

Any other method of teaching subtraction requires a special device to meet this case. Of these we will first refer to the one generally called "borrowing."

Taking (B) as our example, children would be taught to say, "9 from 2? You can't. Borrow 10; 10 and 2 are 12; 9 from 12 leave **3**; pay back 1; 1 and 2 are 3; 3 from 5 leave **2**; 2 from 3 leave **1**."

So-called Borrowing

The absurdity of the whole proceeding is evident on a moment's reflection. In the first place it leads to a confusion respecting the place value of the digits, for that is a point never considered by those who teach this way; next, there can be no borrowing without a lender, and if the teacher is asked where the 10 is borrowed from, he answers coolly "From the next column," never troubling whether it is from the 2 or the 5. But it really does not matter, for whichever figure is supposed to make the loan will be reduced [to 4 or 1] while the loan lasts, and the effect of "paying back" will be to restore its original value, and therefore the second step will be "2 from 5," which is wrong. In spite of the fact that there is not a single point which can justify the use of the word "borrow" in subtraction, this traditional method is dying a very hard death. The actual operations in the above resemble those in the first of the methods next described, but the nomenclature is bad and children fail to gain any intellectual advantage from such unscientific teaching.

(b) *Equal Additions.*

The two methods of getting over the difficulty which are based on correct principles are the methods of "Equal Additions" and "Decomposition."

This method depends on the fact that the difference between two quantities is not altered by adding the same quantity to each. The teacher who proposes to use the method should give plenty of examples to establish the principle. Thus $5-2=(5+3)-(2+3)=(5+7)-(2+7)=(5+10)-(2+10)=3$. He then works a sum, such as B, and

shows that the first step is impracticable, so he adds 10 to the top line and says "9 from 12 = **3**." Having added a ten to the upper line he now adds a ten to the lower one (*i.e.* to the two tens in it) and says 3 tens from 5 tens = **2** tens. Little children, however, experience a difficulty in understanding why the increment in one case is 10 ones, and in the other case one 10, and when the difficulty occurs in the tens or hundreds column it is still greater.

Decomposition.

In working example (B) by the method of decomposition, the difficulty arising from the units digit is removed by decomposing the 5 tens into (4 + 1) tens, the one ten is added to the 2 making 12, from which 9 is subtracted, leaving **3**. In dealing with the tens we must not subtract 2 tens from 5 tens; we have already used up 1 ten, so must say "2 from 4 leave **2**."

	4+1
	3 5 2
	2 2 9
	1 2 3

This is easily explained to the children by the use of the bundles of sticks. The teacher says that he wants to take away 2 hundred-bundles, 2 ten-bundles and 9 sticks from 3 hundred-bundles, 5 ten-bundles and 2 sticks. In order to take away 9 sticks it is necessary to take and untie one of the 5 ten-bundles. This gives 12 sticks, and after taking away 9 sticks, **3** sticks are left; 2 ten-bundles have now to be taken from the 4 ten-bundles remaining from the 5 ten-bundles—result **2** ten-bundles; and on taking 2 hundred-bundles from 3 hundred-bundles, 1 hundred-bundle remains.

The above example would have been much more involved had the tens digit in the upper line been 0. In that case it would have been necessary to decompose the 3 hundreds into (2 + 1) hundreds, then decompose the 1 hundred thus obtained into (9 + 1)

tens, and then proceed to add the 1 ten to the 2 units as before.

As it is quite a common thing to find a nought, or even two or three, in the minuend, we must regard this method as leading to unnecessary complications; and neither of these methods can compare in simplicity with the "implied carrying figure" which obviates the difficulty when subtraction is taught as complementary addition.

Addition and Subtraction Combined.

The latter method also enables the pupil to subtract the sum of a series of numbers from a given number in one step.[1]

Example. Subtract (365+137+273) from 908.

The mental work is as follows:—

3, 10, 15, and **3** are 18, carry 1
(1) 8, 11, 17, and **3** are 20, carry 2
(2) 4, 5, 8, and **1** are 9

908	
365	
137	
273	
133	

The given number 908 is regarded as the sum of 365+137+273+the number to be found, consequently the units digit of the latter must be such as will give 18, *i.e.* the next number ending in 8, above 15, viz. 3; similarly its tens digit must produce with 17, the next highest number ending in 0, *i.e.* 20, so it must be 3, and similarly its hundreds digit must produce 9 when added to 8.

[1] If the teacher sets his own addition sums on the blackboard, as most teachers do, he will find it a good plan to make pairs of lines come to a power of 10. This is easily done by making the sum of the units digits equal 10, and the sum of each other pair equal 9. Thus in the annexed example the sum of the first and second lines is 10000, so is the sum of the fourth and fifth. The answer is got by writing 2 in front of the third line. It is astonishing what a long time children take to see a relation between the digits in the third line and those in the result. The position of the key-line may be varied, or the key may consist of the sum of two lines.

4783
5217
4802
3619
6381
24802

It will be gathered from the "mental work" above that we recommend that children should not be taught to repeat the several digits they have to add together, but only the results of each step;—not 3 and 7 are 10, 10 and 5 are 15, etc., but simply 3, 10, 15.

Exercises of the above class are very valuable, and although so useful in book-keeping, etc., for finding the balance in an account, they receive but scanty attention in our schools. Practice sums can also be shortened by adopting this method.

Multiplication.

Preparatory to learning this rule it is necessary for the children to commit to memory the multiplication tables. A start should have been made with these while the children are studying addition and subtraction; and this not simply because it will pave the way for the future work, but because multiplication is after all only a particular case of addition—*i.e.* the addition of a number of like terms. The practice of teaching the tables by mere oral repetition is a very unsatisfactory one, because it does nothing toward developing the intelligence, and it fails to secure the interest of the children, who can see neither the origin nor the purpose of the matter they are required to learn. Each table should be built up by the children in the form of a series of addition sums; thus, taking the "3 times" table as an example:—

How to Teach the Tables.

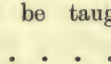
1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12
—	—	—	—	—	—	—	—	—	—	—	—
3	6	9	12	15	18	21	24	27	30	33	36

Of course a portion only of any one table should be attempted in one lesson. Each sum should not

only be worked through by the pupils, but the working should be repeated several times as a counting exercise, the children saying—One, two, three; three ones are three;...five, ten, fifteen; three fives are fifteen; etc. This will greatly facilitate the acquisition of the later tables, because the child becomes familiar with the series of multiples of the numbers up to 12. The results should then be tabulated on the blackboard by the teacher, who should point out such facts as the following, which will serve as mnemonic aids in the last step, viz., that of committing to memory.

1. On the principle that $a \times b = b \times a$, the square number is the first new number in any table, *e.g.* in 6 times, the first five lines are known, the new work begins at $6 \times 6 = 36$.

N.B.—The above principle should be taught through a few graphic illustrations, thus the accompanying group of dots may be regarded as made up of three lines containing four dots each, (3×4) or four columns containing three each, (4×3).



2. In "5 times" the units digits are alternately 5 and 0.

3. In "9 times" the successive tens digits increase by 1, and the units digits decrease by 1.

4. In 10 times the units digit is always 0.

5. In 11 times up to 11×9 the units digit and tens digit are the same, and are the same as the multiplicand.

The last stage is apt to be regarded as mere mechanical work. It is no more so, however, than any other habit. It is quite true that when a child says "Seven eights are fifty-six" he never realises what an "eight" is, still less what seven eights are,

neither does the term "fifty-six" convey a distinct idea to his mind; but he states that "fifty-six" is the equivalent of "seven eights" because from frequent repetition of the statement the mention of the words "seven eights are" serves as a sufficient stimulus to make him say "fifty-six." With young children the close resemblance between "three and two" and "three times two" often leads to the statement of the equivalent as "six" in the first case and "five" in the second. The correct habit, however, is soon acquired.

Frequent exercises must be given on the tables before formal multiplication sums are begun. These should consist of repetition forwards and backwards and at random. The last practice is carried out by the teacher writing the numbers from 1 to 12 in a column on the blackboard, announcing the table required, and then pointing to the numbers at random. Thus, suppose he wished to take a practice in "seven times," he might point to 3, when the children would say "7 threes are 21," and before they had quite finished he might move his pointer to 8, when the children without a pause would say "7 eights are 56" etc. Another useful practice is got by reversing the factors;—thus, instead of seven ones are seven, seven twos are fourteen, the children say, One seven is seven, two sevens are fourteen, etc.

An objection is sometimes raised to the teaching of any tables beyond 9×9 as being unnecessary. This is true as regards the use of the tables in actual multiplication, but the simplicity of "10 and 11 times" makes the objection of little weight here; and owing to the fact that 12 is the number of pence in a shilling and of inches in a foot, the usefulness of a knowledge of the lower multiples of 12 is very great. Indeed, it is questionable whether children should not

learn 16 and 28 times when they come to work sums in weights and measures.

In introducing a first lesson on multiplication the teacher cannot do better than take such an example as 274×3, and treat it first as an addition sum, as (a). He then explains that we might set the number to be repeated, and the number of times it is to be repeated in the form (b); when the tables enable us to find the result without the step-by-step process of addition. The "carrying" presents no difficulty which has not been already faced in addition.

(a) 274
274
274
822

(b) 274
3
822

Short Multiplication.

The next step, after considerable practice in the former, is multiplication by 10. In this the table should not be used after the first lesson. A number —376, is taken and multiplied by 10 in the ordinary way. The children are then reminded that the value of a digit is affected by its place, and that if the 3, 7 and 6 stood in the fourth, third and second places from the right, they would have 10 times the value they would have in the third, second and first places respectively. This change of position may be brought about by writing *any digit* after the 6, but the only digit which alters the position of each digit, and so multiplies it by 10, *without further increasing the number*, is 0. Children must not be allowed to think that there is something magical about the 0, which causes the multiplication, the result is due to the *change of position of the several digits.* If we adopt any system of indicating place position other than the convention which regards the right-hand digit as representing units, we might multiply by 10 without the addition of 0. By insisting on this fact, the teacher is smoothing the way for multi-

Multiplication by 10.

plication of decimals (see page 264), for $357{\cdot}92 \times 10 = 3579{\cdot}2$.

In example (c) if the initials refer to all digits coming under them the multiplication is accomplished without 0. The child will see that although the answer stands for 3 thousands 4 hundreds and 6 tens, owing to the position of the digits under the letters, yet if we isolate the answer, the 3, etc., will not stand for 3 thousands, etc., unless we write a 0 after the 6. This illustration teaches the effect of change of position, but in their own working children should always insert the 0.

(c)	Th.	H.	T.	U.
		3	4	6
			1	0
	3	4	6	

Multiplication by Multiples of 10.

The next step is to teach that as $40 = 10$ times 4 40 times a number is the same as (10 times 4) times the number, consequently this step is merely a combination of the two preceding steps. Four times the given number is found by multiplying by 4, and this result is increased tenfold if each digit be set down one place farther to the left than the position it would naturally occupy. The units space may be filled by a nought, or left empty, provided the child understands that the place value of the other digits is shown by the digits of known value above them.

Multiplication in General.

The general method of multiplication by numbers higher than 12 depends upon the principle that $a \times b + a \times c = a \times (b + c)$. The pupil should discover this truth for himself by comparing the sum of 572×3 and 572×4 with 572×7, and similar examples. He will then easily be led to see that $3852 \times 58 = 3852 \times 50 + 3852 \times 8$, and the way of obtaining these two separate products has already been explained. It remains, however, for us

3852
58
19260
30816
223416

to say a word about the order in which the steps are to be taken. The traditional method is to begin with the right-hand digit of the multiplier, and if we had to go no farther than multiplication of whole numbers the order would be a matter of perfect indifference, although it might seem more natural to begin with the more important digit. But according to the general principle we have laid down (page 221), we must look ahead, and the practice of beginning to multiply with the left-hand digit greatly simplifies the teaching of contracted multiplication in decimals. In fact, many teachers, who begin with the right-hand digit, are driven, in teaching the latter rule, to transpose the order of all the digits of the multiplier —a most unnecessary proceeding.

Children should be frequently asked what the partial products represent (*i.e.* 50 times the multiplicand, 8 times the multiplicand), and whether a nought be inserted in the units place of the first partial product or not, they must be taught to read it off as 192,600, not as 19,260. The teacher should frequently have partial products read, to be sure that there is no doubt on this point.

Since in the above example the 2 and 8 might be called either the *last digit* or the *units digit* of the multiplicand and multiplier respectively, there are four ways in which the rule for arranging the sum might be given :—

(1) Place the last digit of multiplier under the last digit of the multiplicand.

(2) Place the units digit of multiplier under the units digit of the multiplicand.

(3) Place the last digit of multiplier under the units digit of the multiplicand.

(4) Place the units digit of multiplier under the last digit of the multiplicand.

Whichever form we adopt here, the arrangement will be the same, and, provided the first figure of each line comes under the figure we multiply by, every digit of the product having the same place value as that digit in the multiplicand under which it falls. But in multiplication of decimals the "last digit" is not necessarily the "units digit," and in order to secure the result just referred to, it is necessary to adopt the fourth of the above forms. Therefore by our principle (page 221) we should use this form in teaching simple multiplication of whole numbers.

It is not advisable at this stage to dwell upon multiplication by factors, except so far as it is necessary to explain the principle of multiplication by multiples of 10 as above. In this connection children might be set to discover the principle by comparing $(375 \times 2) \times 4$ with 375×8, etc., but unless we are multiplying composite quantities, there is more work involved in multiplying by factors than in the addition of partial products.

We have already referred to special methods (page 219), which should be taught when multiplication is revised by the elder scholars.

Division. The inversion of the multiplication table supplies useful preliminary exercises in division. It is not advisable to require this inverted form to be committed to memory, it is quite sufficient if children are taught to think of any item in the multiplication table and then give the inverse statement, *e.g.*, the child in doing this division exercise by three, thinks of "three fours are twelve," and says "three into twelve goes four." These may be followed by similar examples in which there is a remainder.

The teacher should carefully notice that division may be viewed from two or three different standpoints :

(*a*) As the inverse of multiplication ;—in division

we are required to find a quantity which when multiplied by a given number will produce a given quantity.

(*b*) As partition;—*i.e.*, the determination of the size of each part obtained by dividing a given quantity into an assigned number of parts.

(*c*) As quotition;—*i.e.*, the determination of the number of times a given quantity contains another given quantity. From this last point of view it is seen to be intimately related to subtraction, for we have to find how many times the second quantity can be taken away from the first.

At different stages in the teaching, these several points of view will have to be considered, but for the purpose of teaching the operations with the numbers, the second view is the most convenient one to take, and the teacher should begin by giving mental exercises in the division of easy concrete quantities : 8d. ÷ 2, 16s. ÷ 4, 35 oranges ÷ 5, etc., and should drive home to the children that *the parts* resulting from the division *are of the same kind as the whole* quantity divided. The fact is important in the division of whole numbers, but still more important in the division of decimals (see page 266). For the first lesson or two the divisor should be a factor of each digit in the dividend (noughts may also be introduced)—648 ÷ 2 ; 3906 ÷ 3.

At first children should be required to recognise, and in oral work to name, the place value of each digit in the quotient, afterwards it will be sufficient to observe the place value of the first digit. If this practice is insisted upon, a decimal fraction can be divided without any further teaching.

$$\begin{array}{r|l} 3 & 3906 \\ \hline & 1302 \end{array}$$

In the example the teacher points out that when thousands are divided the parts will consist of

thousands, the 1 must therefore be put in the thousands place, so 9 hundreds divided by 3 will give 3 hundreds, etc.

In the next step it is advisable to give examples in which the first digit is not divisible, but the number formed by the first two digits is divisible, *e.g.*, $1208 \div 4$; $2463 \div 3$.

Here the number of thousands (*i.e.*, 1) is not divisible into 4 parts, consequently we put nothing (not a dot) in the thousands place, and next consider the thousand plus 2 hundred as 12 hundred, which when divided into 4 parts gives 3 hundreds in each part. Therefore we set 3 in the hundreds place. This step prepares the children for the next, in which the remainder from one denomination is converted into the next, etc.

$$4)1208$$
$$302$$

Should there be a remainder from the units digit it may be set down in the form of a fraction by writing it over the divisor—although this is not recommended until children know something of fractions—or else it should be written after the quotient, from which it should be separated by a comma, and the abbreviation r. or rem. ; *the remainder should never be joined to the quotient by the plus sign.* Thus $462+3$ is equal to 465, and cannot represent the result of dividing 2313 by 5.

Division by Factors.

The next step is short division by factors. In this the manipulation of the numbers presents no fresh difficulty, but there are two important points in the theory to teach—(*a*) to establish the correctness of the quotient, and (*b*) to determine the correct remainder.

(*a*) The theory of division by factors is best taught by regarding division as "quotition." Thus in dividing 19096 by 56 we have to find "how many times" 56 is contained in 19096, *i.e.*, how many

56's there are in 19096. We can find how many eights there are by dividing by 8; and since 7 eights make one 56 we can find how many groups of 7 eights there are in 2387 eights, and thus the result gives the number of 56's in 19096. The principle can be illustrated by means of small sticks of wood, 90 sticks can be tied into 18 bundles of 5 each, and piles, each containing 15 sticks, can be formed by placing together 3 bundles. The teacher should repeat the illustration, but tie the sticks first into bundles of 3, and then place 5 bundles in a pile. The children will thus see that the order of the factors is immaterial.

8)19096
7)2387 (8's)
341 (56's)[1]

(*b*) The same illustration will serve to explain the method of obtaining the true remainder; for if we start with 98 sticks, we can make 19 bundles of 5, and have 3 sticks over, and when we arrange the bundles in three, we shall have 6 piles of 3 bundles (or 15 sticks) each, and one bundle over. To find the total number of sticks remaining after forming our 6 piles of 15 each, we must multiply the number of bundles remaining by the number of sticks in each (*i.e.*, by the first divisor) and add in the number of sticks remaining from the first operation. Again, children must be shown that the result is independent of the order of the factors.

When children are thoroughly familiar with division by two factors examples with three factors may be given. Their ability to reason out the method of obtaining the true remainder in such cases may be taken as a sure proof of their grasp of the principle involved, but for general work long division is shorter than continued division by factors.

[1] Beginners should be made to insert these words.

Division by Powers of 10. Division by 10 or a *power* of ten might be taken before division by factors, and, if the importance of place value has been insisted on, will present no difficulty.

Division by Multiples of 10. Short division by *multiples* of 10, however, should not be taught until children understand division by factors; if it is, then the teaching will be purely mechanical, the remainder being found by means of a trick.

(*a*) 10)43756

6)4375 tens, rem. 6 } r. 16.

729 sixties, rem. 1, ten }

(*b*) 60)4375\6

729, rem. 16.

If a sum be worked in the form of (*a*), children can easily be shown that as the digits in the second line are the same as those in the first, the division by 10 might be indicated by marking off the 6, as in (*b*). Then in the next step they will understand that the remainder represents 1 ten, and consequently the total remainder is 16.

Exercises in division by multiples of 100 and of 1000 should also be given.

Long Division. The advantages of the "Italian" or continental method of working long division are so obvious in rapid calculation, that it should become the method universally adopted in English schools. For the purpose, however, of explaining the theory of the rule it is advisable to set the steps of a sum out in full. These must be carefully compared with the working of a short division sum. Some teachers prefer to use the "long" form in teaching division by numbers below 13, but owing to the ease with which children lapse into mechanical methods

it is a questionable policy to allow them *even to see* such a sum worked out by a method other than the one they are intended to adopt, especially as no numbers are involved which are not easily carried in the head. In drawing up a series of examples, the teacher should remember the difficulty which is introduced by the figures carried when the second digit of the divisor is multiplied, and children require a large amount of practice before they can tell how much to allow for this. 71, 81 and 91 are much easier divisors than 17, 18 and 19.

As in short division it is extremely important that children should notice the place value of the digits they obtain in their quotient.

The teacher will point out that neither one nor two digits will form a number divisible by 52, we must take three and the number formed by the first three digits 478 gives the number of *thousands* in the dividend, consequently the first digit in the result will represent 9 *thousands*, and *must be put in the thousands place.* In short division the thousands of the quotient are placed *under* the thousands in the dividend, but we require this space in long division for other work, so in order to indicate the place value of the 9, we place it in the thousands column in this case, but *over the thousands in the dividend.* If children from the beginning are made to recognise the place value of, at any rate, the first digit of their quotient, they will have absolutely

```
      9198
52)478325
   468
    103
     52
    512
    468
     445
     416
      29 rem.

      9198
52)478325
    103
     512
      445
       29 rem.
```

nothing fresh to learn in division of decimals (see page 266). Remembering the "partition" aspect of the rule, the teacher will point out that the children are dividing 478325 into 52 parts, and are able to put 9 thousands into each part. To find how many thousands will be left after this we subtract 52 times 9 thousand (or 468 thousand) from 478 thousand. Children must be shown that the three digits 468 stand for thousands in virtue of their position under the thousands in the dividend; it is not necessary to add ciphers, as these make the fact no plainer and are not used afterwards. The teacher should next show that the 10 thousand remaining, and 3 hundred in the quotient make 103 hundred, which are divided in a manner similar to the first step, and so on. He then points out that in practice it is not necessary to multiply the divisor and subtract the result in *two* steps. The children should have had practice in subtracting the product of two numbers from a third, which is easily done by pupils who work by complementary addition.

As we have said before the real difficulty consists in divining the right digit to put in the quotient, especially when the second digit of the divisor is a high one. If the examples are graduated as we have suggested, there will be no difficulty in getting children at first to drop one digit (or two) each from divisor and partial dividend and instead of saying 52 into 478, to say 5 into 47. Some teachers recommend that the child should form a series of multiples of the divisor down the side of his slate or paper, but apart from the waste of time in obtaining a number of multiples which are of no use in the sum, the practice of depending upon such aid tells against the child later on. The difficulty is very much diminished if the child is taught to take as his

trial divisor the first digit increased by one when the second digit is large, thus the real question being 48 into 252, to say 5 into 25, and not 4 into 25. Secondly, he should be taught to put the lower number in the quotient when in doubt between two; thus in the first step of our example, if in doubt between 8 and 9 he should put 8; on finding that the remainder 62 is greater than the divisor, he should be allowed to increase the digit in the quotient by 1, and subtract once the divisor from 62, leaving 10; he then brings down 3 and proceeds as before.

```
    9
52)478325
   10
```

Compound Rules.

Owing to the absence of a decimal system of money, weights and measures in this country, English teachers are compelled to spend a vast deal more time over this section of Arithmetic than their *confrères* abroad. When the Metric System is introduced into this country a child will require to supplement his knowledge of the simple rules only by a few lessons on the use of the decimal point in order to be able to work all kinds of problems in money, weights and measures. But taking our system as it is there exists a considerable difference of opinion among teachers as to whether the long money tables should be committed to memory or not. We are inclined to think that the relations between the units are sufficient, and that the time commonly spent in repetition of farthings, pence and shillings tables would be more profitably employed in varied questions requiring division by 4, 12 and 20. If we consider the pence table as ordinary given up to 100*d.*, we find it contains sixteen statements. The memory alone will therefore give the result in sixteen cases, while in eighty-four, the effort of the memory must be supplemented by a process in subtraction before we get our required result, while in practice we frequently have to reduce

Money Tables.

to shillings a number of pence quite beyond the reach of the table. It seems therefore preferable to adopt the uniform plan of dividing by 12, and to give frequent exercises in reducing to shillings numbers of pence given either in series (17, 27, 37, &c.) or at random (62, 35, 99, &c.). A similar remark applies to the shillings table, for although it is easier to learn than the pence table, yet division by 20 is correspondingly easier than division by 12. The tables of weights and measures are invariably taught in the above way, that is, simply as statements of relations between the units. We cannot help regarding the amount of attention paid to such things as Apothecaries' Weight, the obsolete Troy Weight,[1] and the awkward relation between poles and yards, as being due not so much to the teacher's zeal for the development of his pupils, as to his servitude to examiners who delight in such vain things.

Obsolete Tables should not be Taught.

Having gone so fully into the methods of teaching the simple rules, we must take these as the starting point in our remarks on the compound rules.

Compound Addition.

The examples in the first stage of compound addition should contain but two units, *e.g.* shillings and pence, or pounds and shillings, and should involve no carrying, *i.e.* they should really consist of two easy simple addition sums placed side by side. The pupil must then be shown that since 12 pence make 1 shilling, any number of pence greater than 11*d.* should be set down as so many shillings (+ so many pence, commonly), and by comparing with the process of carrying tens in simple addition no difficulty will be found in teaching "carrying" in the compound rules. In the early examples it is advisable to use actual coins or models

[1] Abolished by law in 1878.

of them, in illustration, exchanging pence for shillings in case they amount to more than 11.

Compound Subtraction.

In connection with this rule we must repeat our condemnation of the use of the word "borrowing" as being utterly inapplicable to the process of subtraction. The method of complementary addition is recommended throughout, but whether it is intended to adopt this method or not, the earliest examples should not have the number of pence, shillings, &c., in the lower line greater than the number above. The teacher shows by means of coins or counters how much will be left when for instance, £1 8*s.* 3*d.* is taken from £2 11*s.* 8*d.*, or how much must be added to £2 11*s.* 8*d.* to make £1 3*s.* 8*d.*

The principle involved in the case in which the number of pence, or shillings in the subtrahend is greater than the number in the minuend is absolutely the same as in the corresponding case in simple subtraction. Plenty of examples must be given of the type—"What must be added to 9*d.* to make 1*s.* 3*d.*?—to 17*s.* to make £1 5*s.*?" In such cases as these the child may be allowed to reckon "through the shilling, or pound," *i.e.* to find first the complement of 9*d.* with respect to 1*s.* and then increase this by 3*d.* This is rather easier than first reducing 1*s.* 3*d.* to pence and then finding the complement of 9*d.* with respect to 15*d.*, and the mental work is less complex than that which is demanded by the subtraction of 9*d.* from 1*s.* 3*d.* considered as a compound quantity. Some teachers recommend a similar process in simple subtraction—"counting through the ten." Thus in subtracting 8 from 15, they would teach the children to say mentally 8 and **2** are 10, and 5 are **7**. But in spite of the fact that 15 is represented by two digits, the child regards it as one simple number and finds no

difficulty in subtracting 8 from it in one step. So the practice of reckoning "through the ten" involves two mental operations instead of one and has less to recommend it than the practice of reckoning "through the shilling" or pound, in which the two successive subtractions take the place of one reduction and one subtraction.

Compound Multiplication. (a) *Multiplier less than* 13.

If the teaching of this rule is based upon what the children have been taught in simple multiplication, very little difficulty will be experienced. The rule may be introduced, as in the previous case, by showing that multiplication is a short method of obtaining the sum of a number of equal quantities by the aid of the multiplication table. The method of "carrying" to the next higher denomination has already been taught in connection with compound addition.

(b) *By Factors without differences.*

Owing to the fact that (although there is a decimal scale in the abstract numbers used as multipliers), the compound expressions to be multiplied are not based on a decimal system, the method of obtaining partial products and adding is not of general application in compound multiplication. Children should be taught the reason for the difference of procedure in the two cases, and where two or more products are added (see p. 238) the identity of the processes should be pointed out.

£	s.	d.					
3	15	$4\frac{1}{2}$					
		8			£	s.	d.
30	3	0	= 8 times		3	15	$4\frac{1}{2}$
		7					
211	1	0	= (7 times 8) times		3	15	$4\frac{1}{2}$

The children must all be able to prove that the method employed will give the correct result, thus

in multiplying by 56 they show that the first step gives 8 times the multiplicand, and the second gives 7 times 8 (*i.e.* 56) times the multiplicand.

The teacher should point out the advisability of taking even factors before odd—of beginning with the factor 4, 8, or 12, if the number of farthings be odd, and thus eliminating farthings and often pence from the second step.

(c) *By Factors with differences.*

After the children have had sufficient practice in multiplying by numbers not exceeding 12×12, which they can easily factorise, they must be taught how to deal with multipliers which are not the exact product of two factors each less than 13. Thus $57 = 8 \times 7 + 1$, so having obtained 56 times the quantity as above, we add it once; $39 = 4 \times 10 - 1$, hence 39 times the quantity is found by *subtracting* once the quantity from 4×10 times the quantity. Teachers, generally, make far too little use of the second method, and children are taught in every case to take the product *next below* the given number and add, but it is less trouble to *subtract* once the multiplicand from forty times, than to *add* 3 times to 12×3 times the multiplicand, as there are only two multiplications instead of three. Odd minutes in the arithmetic lesson can be put to very profitable use by questioning the children on the factors whose products lie nearest to given numbers. It should be noticed that of the numbers not exceeding 144, no less than *one hundred and five* are either exact products of two factors (each less than 13) or differ from such products by 1, and of the remaining thirty-nine only *ten* are found among the numbers which do not exceed 100; so that of the multipliers not exceeding 145 only thirty-nine involve three multiplications, and one hundred and six require no more than two.

(d) *Multiplier exceeding* 12×12.

At this stage children cannot be expected to factorise numbers not found in their muliplication table, but later on, when this rule is revised, they will be able to resolve numbers into three factors and work examples in continued multiplication by three factors.

The method generally taught in schools for multiplication by numbers above 145, and often for lower ones, consists in multiplying continuously by a number of tens equal to the highest power of 10 found in the multiplier, and from the different multiples thus obtained of the given quantity, finding the required multiples of powers of 10, and adding the results. The explanation presents no difficulty after section (c) above has been taught, especially if reference is made to the addition of partial products in simple multiplication (see page 238).

The annexed example shows by the multiplication of £3 16*s.* $2\frac{3}{4}$*d.* by 3864 how such method should be taught.

	£	*s.*	*d.*					
4 ×	3	16	$2\frac{3}{4}$					
			10					
6 ×	38	2	$3\frac{1}{2}$	=	10 times.			
			10					
8 ×	381	2	11	=	100 times.			
			10					
	3,811	9	2	=	1000 times.			
			3					
	11,434	7	6	=	3 × 10 × 10 × 10 times	£3	16	$2\frac{3}{4}$
	3,049	3	4	=	8 × 10 × 10	,,	,,	,,
	228	13	9	=	6 × 10	,,	,,	,,
	15	4	11	=	4	,,	,,	,,
	14,727	9	6	=	3864	,,	,,	,,

This method has the advantage of being a general one and being easily taught because it is merely an extension of the method taught previously. It will be found, however, that the following method of multiplying by high numbers involves less work, particularly with children who have been taught reduction well. Special Method.

The children have already been taught that the multiplicand and multiplier are interchangeable, and consequently multiply 3864 by 3, and not *vice-versa*.[1]

$$
\begin{aligned}
3864 \times 3f. &= 11592f. \\
&\quad 2898d. \\
3864 \times 2d. &= 7728 \\
&\quad 10626 \\
&\quad 885s.\ 6d. \\
3864 \times 16s. &= \begin{cases} 23184 \\ 3864 \end{cases} \\
&\quad 62709 \\
&\quad £3135\ \ 9s. \\
3864 \times £3 &= 11592 \\
&\quad £14727 \\
\text{Ans. } £14727 &\ \ 9s.\ \ 6d.
\end{aligned}
$$

If the simpler forms of reduction sums are begun, as they should be, as soon as compound rules begin, the working can often be shortened considerably—thus the number of farthings or halfpence can be brought at once to pence, and the number of

[1] The expression $3864 \times 3f.$ may be objected to on the ground that it implies that an abstract number has to be multiplied by $\frac{3}{4}d.$ The objection is not, however, valid, for the expression consists of two parts, *f.* denoting the unit employed, and 3864×3 denoting the number of those units taken; and 3864×3 represents but one number, although its factors are indicated.

three-farthings can even be reduced to shillings straight away $4/\overline{)3864}$ and if the number of pence in the multiplicand be an aliquot part of a shilling, the result may be reduced to shillings directly, and so on.

$3864 \times 3f. = 241s.\ 6d.$
$3864 \times 2d. = 644s.$
$885s.$

This method of dealing with examples in which the multiplier exceeds 145 (viz:—by combining the simple multiplication of each unit with reduction), certainly seems far superior to the other method, which after all should be regarded as only provisional and to be superseded by "Practice." It also has some advantage as an introduction to the study of compound long division, of which it is the exact converse.

Compound Division.

In "compound division" it is obvious that the teacher must base his instruction on the "partition" view of the nature of the operation, and although the result is called a quotient, the word entirely loses its etymological meaning.[1]

The instruction in this rule follows precisely the same lines as in the case of simple division, the fact that the units are not related by a decimal scale being a matter of detail.

On page 242 we warned teachers against the bad practice of joining the remainder to the quotient by means of the sign +, we would now not merely remind them that the remark applies equally to compound division, but would like to emphasise the fact that when the dividend does not divide into a number of exact parts, *the remainder is not an abstract number but a concrete quantity of the same order as that last divided.* If the last step in the

[1] Quotient is from Lat. *quotiens*, how many times.

division consists in dividing farthings, the remainder, if any, will be a number of farthings, and should be so indicated.

If the Italian method has been adopted in simple division, it should be used throughout in compound long division, the only fresh element here is the manner of setting out the conversion of the remainder from one denomination into the next.

Reduction.

We have already recommended that easy exercises in reduction should be given as soon as compound rules are introduced, in fact such exercises will enable us to dispense with memory work on the tables. It is astonishing what a difficulty some children have in deciding whether to multiply or divide in reduction, *e.g.* in bringing pence to shillings they know that $12d. = 1s.$, but proceed to multiply instead of dividing. It requires great care on the part of the teacher to impress the fact that to denote the same quantity, the *larger* the unit the *smaller* the number. If the children write (or picture to themselves) the names of the units in a line they will soon get accustomed to dividing when going from right to left, and multiplying when going from left to right. Their work may be compared with train-journeys, in which the slow trains stop at every station, while the express, which has no passengers to pick up at intermediate stations, pass straight through. The pupils will prefer to convert miles to yards by "express;" *i.e.*, by multiplying by 1760.

In teaching the tables of weights and measures the teacher should endeavour to make the value of each unit as clear as possible to the child. Every school should be provided with sets of those weights and measures which are portable, the yard (and metre)

with subdivisions can be marked on the wall, and the size of an acre taught by reference to the play-ground (which should be known as a certain fraction of an acre), or by marking off an approximate acre (70 yards square) in a neighbouring field. Children should be made practically acquainted with the distance to some point a mile away from the school. In setting problems on weights and measures teachers should be careful that the notions of the magnitude of the various units are not outraged as is sometimes the case. The pupil should be encouraged to attach a clear meaning to the expressions in the sums, so that if his answer shows that he would require "88 days to walk a mile," he may suspect that he has gone wrong in the working. Problems based on such assumptions as that "two horses can plough 76 acres in $2\frac{1}{2}$ days" should be carefully avoided even in town schools.

Senior Arithmetic.

In this division of the subject the teacher should regard arithmetic more from the point of view of the mental discipline which the more theoretical part of it provides. In the junior section we have attached considerable importance to the teaching of the theory in each rule, the primary purpose being to ensure an intelligent grasp of the rules and accuracy in working examples, the disciplinary value of the theory being regarded as of secondary importance. Henceforth this value acquires a more prominent position, especially in the case of those pupils who will study no other branch of mathematics.

Theory of Numbers.

With this end in view it is desirable to teach the properties of factors and multiples much more

thoroughly than if they merely were to serve as keys to tricks to be performed in manipulating vulgar fractions. As a preliminary it is very desirable to teach the more elementary forms of symbolic notation. If the children proceed to algebra, they will have so much knowledge to their credit; if not, they will still have the advantage of coming to the study of this part of the subject with their ideas on generalisation very much extended. We must not be thought to imply that algebraical notation is a *sine qua non* for the establishment of a general arithmetical theorem. Some teachers often suppose it is, and here they make a great mistake. The establishment of a general proof in arithmetic, like the establishment of a general proof in geometry, can be effected by the consideration of a single case, provided the proof be based upon those properties which are common to all members of the class to which the individual case considered belongs. Thus Euclid I. 5 is established universally from the consideration of an individual isosceles triangle not by measuring the angles at the base and finding that each is equal to say 70°, but by reasoning from the equality of the sides—a property common to all isosceles triangles. So the truth that "all numbers ending in 5 are divisible by 5," can be established universally from one example, not by selecting a number ending in 5 and dividing it by 5. If this were valid we might select such a number as 153 or 693 and prove that all numbers ending in 3 are divisible by 3. We must base our proof on the property common to them all, namely, that such a number can be resolved into a number of tens + the units digit 5; and from the elementary propositions or axioms we start with we deduce (*a*) that each part is divisible by 5, and (*b*) therefore the whole number is divisible

by 5. It will be found that children are greatly interested in working out simple theorems in numbers, and are as pleased with them as with Christmas conundrums.

Highest Common Factor.

It is greatly to be regretted that the term "measure" was ever introduced into arithmetic, as it denotes nothing more than "factor," and children who have learned something about factors in connection with multiplication, are often led to suppose that they are about to begin an entirely new subject with "measures." It was formerly a common practice to give children a definition of "greatest common measure," sometimes but not always preceded by definitions of "measure" and "common measure," and then show a mechanical method of determining the G.C.M. of two numbers. Happily this is giving way to the more intelligent plan of teaching children first how to resolve numbers into their prime factors. The time spent in thoroughly teaching the tests of divisibility by 2, 3, 4, 5, 6, 8, 9, 10, 11, 12 will be amply repaid in the time saved in subsequent arithmetical operations (cancelling, etc.), and will produce a widening of the child's intellectual calibre. When children have had abundant practice in factorising individual numbers they should be set to find the square root of numbers which are perfect squares and contain no prime factors greater than 12. They should be made to realise that multiplication and division consist of the introduction and elimination of factors, *e.g.*, when $7 \times 3 \times 5$ is multiplied by 6, the factors 2 and 3 are introduced, forming $7 \times 3 \times 5 \times 2 \times 3$; and when this product is divided by 15 the factors 3 and 5 disappear forming $7 \times 2 \times 3$.

The properties of common factors should next be considered, and the important fact established that

"the greatest common factor of two numbers is the product of all their common prime factors." This should be regarded as the working definition, although the ordinary definition should be taught as well. If children set to work with the above definition before them, they will understand that in order to find the H.C.F. of two numbers, (*a*) they must search for and retain all the factors that are common, and (*b*) they may cast out all factors which evidently are not common.

The habit of eliminating from one of the numbers the factors which are not common, is one that teachers should endeavour to cultivate. In simplification of fractions much needless work is often done through failure to use factors which are not common in order to find out those that are :— thus, a pupil cancels $\frac{7\,5}{1\,8\,5}$ by 5 because the common factor is evident, but he makes no attempt to cancel $\frac{1\,1\,5}{2\,0\,7}$, for although 5 is evidently one factor of 115, and therefore a key to obtain the other, he has not been taught to realise in the negative result that 5 is not a factor of 207, that he has advanced one step towards a positive result, for if there is a common factor it must be 23.[1]

The mechanical working out of the common form for obtaining the H.C.F. of two numbers should never be allowed. The principle underlying its use may be shown by an example such as the following :

Find the H.C.F. of 43 times 35 and 27 times 35.

The children should first factorise 1505 and 945 and see that the only common factors are 7 and 5.

[1] Had $\frac{1\,1\,5}{5}$ been a composite number the common factors would have been found among its factors.

27 thirty-fives) 43 thirty-fives (1
27 thirty-fives

16 thirty-fives) 27 thirty-fives (1
16 thirty-fives

11 thirty-fives) 16 thirty-fives (1
11 thirty-fives

5 thirty-fives) 11 thirty-fives (2
10 thirty-fives

1 thirty-five) 5 thirty-fives (5
5 thirty-fives

The teacher will point out that all the operations are performed on numbers of "thirty-fives," and consequently so long as there is anything left it must consist of a number of "thirty-fives," and the last division will take place by 1 thirty-five. Having shown the children a method which can be employed when the factors are not obvious, the teacher will show how the work may be shortened :—

(*a*) By taking out *common* factors and *retaining* them.

(*b*) By taking out *non-common* factors and *neglecting* them.

(*c*) By the Italian method of division.

(*d*) By omitting to write down the quotients, and

(*e*) By not repeating the successive divisors, but using them as dividends where they stand.

L.C.M. The teacher must impress upon the class that the term "factor" implies relationship. One number cannot be absolutely a factor, but is a factor *of another*. Hence, he will show that this second is a "multiple" of the first. This idea of the relation between "factor" and "multiple" is of the highest

importance. By resolving one or two numbers into factors the teacher will establish :—

(*a*) That a number is a multiple of each of its factors—prime or composite.

(*b*) That all the factors of a number must be found in any of its multiples.

Proceeding to common multiples, he will show that *the least common multiple of two numbers must contain all the factors of the first, and those of the second which are not found in the first.*[1] In addition to the usual definition of L.C.M. based on its properties, this should be given as a sort of "working definition," being based on its constitution. Starting with this definition the L.C.M. can readily be found by factorising and only after ample practice has been afforded in this method should the common method be introduced, and when it is introduced there must be no mere mechanical application, the pupils must see :—

(*a*) Whether any contractions are made or not, every factor in each number given must appear either among the divisors or in the last line of quotients.

(*b*) That the method of selecting these factors must give a number agreeing with the working definition.

Mistakes most commonly arise from dividing by a composite number and retaining one or more of its factors in the numbers brought down. The pupil should, however, be taught to set composite numbers in the divisors and to divide by as many factors as possible. It is a good plan to take the first number (not wholly contained in another) as the

[1] This may be extended so as to apply to more than two numbers.

first divisor setting it out in factors, thus :—Find the L.C.M. of 10, 12, 18, 25, 90, 20.

$$\begin{array}{r|l} 2\times 2\times 3) & 10,\ 12,\ 18,\ 25,\ 90,\ 20 \\ 5\times 5) & 1,\ 3,\ 25,\ 15,\ 5 \\ \hline & 1,\ 3. \end{array}$$

$$\text{Ans.} = 2\times 2\times 3\times 5\times 5\times 3 = 900.$$

The teacher will show how this method is in direct agreement with the working definition, for the factors of 10 are merely held over, and by dividing the other numbers by one or more factors of 12, *i.e.*, 2, 3, 4, 6 or 12, we obtain the factors of the succeeding numbers which are not found in 12. To these we must join 3 and 5 to make the result a multiple of 18 and of 20 respectively, but as these are contained in 15 we do not consider them separately. The result must contain 5×5 to be a multiple of 25. Taking this as our next divisor, we have only the prime factor 3 left, which is necessary to complete the factors of 90 (see above).

Vulgar Fractions.

If any intellectual advantage is to accrue from the teaching of vulgar fractions it is of the highest importance to proceed from clear and logical definitions. Let a teacher before teaching "multiplication of fractions" ask, "What is a fraction?" "What is meant by multiplication?" If these two terms are *clearly* understood there will be very little difficulty in the way of teaching this rule, but the teacher must not assume because his children are in the habit of using the word multiplication in a glib manner that the meaning of the term is very real to them.

We do not wish to trespass on the ground covered by so many excellent text-books in arithmetic in dealing with vulgar fractions. The theory is

generally well set out, but we must impress on teachers the necessity—

(*a*) Of plentiful concrete illustration—lines and areas on the blackboard, lengths of rods, strings, &c.

(*b*) Of clear definition of terms.

(*c*) Of approaching the subject from different points (see p. 221).

(*d*) Of showing the similarity between operations with fractions and those with whole numbers.

(*e*) Of not allowing the simplification of complex fractions to be done by scraps.

Although children are taught that the value of a fraction is not altered by multiplying its two terms by the same number, they are seldom made to use this principle in simplifying fractions:—instead of simplifying $\frac{\frac{7}{8}}{\frac{5}{1\frac{2}{}}}$ by multiplying both terms by 24, thus $\frac{\frac{7}{8}}{\frac{5}{1\frac{2}{}}} = \frac{7 \times 3}{5 \times 2} = \frac{21}{10}$ (the middle step being mental) they make the denominator go through an acrobatic performance, and write $\frac{7}{8} \times \frac{1\frac{2}{}}{5}$ in a mechanical way before they can get the result.

Owing to the connection between some of the higher work in decimals and vulgar fractions, it is usual to postpone the study of decimals until after vulgar fractions. It is, however, much to be regretted that the simpler operations with decimals (addition and subtraction, multiplication and division by whole numbers) do not immediately follow on the simple rules with integers. Such an arrangement would emphasise the fact that decimals are an extension of the common scale of notation rather than the fact that they deal with quantities less than unity. The former view is the more important, and must strongly be insisted on when children are introduced to decimals. If this is done, and the use of the

Decimals.

point to indicate the units digit be explained, addition and subtraction present absolutely no difficulty. Children often come to regard the "position of the point" as something that can be determined by a sort of trick and which is unimportant so long as the digits are correct. A boy who would regard the answer £4 for £400 as a very serious mistake, talks lightly of having 4·3785 instead of 437·85, and calmly says "it is all right except the point." The teacher should endeavour to avoid the expression "position of the point," and talk about the "position of the digits;" the position of the point is as important as the position of the paper, the important thing is the *position of the digits* with regard to the paper and the point;—they must be written in the right order on the paper and at the correct distance from the point.

Multiplication of Decimals.

Few parts of the subject show up the difference between the methodical teacher and the unmethodical one so much as multiplication. The former proceeds step by step and bases each lesson on his previous teaching, and as the children understand the reason for what they are doing the work presents no difficulty. The best steps to take in teaching multiplication of decimals are the following:—

(*a*) *Multiplication of a decimal by an integer less than* 13.

The position of the multiplier is pointed out (see p. 239), and by comparison with integral multiplication the fact is demonstrated that if the first digit is placed under the multiplying digit, every digit in the product has the same place value as the digit of the multiplicand under which it falls.

(*b*) *Multiplication of a decimal by a power of* 10.

The children should be asked how any given digit may be made to represent 10 (or 100, &c.) times as

much, and if they have been taught to recognise the place value of the digits they can reason out the rule for themselves.

(*c*) *Multiplication by a multiple of* 10, 100, &c. If the teacher points out that $30 = 3 \times 10$, the children will see that this is a combination of (*a*) and (*b*), and that the operation of multiplying by 3 and then altering the place value of the product is accomplished in one step if the first digit of the product is placed under the multiplying digit.

(*d*) *Multiplication by any number above* 12.

This is merely a combination of (*a*) and (*c*), with addition of the partial products. It is important that the point should be inserted in the partial products, and the place value of each digit in them recognised. It is a common, but not very intelligent, practice to set down the partial products as whole numbers, and then by a trick place a point in their sum.

(*e*) *Multiplication by a negative power of* 10 (·1, ·01, &c.).—This is the converse of (*b*), and children should be made to reason it out for themselves, the teacher merely asking, "What does ·1 mean?" "How can each digit be made to represent $\frac{1}{10}$ of its original value?"

(*f*) *Multiplication by a multiple of a negative power of* 10.—This is a combination of (*a*) and (*e*), just as (*c*) was a multiple of (*a*) and (*b*).

(*g*) *Multiplication by any decimal.*—The ultimate object of our teaching is attained by a combination of steps (*c*) and (*f*). If the teacher follows these steps he will not only ensure that his pupils thoroughly understand the rule, but on these lines he will have enabled them to reason the whole matter out for themselves.

Division of Decimals.

We have condemned the use of a "trick" in multiplication of decimals, and we regret to say that

division of decimals is often taught in a still more unintelligent way, and in this case the "trick" more often fails to give the correct result than in the former. We would again insist on the importance of arranging the teaching in well marked stages, and would suggest the following as the best order to follow :—

(a) *Division of a decimal by a whole number.*—Whether the division be "long" or "short," if division of integers has been taught with a proper attention to the place value of the digits of the quotient, there is *absolutely nothing fresh to learn* in this section. (See page 241.)

(i)		(ii)	
	118		·00118
48)5678		48)·05678	
	87		87
	398		398
	14 rem.		·00014 rem.

Comparing (i) with (ii), in the first case we begin by dividing 56 *hundreds* by 48, and the first digit will therefore represent *hundreds*, and is placed in the hundreds column; in the second we divide 56 *thousandths* by 48, and the result will be one *thousandth*, and the place value of the digit may be indicated provisionally by simply placing it in the thousandths column over the 6 thousandths. It will be necessary to prefix two noughts and a dot to show this if the result is to be written again in another part of the paper, and it is advisable to prefix them to the digit even when standing above the dividend. Similarly, the true value of the remainder may be shown. Position under the dividend may be regarded as sufficient indication of the place value of the digits in the new dividends at each step.

(b) *Division by a power of* 10.—As this is the

same as step (*e*) in multiplication, the children should be made to reason it out for themselves.

(c) *Division by a negative power of* 10.—Although this is merely the converse of (b) and really the same as (*b*) in multiplication, it requires careful teaching, as children at first experience some little difficulty in understanding how when a number is *divided* the quotient can be *greater* than the dividend. This should be explained by referring to the meaning of "number." Thus in 6*d.* the number 6 shows how many times the whole unit "penny" is contained in the amount, and it is evident that a "half-penny" or "quarter-penny" must be contained in the amount *more than* 6 *times.* Other illustrations must be added, as it is important that the point should be quite clear.

(d) *Division by any decimal.*—The usual method of teaching is to tell the children to multiply both divisor and dividend by such a power of 10 as will make the divisor a whole number. This, of course, is based on the simple mathematical principle that $a \div b = ac \div bc$. But although the principle is sound, its adoption is open to the following objections :—

(i) The principle is seldom taught as the foundation of the practice.

(ii) It does not afford a simple method of arriving at the true value of the remainder at any stage.

(iii) It does not form a natural sequence to the other parts of the subject of division.

(iv) It involves exactly the same work as the following method.

The best method of teaching division by a decimal seems to be that which arises naturally from (a) and (c) above, and division by factors. The children can easily be taught to factorise any decimal into a

negative power of 10 and a whole number. Thus $\cdot 7 = \cdot 1 \times 7$; $\cdot 72 = \cdot 01 \times 72$, or $\cdot 01 \times 8 \times 9$; $3 \cdot 45 = \cdot 01 \times 345$. The first step in the division can be performed mentally while copying down the digits, and the second by short division, or long division, or division by factors.

The true value of the remainder is found by the method given on page 243, and the true significance of every part of the work is realised by the pupil.

Approximations.

The utilitarian value of arithmetic has been given as one of the strongest reasons for including it in the school curriculum, but in no part of the teaching of this subject is its utilitarian value so much lost sight of as in the scant treatment meted out to decimal approximations. Teachers who know very well that bankers take no account of fractions of a penny, will yet allow their pupils to bring out the answer to a compound interest sum to a dozen places of decimals (*i.e.* the hundred thousand millionth part) of a pound. Of course there are occasions on which it is desirable to bring out a result with absolute accuracy for the purpose of demonstrating a theoretical point or of giving the pupil practice in calculation, but this should not be allowed in any "commercial" rule. In teaching approximations the teacher must first convince his class that in actual measurements we are always content with approximations. Let him set three boys independently to measure the width of the blackboard, the length of the class-room or of the playground, with a foot rule divided into inches and tenths. Their recorded results will make them stand self-convinced. They will at once see the absurdity of attempting to give tenths, still less hundredths of an inch, in denoting the length of a room.

The three points requiring special attention here are :—

(i) Approximate correctness of expression.

(ii) Approximation in multiplication.

(iii) Approximation in division.

In teaching the first it is important to show that error is to be estimated as a fraction of the whole, not by its absolute amount. Exercises should be given in expressing from accurate tables such things as the population of towns to the nearest thousand, or of countries to the nearest million, &c., cases in which the required number of "significant figures" does not run into the decimals. By questioning on the place value of succeeding digits in the decimal of £1, the children will be made to see that the third is the last which can be of any *practical* value (£·001 = 1 farthing nearly); the fourth may be used to correct the third, but beyond that it is useless to go. Children should be taught to convert decimals of £1 into shillings and pence at sight, and *vice versa*.

In multiplication, if the order suggested on page 239 has been systematically adopted, nothing is required but to omit the unnecessary digits.

In division, the principle is brought home by working a sum at full length and then showing how many steps could be taken before an error in the right hand digit of the divisor could possibly affect the quotient.

Recurring Decimals.

As far as practical utility goes much of the time spent on exercises in recurring decimals could be much more profitably devoted to instruction in approximation, but the theory of recurring decimals affords a valuable mental discipline, and for this reason deserves very careful teaching. Too often children are taught absolutely nothing about recurring

decimals beyond the method of converting them into vulgar fractions and *vice versa*. Consequently when asked to perform some simple operation with recurring decimals they first convert them into vulgar fractions, then perform the required operation, and finally convert the result into a decimal; and yet this is a point to which examiners are continually calling attention. Addition and subtraction of recurring decimals, as well as the multiplication or division of a recurring decimal by a whole number or by non-recurring decimals, should be performed without conversion into vulgar fractions. The interest taken by senior children in the theorems connected with recurring decimals is known only to those who have taught the subject. Among those most suitable for senior pupils are :—

(i) Determination by inspection of a vulgar fraction whether it will produce a non-recurring or a recurring decimal.

(*a*) In the former case the number of digits.
(*b*) In the latter, whether pure or mixed, and number of digits in the period.

(ii) Determination of different denominators which will produce a given number of digits in the period; and as a corollary the recognition of such a number as $\cdot\dot{4}\dot{5}$ as $\frac{5}{11}$.

(iii) Complementary remainders and relation of digits in the second half of the period to those in the first half. This is of great practical importance in shortening the working and also for remembering the digits representing such fractions as sevenths and thirteenths. Thus for $\frac{1}{7}$, $\cdot\dot{1}42\ldots$ is easily remembered (the sum of the digits $= 7$) and by the complements on 9, the other digits are $85\dot{7}$ $\therefore$ $\frac{1}{7} =$

$\cdot\dot{1}42857\dot{}$, and $\frac{1}{13} = \cdot\dot{0}76\ldots$ is easily remembered for the sum of the digits $= 13$, and by complements the other digits are $923\dot{}$, $\therefore \frac{1}{13} = \cdot\dot{0}76923\dot{}$.

(iv) The cyclic arrangements of the digits.

It is not advisable to attempt a complete mastery of all these theorems at once, but the subject may be frequently revised and extended at each revision.

Practice.

Practice affords considerable scope for intelligent teaching, but as it is based on the conception of fractions, it should not be taught to children ignorant of vulgar fractions. The former custom of teaching it before fractions is responsible for much of the mechanical work now found in the handling of it. A knowledge of fractions is essential, because in the first place it is desirable in school exercises to have each line brought out to its exact value. If only approximate values are given in the several lines, since children may take various arrangements in their aliquot parts, the results may be at variance throughout the class, and this is not desirable, although for ordinary purposes it is sufficient to bring each line out to the nearest penny, or farthing.

Having explained the nature of an "aliquot part" —a fraction whose numerator is unity—the teacher should help the class to *construct* a table of aliquot parts of the principal units of money, weights and measures. These tables may then be committed to memory.

A course of lessons in practice should always include instruction in the method of finding the smallest possible number of aliquot parts whose sum is equal to a given fraction. This is done by writing all the divisors of the denominator and then selecting such of them as will make up the given numerator; thus, if $\frac{17}{24}$ be the given fraction, we set down

1, 2, 3, 4, 6, 8, 12, 24, and find that 12, 4, and 1, or 12, 3, and 2 will make up 17; hence

$\frac{17}{24} = \frac{12}{24} + \frac{4}{24} + \frac{1}{24} = \frac{1}{2} + \frac{1}{6} + \frac{1}{24}$ or $\frac{1}{2} + \frac{1}{3}$ of $\frac{1}{2} + \frac{1}{4}$ of $\frac{1}{6}$.

But we can also see that $\frac{17}{24}$ falls short of 1 by $\frac{7}{24}$, *i.e.* by $\frac{6}{24} + \frac{1}{24}$, *i.e.* $\frac{1}{4} + \frac{1}{24}$ or $\frac{1}{4} + \frac{1}{6}$ of $\frac{1}{4}$.

In many cases the simplest arrangement of aliquot parts is evident, but where it is not, the quantity beyond the principal unit should be brought to a fraction of the principal unit and the simplest arrangement obtained by the above process, as a considerable amount of time is generally saved by so doing.

The method of finding the cost of a quantity by subtraction from the cost at the next highest number of pounds, &c., is not nearly so much used as it should be. Not only is it available when the price differs from the next higher number of pounds by *one* aliquot part, but pupils who have been taught to work by complementary addition will find it advantageous in nearly all cases in which the odd shillings and pence exceed £$\frac{1}{2}$.

Invoices or Bills.

The method of drawing out and receipting a bill cannot in any way be considered as arithmetic, although it is generally taught in connection with that subject. In "Bills of Parcels" no new arithmetical principles are involved; most of the items are worked out by "practice" or by some of the following special methods:—

(1) Most pupils are taught the relation between the number of shillings in the price of a dozen and the number of pence in the price of one article, but generally speaking, there is not enough use made of this method of calculating when the number of articles is *near* an exact number of dozens, *e.g.*, 37 (= 3 doz. + 1), 70 (= 6 doz. − 2).

(2) A similar remark applies to the calculation of the price of score by means of the equality between the number of shillings each and of pounds per score.

The whole of the price should be converted into pence in (1) and into shillings in (2).

(3) Such a common type as the cost of $12\frac{1}{2}$ lbs. at $10\frac{1}{2}d.$ per pound is generally found as the sum of four products, viz., $\frac{1}{2}d. \times \frac{1}{2} = \frac{1}{4}d.$, $10d. \times \frac{1}{2} = 5d.$, $\frac{1}{2}d. \times 12 = 6d.$, and $10d. \times 12 = 120d.$ But children should be shown that $(10+\frac{1}{2}) \times (12+\frac{1}{2})$

$$= 10 \times 12 + 12 \times \tfrac{1}{2} + 10 \times \tfrac{1}{2} + \tfrac{1}{2} \times \tfrac{1}{2}$$
$$= 10 \times 12 + (12 + 10 + \tfrac{1}{2}) \times \tfrac{1}{2} = 10 \times 12 + 22\tfrac{1}{2} \times \tfrac{1}{2},$$

and that there is need of but two multiplications, only one of which involves fractions.

(4) The practical purpose of this rule should be kept in mind, and no fractions of a penny should be set down, except $\frac{1}{4}d.$, $\frac{1}{2}d.$ or $\frac{3}{4}d.$ Should the exact value not work out to one of these, the next highest farthing should be given.

Proportion.

We now have to consider the methods of teaching the important rule of "proportion"; and since, with the exception of such matters as averages and evolution, all the remaining rules in arithmetic are based upon proportion, too much importance cannot be attached to the soundness of the instruction given in it. We will consider first the two methods at present in most common use, viz.— the "method of unity," and the "dot method."

The method of unity affords the pupils a valuable practice in reasoning, and (for that cause) should be taught to every child. At this stage, when children have thoroughly mastered the common arithmetical operations, they should be taught the first seven axioms of Euclid, with other simple truths

based upon them, such as "If equals be multiplied by the same number the products are equal," and "If equals be added to (or subtracted from) unequals, the difference is unaltered." Problems can be found in abundance, the solutions of which, as deductions from these simple principles, afford a very valuable mental training, and among these problems may be included examples in simple and compound proportion. But, just as in teaching geometry we recognise the existence of two distinct purposes, (*a*) for mental discipline, and (*b*) for the preparation for draughtsman's work, and while Euclid's method of bisecting a line, &c., is the best from the first point of view, yet is one that no practical draughtsman would ever dream of following; so in teaching children proportion, it is advisable to include in the instruction the "method of unity," although it is too cumbersome for ordinary use.

The "dot method" is more concise, but is often employed by children who have but a very imperfect understanding of the significance of its statements, and hence leads to unintelligent rule-of-thumb work. If the pupil has a clear idea of the meaning of ratio there is no objection to the use of dots to indicate the equality existing between two ratios except the unnecessary displacement of the known signs $\div$ and $=$ by the new signs : and : : ; but here, except in the case in which at least one pair of terms consists of abstract numbers, the usefulness of the dots ends. The use of x to represent an unknown quantity is an encroachment on the province of algebra, although that is not a very important matter; but many theorems which are true in the case of proportion between abstract numbers are meaningless when stated with reference to concrete quantities. Thus,

"the product of the means is equal to the product of the extremes" is true with regard to abstract numbers, but cannot be applied to such a statement as

5*s.* : 8*s.* :: 15 ft. : 24 ft.

for how can 8 *shillings* be multiplied by 15 *feet*, or what is the product of 5 *shillings* and 24 *feet*?

If, therefore, the "dot" statement implies multiplication by a concrete quantity, it is unsound. If it indicates that the first term contains the second a certain abstract number of times, it is a clumsy way of representing what the pupil has learnt to do in a simpler fashion.

Fractional Method.

The fact is, we have here another example of the unnecessary complication which has arisen in the teaching of arithmetic. We have complained (page 258), that our pupils should have to learn over again, under the name of "measure," what they have already learnt under the name of "factor," and it is a pity that the term "ratio" was ever introduced into arithmetic, for it denotes nothing more than the term "fraction." Its use, however, has led to the waste of a great deal of work done in "fractions," and to needless confusion in the children's minds. In studying fractions children are taught to find what fraction £2 5*s.* 6*d.* is of £5 13*s.* 9*d.*; but this teaching is absolutely thrown away, as far as subsequent work is concerned, and even at the time it involves considerable difficulty, because the children can see no purpose to be served by their work. Such a process as finding $\frac{2}{5}$ of 4 tons 15 cwts. presents, perhaps, a little more interest to the child, but he is seldom taught that the process is of great use in subsequent rules. The child who has learnt to perform the two operations above has only to be

taught to combine them, and will then be able to work proportion sums intelligently. If the question were, "How much coal can be purchased for £2 5*s.* 6*d.*, if 4 tons 15 cwts. cost £5 13*s.* 9*d.*?" the child has already learnt to find that £2 5*s.* 6*d.*, the new price, is $\frac{\text{£2 5s. 6d.}}{\text{£5 13s. 9d.}}$ of the old price, *i.e.*, $\frac{2}{5}$ of the old price. Then the idea of proportion, which is really almost an intuitive one, teaches him that if he pays 7 times the price he will get 7 times as much coal, and if he pays $\frac{1}{4}$ of the price he will get $\frac{1}{4}$ as much coal, so, if he pays $\frac{2}{5}$ of the original price he will get $\frac{2}{5}$ of 4 tons 15 cwts. of coal. In actual working, after the numerator and denominator of the first fraction had been brought to the same denomination, the cancelling might have been deferred. Some teachers may object that this method abolishes the elaborate "statements" in which they delight, but surely this is an advantage. If a child is required to find the cost of 6 pounds of tea at 1*s.* 10*d.* per lb., he simply puts down 1*s.* 10*d.* and multiplies by 6, because he knows that the answer will be 6 times 1*s.* 10*d.*, and if he knows that the answer is $\frac{\text{£2 5s. 6d.}}{\text{£5 13s. 9d.}}$ times 4 tons 15 cwts., why should he not be allowed to multiply by that fraction in the shortest possible way. The "dot" method of dealing with proportion has led to such mechanical teaching, that it is resorted to by nine of its followers out of ten, in dealing with questions requiring merely multiplication or division, provided only that the question begins with "If" or contains a conditional sentence.[1] Indeed, whole classes will

[1] Such as "If 1 cwt. of sugar cost 36*s.*, what is the cost of 1 lb?"

come to grief if asked the question, "If the front wheel of a bicycle is 78 inches in circumference and the hind wheel 72 inches, how far will the back wheel go while the front one goes 13 miles?" The first word seems to demand the dots, and the result is calmly given as 12 miles.[1] We have said that children acquire the idea of proportion almost intuitively; this, of course, refers only to the proportion existing between such things as prices and quantities purchasable, and other things with which the pupil is familiar; it required a Newton to discover the proportion between the attraction of gravity and the square of the distance, and many such relations are only arrived at after much study. It will be necessary, therefore, for the teacher to extend the child's idea of proportion to some of the simpler cases which it does not cover, particularly those of an inverse kind. A child may not at first realise that if 1 man can do a piece of work in 24 days, 6 men can do it in 4 days. Yet the working of this is a simple division sum—we *divide* the number of days by the number by which we *multiply* the number of men. So if 4 men can do the work in 24 days, 3 men (*i.e.*, the original number *multiplied* by $\frac{3}{4}$) will take $(24 \div \frac{3}{4})$ days.

It will thus be seen that this method of teaching proportion is based upon what the children already know, viz:—

(*a*) The reduction of one quantity to the fraction of another of the same kind.

(*b*) The multiplication or division of a quantity by a fraction.

(*c*) That relation (proportion) existing between natural quantities which enables them to decide in the case of whole numbers whether the required

[1] The poor rider's position is not taken into account.

result should be obtained by multiplication or division.

Rules Based on Proportion.

For want of a better term to denote classes of operations or problems we are still constrained to speak of the "rules" of arithmetic, although it is a reminder of the days now passing away (though none too quickly), when the teaching of arithmetic consisted in giving a number of rules for the pupil to apply mechanically. We have advocated the abolition even of proportion as a "rule," and recommended the treatment of it as an application of "fractions," and we are certain that the teaching of arithmetic will gain by a diminution in the number of its rules. Such matters as "Tare and Tret" to be found in the text-books of our forefathers no longer appear in ours, and many "rules" are retained in ours only to meet the exigencies of examinations. If the fractional method of dealing with proportion be adopted, the teaching of most of the subsequent "rules" resolves itself into an explanation of various cases in which proportion exists between quantities:—in Proportional Parts and Partnership we have to determine the relation to the whole of quantities whose relation to one another is given, and in Profit and Loss, Insurance, Interest, Discount and Stocks, we not only have to point out the quantities between which proportion exists and explain a large number of commercial terms and practices which are not arithmetic at all, but we introduce a special class of fraction called a "percentage."

Careless teaching in the matter of percentages is fairly common. The most common error arises from the neglect of the fact that a percentage is only a number—a fraction—and to say that a certain quantity is 25 per cent. is absurd unless we say of

what it is 25 per cent.; and just as we may add or subtract fractions of the same quantity (*i.e.*, $\frac{1}{4}$ of 1*s.* $+$ $\frac{2}{5}$ of 1*s.* $=$ $\frac{1}{2}\frac{3}{0}$ of 1*s.*), so we can add or subtract percentages of the same quantity but *not of different quantities.* It is of the highest importance in every case to state the quantity of which our given quantity is a percentage. From this arises the difficulty in teaching "Profit and Loss," where the pupils have to be taught the convention that profits are always calculated as percentages of the cost price, unless the contrary is stated.

The young teacher should himself study the direct methods employed in the more recent works on arithmetic, and bearing the above principles in mind he will have no difficulty in teaching them to his class.

Mensuration

Considerable difference of opinion exists on the subject of the relation of mensuration to arithmetic. It is advisable to deal in arithmetic with the relation between the areas and volumes of rectangular surfaces and solids, and their respective boundaries, and also with simple questions arising therefrom such as amount of carpet required for a floor, but the calculations of other figures should form a subject apart and should always be associated with actual measurements. Care must be taken in using such a contracted statement as

$$\text{length} \times \text{breadth} = \text{area}$$

to point out that we cannot *multiply by feet*, &c., the statement means that the *number* of square units in the area is equal to the product of the *numbers* of lineal units in the length and breadth respectively.

Mental Arithmetic.

Objects.

A child who always has a slate or paper before him on which he can put down carrying figures, &c., finds

himself at a loss when required to calculate without such help. Hence the primary purpose of mental arithmetic is to teach the child to *calculate without the assistance of slate or paper*, and to do this calculation *accurately* and *rapidly*. It also tends to develop the memory by obliging the child to keep in mind the quantities he has to deal with and the successive operations he is required to perform. But mental exercises are also of great value in teaching a new rule to a class, since the principle is not obscured by complicated expressions. Thus children taught mechanically, often write the wrong quantity in the numerator when asked to bring one compound sum to the fraction of another (*e.g.*, what fraction is £7 18*s.* 2½*d.* of £8 15*s.* 7¼*d.*?), but when asked what fraction 1*d.* is of 2*d.*, or 3*d.* of 9*d.*, they invariably give the correct result. Evidently then the way to teach such a rule is to drill in the principle by means of simple exercises which can be worked mentally. So in simple interest and stocks questions involving round sums of money can be worked mentally, and lead up to an intelligent appreciation of the general methods of working. It is advisable as we have said before, to continually revise the back rules, and as time is often pressing, the revision may be carried out by means of mental exercises.

Use in New Rules.

In Revision.

Bearing this in mind the teacher will see that many of the plans we have recommended in dealing with the subject generally will serve as suggestions for exercises in mental arithmetic, such as counting by threes, fives, &c. ; methods given under "bills of parcels," examples involving several operations should also be freely given. In addition to these practice may well be given in "Long Tots," and any device such as the Oxford Tot Frame or Arnold's

Revolving Tots will be found of great service in reducing the mechanical work of setting the examples. Although mental arithmetic should not be confined to the acquisition of a few tricks to solve particular cases, yet there are many special methods which are particularly applicable to mental calculations, among them we may give :—

(*a*) The calculation of the price of dozens and scores (see page 272).

(*b*) The calculation of the income per annum from the income per diem—1d. per diem = £1 10*s.* 5*d.* per annum.

(*c*) The calculation of any percentage related to 5 per cent., such as $2\frac{1}{2}$ per cent., 15 per cent., from the fact that 5 per cent. of £1 = 1*s.*

(*d*) Addition or subtraction of fractions with the same numerator. If the numerator is 1, this is effected by adding (or subtracting) the denominators for the new numerator and multiplying them for the new denominator.

$$\frac{1}{7}+\frac{1}{5}=\frac{5+7}{5\times 7} \qquad \frac{1}{6}-\frac{1}{11}=\frac{11-6}{11\times 6}$$

If the numerators are the same, but not 1, the new numerator will be the sum (or difference) of the denominators multiplied by this number, and the new denominator will be found as before.

$$\frac{3}{7}+\frac{3}{5}=\frac{3\times(5+7)}{5\times 7} \qquad \frac{5}{6}-\frac{5}{11}=\frac{5\times(11-6)}{11\times 6}$$

(*e*) Decimalisation of money at sight is a very valuable mental exercise.

(*f*) Pupils who are familiar with the formula

$$a^2-b^2=(a+b)(a-b)$$

can be made to deduce from it $a^2=(a+b)(a-b)+b^2$, and hence whatever a represents, its square may be

quickly obtained from this formula; since it can readily be made into a round number either by adding or subtracting a small number; thus,

$$58^2 = (58+2)(58-2)+2^2 = 60 \times 56 + 4 = 3664.$$

Algebra.

Not only is algebra regarded as an essential subject in all secondary schools, but it is the most popular of all the specific subjects taught in elementary schools.[1] If properly taught it affords a very valuable mental discipline, but too often the teaching is not scientific and the subject loses nearly all its value, for children cannot be expected to profit much by what is frequently only a collection of tricks for obtaining the answers to exercises.

Its Province.

The question has been much debated as to where the line of demarcation should be drawn between arithmetic and algebra. Some teachers regard algebra as merely a sort of generalised arithmetic, others will name certain subjects, such as negative quantities, which belong exclusively to algebra, but never venture to state subjects which belong exclusively to arithmetic. To the practical teacher, however, the point is not of great consequence. If the child learns algebra as well as arithmetic, it is advisable to study most of the generalisations in connection with algebra, but if not, he should not be deprived of the teaching of those generalisations by any idea that they lie beyond the province of arithmetic. Leaving here the question of the use of symbols to represent known but varying quantities, we may consider that in algebra we may include anything taught in arithmetic together with the symbolic

[1] In 1899 there were 38,000 children examined in Algebra.

representation of unknown quantities and of negative quantities, as well as the application of general formulæ to particular cases.

The close connection between the known arithmetic and the new subject algebra is not an unmixed boon, but is often a source of danger. On the one hand some pupils seize hold of the idea that the two are practically identical and take no pains to ascertain the more extended field offered by algebraical forms, and others, thinking there is nothing new for them, do not bring any interest to bear on their work. We cannot help thinking it is a mistake to spend much time at the beginning with substitutions, the teacher should press on as quickly as possible so as to reach an easy type of simple equation (*e.g.*, without negative quantities) at which point the pupil's interest in the subject begins to quicken.

The solution of an equation should be based strictly on Euclid's axioms respecting equalities of sums and differences and their extensions to equalities of products and quotients. The process so commonly taught of "taking over a term to the other side and changing its sign," is a mark of unsound teaching. The pupil should be made to realise each time he performs the operation that he is adding the same quantity to, or subtracting it from, each of two equal quantities.

When his interest in the subject has been aroused in this way, the pupil should be introduced to the idea of negative quantities. By means of numerous illustrations the pupil should be led first to consider a negative quantity as one which is "less than nothing." Let him suppose three men each possessing £10, and who bought goods respectively for £5, £10 and £15. Here he would see that after settling their accounts the first would possess £5 less than

£10, *i.e.*, £5 ; the second £10 less than £10, *i.e.*, £0 ; and the third £15 less than £10, *i.e.*, £5 less than £0, in other words he would be £5 in debt. The conception of a debt as a negative possession is one that boys easily grasp. The centigrade thermometer scale also furnishes a good illustration in teaching negative quantities, since we can reckon degrees below zero. The idea of a negative quantity is not, however, complete until it is realised that it has the "power of neutralising a positive quantity of equal magnitude." This is easily taught by setting the children to balance little accounts ; £10 and $-$£10, *i.e.*, £10 in hand and £10 in debt, etc. If the class is studying such a subject as electricity, illustrations should be drawn from that ; or distances towards the N. should be regarded as negative distances towards the S.

The time spent in giving the children a thorough grasp of negative quantities will bear ample fruits in all the subsequent work. In addition it will no longer be necessary to "add separately the positive and the negative quantities and then subtract and put down the difference with the sign of the greater." Thus in finding the sum of $4x - 7x - 15x + 21x - 8x$, the mental work would be ;— $4, -3, -18, +3, -5$; and $-\mathbf{5x}$ would be set down as the result.

More time should be given to oral or mental practice in multiplication. This will be amply repaid when the pupils come to study factors. Children should have no hesitation at all in giving the product of two such binomial expressions as $(x \pm 3)(x \pm 8)$, and very little in giving the product of such binomials as $(x+3a)(x-8a)$ or $(3x+7a)(2x-5a)$. They should also be required to give the co-efficient of any assigned term in the product of two multinomials, the power of picking out those terms only which are

concerned in the production of the required term is very useful, and when it has been acquired will enable the pupil to write down the whole product without setting down the partial products. This is better than the method of "detached co-efficients" as generally taught. Similarly the "Italian" method recommended in "long division" in arithmetic might be applied to shorten the work of division in algebra. In either case, however, the teacher loses a ready means of detecting those pupils who make an improper use of the answers given at the end of the book. When the work is set out at length the teacher has a ready check on the work if he only casts a glance at the order of the signs in the partial products.

Factors.

The teacher who wishes his class to do well in this subject must devote a great deal of time to the study of factors. Ability to resolve expressions into factors is absolutely essential for efficient work not only in finding H.C.F. and L.C.M., but in manipulating fractions, solving quadratic equations and many other parts of algebra. In finding H.C.F. the pupil should look out for factors not only in the given expressions, but failing to find them and starting to work by the ordinary process he should try to find factors at every step. In simplifying fractions time is generally saved by first factorising every numerator and every denominator.

Pupils who are quick at factors will solve quadratic equations more rapidly by factorising than by any other method, and are frequently able to deal with equations of a degree higher than the second.

It is very desirable that pupils should be taught the properties of an expression which result from its being symmetrical. This knowledge greatly increases the pupil's power.

Geometry.

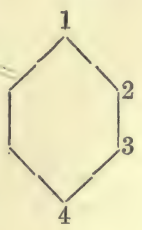
Special Advantages.

Geometry may be regarded both as an art and as a science, from the former point of view it will be considered in the chapter on drawing; here we shall deal with it strictly as a science. As such it is justly entitled to be considered *the* formal science *par excellence*. This characteristic makes it of the highest value in a school curriculum. We have already referred to the splendid practical training in deduction which it offers. At the same time we must admit that it is not quite true to its own ideal. Thus it is claimed that all its definitions are rigorously correct, and that there is no equivocation of terms. But we cannot proceed very far without finding that even such a term as "straight line" has two significations in Euclid—sometimes denoting a line of unlimited length and sometimes a rectilineal segment—while the term "circle" which we are taught to regard in Euclid as "a plane figure," denotes in analytical geometry a line. Still in spite of these weaknesses, geometry has been for centuries the science which men have studied in order to acquire the *method* of pursuing others.

Now the very fact that its benefits are intellectual and not utilitarian handicaps the subject heavily in the competition for the pupil's favour. Stobaeus tells us that "a youth who had begun to read geometry with Euclid, when he had learned the first proposition, asked 'What do I get by learning these things?' So Euclid called his slave and said, "Give him 3*d.* since he must make a gain out of what he learns." So when Mr. Tulliver first visits Tom at school, the boy says—"I wish you'd ask Mr. Stelling not to let me do Euclid—it brings on the toothache, I think."

Geometry may be taught either synthetically and deductively or analytically and inductively, and we have to consider which of these methods we ought to follow. The former is open to the objection that it requires a more mature intellect and judgment than the latter, though the benefits it confers are unquestionably greater. Analytically treated geometry may form part of a kindergarten course. Synthetic and Analytic Teaching.

The kindergarten geometry is very useful as a preliminary training as it enables us to teach definitions through the concrete, and to give our children an idea of space relationships. Thus starting with such a solid as a cube we might easily give an idea of the three dimensions. Next we can lead children to see that the wooden cube is surrounded by air, and there must be a place where the wood leaves off and the air begins, and so lead up to the idea of a surface—which consists neither of wood nor air, but is simply the boundary between them, and can with equal propriety be called the surface of the air or the surface of the wood. The use of the latter name only generally leads to the idea that the surface is composed "of wood," which entirely precludes the idea of a surface having two dimensions only. Carrying this process of analysis further the pupils will grasp the geometrical idea of a line, as something capable of dividing one part of a plane from another but itself forming part of neither. The last step in the analysis gives the mathematical point. In the lesson on the cube the teacher points out the numbers of similar and dissimilar units—surfaces, edges (lines) and corners (points); but this is not enough; the child should be exercised in finding how many pairs



can be formed by each set of units—thus the surfaces of the cube are either opposite or adjacent, while there are four different relationships possible between pairs of edges and three between pairs of corners. Similar exercises should be given on other figures both solid and plane. Thus if we take an angular point of a hexagon any other point must be either adjacent, next but one, or next but two to it.[1]

No attempt should be made to prove theorems by means of kindergarten methods. They are incapable of giving more than a proof to a particular case and unfit the pupil for the general proofs which he will work at deductively later on.

Euclid *v.* Non-Euclidean Geometry.

In teaching geometry deductively it is absolutely essential that no construction should be allowed or statement asserted (except a postulate or axiom) which has not been arrived at by previous propositions, and to these propositions references must be given.

If a teacher were concerned solely with educating his own pupils he could draw up a course of propositions for them in any sequence he thought best. But for good or evil, the pupils' work must come to the test of an examination, and hence the need for a standard order of propositions to which reference may be made. The standard which has kept the field universally for many centuries and still holds it in this country is the course drawn up by Euclid. It is no doubt capable of improvement in many points, but the demands of our public examining bodies make it difficult for any would-be improver to compete with it.

Assuming that the course (whether Euclid's or

[1] This simple fact plays a very important part in chemical philosophy.

another) has been decided on, the teacher should set about teaching the definitions, and will find that the kindergarten preparation has laid a sound foundation. He should exercise the pupils in trying the effect of omitting phrases from definitions, *e.g.*—"in the same plane" or "both ways" from the definition of parallel lines. This will impress upon the pupil the importance of such phrases.

General Hints on Teaching Euclid's Elements.

On reaching the first proposition he should explain the structure of a proposition, and show that when the general enunciation is given any one can write the particular enunciation from it. This often gives boys a considerable amount of encouragement. It is then advisable to go straight through the book, treating each proposition as a deduction on those preceding it, and leading the boys to discover the proof for themselves. The enunciation should then be committed to memory for future reference, but no more effort made to remember the proposition than is usually bestowed on remembering a deduction.

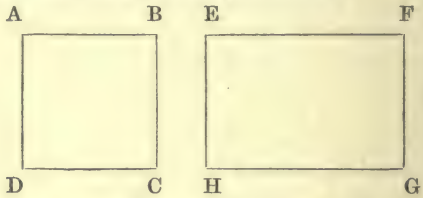
As we proceed a classification of the theorems should be made, *e.g.* (*a*) those that prove the equality of two lines, 4, 6, &c.; (*b*) those that prove the equality of two angles, 4, 5, 8, &c. Then when the pupil comes to a new proposition, he asks himself (*a*) what has to be proved, (*b*) which propositions may prove such a thing, (*c*) what hypotheses are required in each case and which one does the new proposition grant.

The relations between propositions should always be pointed out—not merely when one proposition is the converse of another, but such relations as those existing between I 4 and 24; 8 and 25, or I 5 and 18; 6 and 19.

After this the book should be thoroughly revised and exercises on the propositions worked. This

plan will excite much more interest in the subject than the too common plan of lingering over one or two early propositions until they are letter perfect. The pupils will feel that the subject is by no means beyond their ken, and will be less inclined to say "there's no sense in it," and "it brings on the toothache."

The second book is generally regarded as difficult to teach, but the key to it really lies in the fact that a rectangle or a square may be represented by two methods—intuitively and symbolically.



Thus the two annexed figures may be described either as the figures ABCD and EFGH—descriptions which appeal to our notions gained by "looking on" the figures—or as the square on AB and the rectangle EF·FG—titles under which they might be described even without being drawn. Now the principle on which most of the propositions of the second book are proved is to show that the various quantities are equal when regarded intuitively and then to express them symbolically.

The other parts of Euclid present no special difficulty when the first two books have been thoroughly mastered.

Higher Mathematics.

We will bring this chapter to a close with a few remarks on teaching the higher mathematics.

Trigonometry combines the advantages and disadvantages of algebra and geometry. **Trigonometry.**

(*a*) The ease which the use of algebraical treatment lends the subject tends to obscure the geometrical or intuitional, interpretation of the processes and results. (*b*) It proceeds deductively, step by step like geometry, but great care has to be exercised in discriminating between the formulæ which should, and those which should not, be retained in the memory. The number of really fundamental formulæ is small.

With the help of compasses and protractors rough instruments can easily be constructed which should be used for practical exercises in determining the heights and distances of inaccessible objects, the areas of playgrounds, fields, &c.

It is a matter of regret that the use of logarithms should be practically confined to this subject and not made part of the ordinary arithmetic course.

In the higher forms of secondary schools this branch should be included, the chief properties of the curves being taught either through Geometrical Conics or Analytical Geometry. **Conics**

It is also advisable to give the senior pupils of such schools an introduction to the calculus :— **Differential and Integral Calculus.**

(*a*) Because of its great practical use (*e.g.*, in engineering). (*b*) Because it gives pupils a stronger hold over their previous mathematical study by enabling them to view it from another stand-point, and (*c*) Because it furnishes a new instrument for the prosecution of more advanced mathematical work.

CHAPTER XIII

Elementary Science and Object Lessons

Attempts have been made to distinguish between these two by defining object lessons as the study of the object itself, and elementary science lessons as the study of principles which the object illustrates. Although there is much truth in this distinction in practice the difference is impossible to maintain and the better the teacher the more truly scientific will his object lessons become. The barrier between the two was kept up in the elementary code by classifying them as separate subjects, and requiring every school to give object lessons in the lower standards, while ranking elementary science as a class subject with geography, history and grammar. The consequence of this was that lists of thirty object lessons, generally of the most heterogeneous nature, were prepared in every school, and valuable opportunities of using these lessons to the best advantage were thrown away. Thus, it was no unusual thing to see a list something like the following :—

The whale.
Comb-making.
A steam-engine.
An egg, &c.

However interesting these subjects may be individually, it cannot be denied that the wrench from subject to subject must be painful to an intelligent teacher, and the loss of sequence and consequent opportunities of comparison and development is very serious. Fortunately the new code has to a large extent, minimised this difference, and, while still retaining the two names, requires that the object lessons shall lead up to some particular class subject, and insists upon the teaching of elementary science in the lower standards by means of object lessons. The difference between the two is merely of degree, and object lessons should be looked upon as elementary Elementary Science.

Objects of both.

The aims of both are the same, and while in object lesson teaching greater attention will be paid to the development of the powers of observation, and of clear expression of facts observed, the reasoning faculties will not be neglected. Easy inferences and generalizations will be obtained whenever possible, and the lessons will be so arranged in sequence as to give frequent opportunities of comparison and deduction. In elementary science lessons the principle underlying the fact becomes of greater importance, and the reasoning powers must do a greater share of work.

Lists of Object Lessons.

In drawing up lists of object lessons, therefore, the subject to which they will have to lead will form the main consideration, and the position of each lesson in the series will be easy to determine. The teacher, in drawing up the series, should not be bound too much by the exact meaning of the word object lesson, but should be able to include lessons in which the facts observed in previous lessons may be reviewed, and their value pressed home to a definition or generalization. Thus in a series

of object lessons on Natural History, where the classification of animals is the main object of the series, the course might develop as follows:

1. A geranium.
2. A mouse.
3. Plant and animal compared.
4. A shrimp.
5. A herring.
6. Animals with or without backbone.

In lessons 1 and 2 the points which the teacher should emphasize are those which he will require in the third lesson, and so on throughout the series. In other words, the objects will be studied more as types than as individuals.

The Object Lesson. Preparation. (a) *Object of Lesson.*

When the list of object lessons to be given has been placed in the class teacher's hands, he should carefully study it in order to determine the chain which binds the lessons in the series together, and the exact relation that each lesson is intended to bear to the others. Thus in the six lessons given as illustrative of a course in natural history, a very good lesson on a geranium or a mouse might be given which would be utterly valueless as leading to the comparison of plants and animals, or as helping in any way to a knowledge of the classification of animals. Where the class teacher is inexperienced or weak, the head teacher should carefully point out the purpose of the lesson, and should discuss with him the best method of giving the lesson.

Many teachers, in preparing notes for any lesson, begin by stating the object of the lesson. This should be obvious from its position in the series of lessons or from its title, and general statements such as "to cultivate the powers of observation," "to develop the knowledge of the children," are

both futile and absurd. The object of the series of lessons is the important matter, and each lesson is but an item leading to this important result.

(b) *Matter to be Taught.*

When the purpose of the lesson has been determined, the selection of the matter to be taught becomes easy. Great care must be taken that the points essential to the following lessons are thoroughly taught, and all extraneous matter rigidly excluded. Inexperienced teachers are apt to overburden their lessons with subject-matter, and bewilder both themselves and their class with too many facts or too much description.

(c) *Method of Teaching and Illustrations.*

It is in the method of teaching that the difference between teachers is principally shown, and it is in this that the inexperienced teacher will require most assistance from the head teacher. The teacher has to remember that he is not only giving a lesson for a certain object, but that he has to interest his pupils while doing so, and has to concentrate their attention upon the subject so that the object of the lesson may be attained. Clearness of expression and apt verbal illustrations are obvious necessities for the end, and the class teacher should carefully cultivate these. The school museum, pictures, diagrams, &c., should be thoroughly examined by the teacher, and everything likely to be of use in the lesson should be noted. It is not necessary to have many objects or diagrams to illustrate a lesson. The right object or diagram is the only one necessary, and all extra illustration of this kind is harmful, tending to distract instead of to concentrate the attention of the class. The children themselves should be interested in illustrating their lesson, and where possible each should have the object itself before him. The natural curiosity of the child delights in being directed into fresh channels, and

where a shrimp or a flower or seed can be pulled to pieces and examined, there is little fear of non-success. Where the course of lessons is one of natural history, each pupil should be encouraged to watch his own seed or silkworm develop, and to record his observation in writing.

The value of the *blackboard* for the sketch which aptly illustrates, or for recording the important points of the lesson cannot be over-rated. The young teacher most frequently neglects this point, either from desire to hurry on with the lesson or from ignorance of its value. The blackboard should show a précis of the lesson. Questions carefully selected are an important aid in the development of a lesson. A few should be put at the beginning of the lesson, in order to make sure that the ground previously prepared is ready for further cultivation. At each stage questions should be asked, in order to see that the new material is thoroughly grasped. At the end of the lesson, or during pauses after an important stage has been completed, the children should be encouraged to ask any question which may solve their difficulties. Finally, the teacher should question himself as to whether the lesson has been a success or a failure, and should seek the reason in either case. The teacher who wishes to succeed will profit equally by his successes and his failures. He will learn that there are few lessons which might not be improved, and will find ways of interesting his pupils in subjects apparently without interest. He will discover when to "tell" and when to "elicit," when to follow up a boy's answer and when to leave it, when to illustrate and when to explain. The order of his class, at first apparently so difficult to obtain, will in time require no effort, and the pupils will be as anxious as himself for the success of the lesson.

(d) *Secondary purpose of Lessons.*

It must not be forgotten that the accurate observation which the teacher should try to cultivate in his object lessons should be accompanied by a power of expression equally accurate. Careless or slipshod answering should never be allowed, and in all classes the matter of the lesson should be utilised for lessons in composition. Some teachers use their object lessons as a means of expanding the vocabulary of their children, and try to introduce one or two fresh words to them at each lesson. Provided the words so introduced are such as are likely to prove of use to the children in after life, and are not mere technical words, the practice is a very good one. The teacher should make a list of the words so introduced, and should frequently revive them, until they become part of the ordinary vocabulary of the children.

Elementary Science Lessons.

The remarks made upon object lessons apply equally to lessons in science, but greater importance must be attached to the sequence of the lessons and the methods of illustration. Great care must be taken that all apparatus required for each lesson is ready and in working order, revision of fundamental points must be more frequent, and the warning about the danger of over-illustration must be remembered. Lessons on the theoretical part of the subject will be more frequent, and perhaps to a young teacher less attractive, but most important. They should never be "shirked" nor passed over until the theory they teach has been thoroughly mastered. In giving a series of elementary science lessons on any subject, it is a good plan to get all the sets of examination questions upon the subject you can find, and to see that your class can answer all that come within the range of your work after you have given the lesson. Technical terms are

more allowable in the higher standards, although these should be admitted with caution, and only when their greater accuracy makes their use essential.

Written Answers. The practice of oral examination, which is now the rule in the elementary schools, has tended to abolish the written science answer almost entirely. This is a misfortune, because the power of clear expression should develop hand in hand with the development of the other powers of the mind. What confusion of expression and thought exists in the mind of a child who may answer intelligently any verbal question you may set is known only to those teachers who have required the verbal answers to be followed by the written paper. It is on this account, therefore, that written answers to questions and composition upon the subject of the lesson should be frequently required. Any teacher who has prepared children for examination in science will agree that it is much more difficult to get good written answers than to give the children an intelligent knowledge of the subject.

Note-books. Special note-books should be kept by each pupil for each science subject. In the lower classes the notes should be dictated, but the upper children should be encouraged and practised in the art of taking their own brief notes. In all classes neat diagrams should be insisted upon, and will be obtained with little difficulty. The diagram is the "map" of science, and a good one saves much written explanation.

Apparatus. One of the greatest difficulties in the teaching of Elementary Science has been due to the lack of apparatus for teaching it. In most good schools now, however, sufficient apparatus for the teaching of the subject taken in the school is generally

provided. It is a pity that a special room for practical work is not provided in every school. A room fitted with ordinary tables and provided with a gas and water supply would generally be sufficient and an excellent course of lessons in practical science requiring little apparatus could easily be devised. The teaching of science in schools at present is now almost entirely theoretical, and the teacher can only make it more practical by encouraging his children to make and experiment with their own apparatus at home—a plan not always without an element of danger—or can allow one of his boys occasionally to perform the experiments in front of the class. The most valuable of all science teaching, viz., Quantitative work in Physics or Chemistry is utterly impossible under present circumstances, and the great majority of children leave school with the uncertain foundation of untested theoretical knowledge.

Peripatetic Systems.

To meet the difficulties of providing apparatus and to ensure that the teaching is done by qualified teachers a system of peripatetic teaching has been adopted in some districts. The advantages of having a qualified teacher and adequate apparatus are very great, but the results of such teaching are not always so beneficial as might be expected. It is impossible for a teacher who visits many schools to be enthusiastic for the individual school, or to have that personal knowledge of each child which operates so powerfully for the help of the class teacher. Where enthusiasm exists, it is enthusiasm for the subject which the peripatetic teacher is apt to force into a prominence much out of its natural perspective. The weekly lesson consists in the performance of a few experiments more or less interesting by a peripatetic teacher who has no personal interest

in the class before him, and who sometimes has to have the class kept in order by the class teacher. Between the intervals of his visits the class teacher generally revises and amplifies the lesson given, and sometimes feels resentment that the credit for success is not always his. It would be much better if the managers or head teacher encouraged the class teachers to become qualified in the subjects they wish to be taught by attending classes conducted by specialists in the teaching of the subject, and the peripatetic teacher could limit his work to these classes with much more advantage.

CHAPTER XIV

PRACTICAL OR MANUAL SUBJECTS

On the technical side of education, writing is taken in all elementary schools, drawing in nearly all boys' schools, and some girls' and infants' departments, and woodwork (boys), cookery, laundry work and housewifery (girls), in some of the better equipped urban schools. In many schools also various kinds of hand and eye work—clay-modelling, paper cutting and mounting, colour-work, cardboard modelling, etc.—form part of the curriculum. Except writing and drawing, the others are still considered as a little outside the ordinary course and special text-books and training are necessary if they are to be properly taught.

WRITING.

Although we have included writing among the technical subjects, it is taught in the elementary schools more from its direct and frequent utility than from any idea of its influence in the correlation of hand and eye. The utmost advantage, therefore, is not taken of writing as a means of manual training, although it is impossible to teach writing well without developing to some extent the

deftness of hand and accuracy of eye which all manual instruction seeks to cultivate.

The three principal "points" of good writing are *legibility*, *rapidity*, and *beauty*. Until quite recent years beauty and legibility were the main considerations of writing masters, and a style of writing was taught in which every element of a letter was made with the utmost exactitude of slope, thickness, height, etc., and the pen was lifted for each stroke. A style of writing thus became general and known as copperplate, which, if not so elaborately ornamented with fancy flourishes as the calligraphy of olden times, was yet laborious in production. Of its legibility and beauty, when carefully written, there can be no doubt, and its value as hand and eye training was much greater than that of the systems now generally taught. It had the advantage too of directing the care of the teacher towards the various elements which make up our written characters.

Copperplate.

The Mulhauser System.

This study of the elements of writing, and elaborate precision of detail, was best evinced in what is known as the Mulhauser system of teaching writing, in which the written characters were taught by combining the elements, and the exact slope of the writing, and the position of the junctions of the various elements were fixed by means of cross lines. For the style of writing it taught the system was an excellent one, and its method of commencing with the elements and working on to their combinations must always be followed if writing is to be taught successfully.

Modern Writing.

Owing, however, in a large measure to the influence of the Civil Service Examination, this great precision of detail and accuracy is now thought too laborious and a freer and more cursive system of

writing is generally taught. The writing slopes much less than formerly, and is sometimes vertical, while each word is written as far as possible without lifting the pen. Legibility is obtained by making the letters rounder than formerly, while the speed with which the writing can be done is much greater than was previously the case. There is little or no sacrifice in beauty if the tops and bottoms of the small letters are in parallel straight lines, and if all letters have the same slope, and if the capitals are shapely. We regret the parsimonious attention paid to the capitals in some modern systems. Owing to the comparative rarity of capitals, the amount of time spent in investing them with a little artistic merit is small, while the effect is great. In fact writing may aptly be compared with a column in architecture, the beauty of which is attained by securing evenness and regularity in the shaft and ornament in the capital.

Upright *v.* Slope.

The reaction from copperplate to the more cursive style resulted at first in a great tendency towards "upright" or vertical writing, and this style still keeps its ground in some schools. The pendulum, however, is swinging now towards the adoption of a slight slope. It is found that the vertical writing produces a cramped manner of holding the pen, and is apt in time to degenerate into a backward slope, which is still more cramped.

Copybooks *v.* Blackboard.

There is much diversity of opinion as to whether the copybook or the blackboard is the best medium for the teaching of writing. In the hands of a good teacher either system will produce good results, and whether copybooks are adopted or not the blackboard will take an important share in the teaching. The disadvantages of the blackboard are that it cannot always be plainly seen by every boy in the class, and

that the difficulty of obtaining uniformity of style and detail throughout the school is much greater than when copybooks are used. Its great advantage is that the teacher can choose his examples to meet the difficulties of his class as they arise.

When copybooks are used uniformity throughout the school is secured. A good copybook should repeat the figures in each number, and should not contain grammatical or other definitions about which there can be any diversity of opinion. The danger of copybooks is that after the first line the child will copy his own writing, and will so gradually slip from the pattern set. With careful supervision he should not repeat his errors of shape or spelling, and where such repetition occurs careful supervision has been lacking. To avoid this slipping away from the copy many plans have been devised. The copies are sometimes printed on separate slips and each copy is written but once; different copies are placed lower down on the same page; some teachers begin writing from the bottom of the page instead of the top.

Where the teaching is done entirely from the blackboard, the head teacher will do well to obtain the series of copybooks of the style he wishes to adopt and place the numbers in the hands of the class teachers.

Writing in Upper Classes.

If a uniform style of writing has been taught from the very earliest beginnings in the infant school each child who has passed Standard V. should be able to produce a legible piece of writing with a fair amount of style and speed. The writing lessons after that should be rarely necessary. Until that time all writing done in the various classes should reach the copybook standard, but after that the same perfection should not always be insisted upon. So long as the writing does not deteriorate into a slipshod and care-

less style, and the letters are formed correctly, individualities of style should not be too rigidly suppressed. It must be remembered, that in many lessons writing is only the medium of expression and that provided it is easily legible it fulfils the purpose for which it is used. Where "copy-book" writing is insisted upon in grammar lessons or composition lessons the concentration of thought necessary for good grammar and good composition will be impossible.

It is strange that so little time is given to the various kinds of printing and engrossing in the higher standards of the school. Ornamental printing is much appreciated by the children and forms a valuable training to both hand and eye.

The Teaching of Writing generally.

The Head Teacher should see

1. That the system of writing is uniform throughout the school.

2. That the same style is taught in the infant school.

The class teacher

1. Should thoroughly understand the system he has to teach, down to the details of its various elements.

2. Should mark each line of writing as it is done, and never pass slipshod work.

3. Should use the blackboard freely for the correction of errors.

4. Should give text and half-text writing to his class whatever its standard.

5. In the upper classes should let the children examine their own writing for the various faults of slope, size, spacing, &c., and mark the faults themselves.

6. In the lower standards and in the infant school should use the pencil rather than the pen. Many teachers use the pencil up to the end of

Standard I., and there seems some wisdom in introducing the difficulties of pen and ink after the knowledge of the formation of the letters has been gained rather than at the same time.

7. At each examination should make a list of children who write badly and should give these children extra practice in writing.

Drawing.

Of all the various forms of technical work advocated for the elementary schools, drawing is undoubtedly the most generally useful, and most generally taught. The advantages of teaching this subject are many.

Habit of close observation.

1. The faculty of "seeing" an object as a whole and in detail is gradually strengthened as the child advances from the simpler to the more advanced copies of the higher standards.

Hand and eye are co-ordinated.

2. The hand is co-ordinated with the eye, and what the eye sees the hand reproduces as exactly as possible. The importance of the co-ordination of hand and eye is so generally recognized that offshoots and developments from the study of drawing have been introduced into many schools, and have assumed the title of Hand and Eye work, a title the parent subject can claim with equal right.

Ready means of illustration.

3. The practice in reproducing the forms of objects either from copies or from memory should give a ready means of illustration to each child who has passed through the usual drawing course. A rough sketch or a rough plan will frequently save much verbal or written explanation, and will be much more readily understood. It is a fault in the ordinary teaching of drawing, due probably to the code for drawing, that this faculty of rapid sketching

from memory is not more generally cultivated, and that so much time is given in the upper standards to the minute details of elaborate freehand copies. A boy who has passed the Standard V. course for Freehand with a fair amount of credit has shown himself capable of overcoming the ordinary difficulties of Freehand Drawing, and in the standards above that memory drawing and rapid sketching in bold outline should take a much more prominent part.

Relief from other work.

4. The advocates of technical training urge that all work of this kind is valuable, not only intrinsically, but also as affording a relief to the mental strain of the ordinary school routine. There can be no doubt that this is true, and that the drawing lesson does give this advantageous change of work. There is a danger, however, that the argument is carried too far when the relief so given is made the lever for introducing extra technical subjects into the curriculum. For a man who has to do six hour's work, and has only six hours in which to do it, the addition of an extra hour's work, however pleasant and changeful it may be, is a form of relief which would not bring much thanks.

Use in technical subjects.

5. The ability to draw well is also essential in many of the technical pursuits in which a boy is likely to engage in after life. The scale and geometrical drawing are most likely to be useful in this respect, and drawing to scale should be carried to a much higher point than the code at present demands.

Development of æsthetic taste.

6. The insensible influence which the study of drawing has upon the aesthetic side of the mind is none the less valuable because it cannot easily be gauged. The close attention to proportion, symmetry, and natural growth which the subject

demands must develop a love for the natural and beautiful, and a distaste for the crude and inartistic. A wider field of pleasure is opened out by the development of the artistic instinct, and the beauties of nature and of art may become serious and more frequent rivals to the grosser delights.

The Code for Drawing.

The importance of the drawing code has been modified by the freedom now allowed, although it is probable that in most schools the code will be closely followed. One or two points have already been mentioned in which improvement might be made. The freehand required for the upper standards is too elaborate in detail, and tends too much to mechanical copying. A course of study following the line of the Brushwork course would be much more useful, and natural forms should be utilized for copies as far as possible. Many teachers also would prefer that scale drawing should be carried on up to the drawing of simple plans and elevations from specified measurements, the taking of measurements from drawings, and isometric projection.

The Brushwork course suggested is an excellent one in many ways, and tends to develop thoroughly the power of rapid drawing from memory. Its fault is that it pays too little attention to detail, and leads the pupil to overestimate his real ability to draw, a fault which can easily be corrected by a judicious admixture of ordinary freehand drawing. In favour of the Drawing Code it must be remembered that its introduction has caused a great advance in the teaching of the subject in the elementary schools, and that any faults one may find with it are easily met by the freedom now given to work by any syllabus which her Majesty's Inspector may be induced to approve.

Two lessons per week are sufficient for Standards

I. to III., and three lessons are advisable in the higher classes. Each lesson should be at least 40 minutes in length. The advantage of drawing as a "relief" lesson has already been mentioned, and in consequence the end of the session seems a very suitable time to adopt for the teaching of this subject. The end of the afternoon session is frequently adopted, and is as suitable as any other time, provided that the school is well lighted during the winter months. Time for Drawing Lessons.

Freedom of classification within reasonable limits is allowed in this subject, and is probably more necessary in this than in any other subject. The ability to draw well is so much a "gift" that the rate of progress made by each child varies remarkably. This variation, however, is not so pronounced in the mechanical parts of the subject, which require more of the mathematical talent, and a child may advance at very different speed in these two branches of the subject. It is a good plan therefore to adopt a double classification for Drawing. For Scale Drawing and Geometry it will be found that the subject can well be taken in the ordinary class, and that the rate of advance will correspond very closely with the progress through the Standards. In Freehand and Model, however, the natural aptitude is the principal determining factor, and the classification will be very different from that of the ordinary class. Much greater licence should be used in promoting from class to class in these subjects, and the separate classification for geometrical drawing will remove the difficulties that might otherwise arise. If geometrical drawing be taken in all classes simultaneously, one rearrangement of the classes per week is avoided. Classification for Drawing.

The teaching of Freehand Drawing is sometimes

The Teaching of Drawing. (a) *Freehand.*

commenced in the Infant School as Kindergarten Drawing for the very lowest classes. The value of the drawing as a kindergarten exercise is very great, but the method of drawing short thick lines over lines already ruled upon a slate produces a style of drawing which is far from freehand, and which leaves much to unlearn later on. In Standards I. and II., where the Code requires the drawing of straight-lined figures, a carefully graduated syllabus should be drawn up for both ruler and freehand work. Some course similar to the following will be found satisfactory:

The straight line from point to point in any position.

The straight line of double or half given length.

The straight line of fixed length (ruler).

Use of Ruler and Set Square.

Lines at right angles to (*a*) horizontal, (*b*) vertical, (*c*) oblique lines.

Lines parallel to (*a*) horizontal, (*b*) vertical, (*c*) oblique lines.

The meaning of an angle. Acute and obtuse angles.

The square, rectangle, equilateral and right-angled triangles.

At each stage figures applying the knowledge gained should be drawn, and these should be chosen so as to be as interesting as possible. We give to the young teacher the following hints:

1. Ruler drawings should be perfect. Measure them as frequently as possible.
2. Cultivate a bold line from point to point, not a line "sketched" or patched together.
3. Insist upon thin lines, but do not let thinness develop to the extreme of invisibility.

4. Do not "line in" these straight-line drawings.
5. Never pass a bad line.
6. Give a merit mark to each drawing.
7. Question frequently on lines and angles.
8. Sometimes have freehand drawn before ruler.

Children who have been through this course and can produce a straight-lined drawing with fair success should at once advance to Standard III. work. In this and the higher standards copies are set containing curved lines of increasing difficulty. These copies are either on class sheets or separate cards. For class teaching the sheet is the better because it enables the attention of the whole class to be devoted to one copy, and so lessens the teacher's difficulty. It is impossible, too, for any pupil to measure the class sheet, except with his eye, and in consequence the bad habit of "measuring" is not developed. The great drawback to sheets is that it is impossible so to place them that every child can have a clear view. Before the class commences to draw the copy the teacher should give a lesson upon it, pointing out its details of general shape, proportion, growth, etc., or obtaining suggestions upon these points from the children. When the class has formed the habit of examining the copy carefully in this way cards may be used. These admirable cards, giving hints upon these important points, are most useful at first, but should be so used as to give the ability to draw from the plain copy. We have remarked already upon the importance of rapid sketching from memory, and now add the following hints :—

1. Try to get each copy completed.
2. Fight against "measuring," by having the drawing of a different size from the copy, and make the drawings as large as the paper allows.

3. Insist upon the cleaning out of all working lines and upon careful lining in.
4. Pillory carelessness.
5. Give a merit mark to each drawing.

(b) *Model Drawing*

The difficulty of teaching model drawing is not so much inherent in the subject itself as caused by the fact that each child's view of the object placed before him requires a difference in the drawing of it, and in consequence the teaching has to be mostly individual. It is essential, however, before beginning any model drawing that a few lessons should be given upon the main principles of the subject, and that such points as the eye-level, the line of sight, and vanishing lines should be thoroughly understood. The model-plane and screen are of great use in teaching these points, and many teachers have shown much ingenuity in making miniatures of these for each pupil. Before going on to the drawing of common objects, the cube, square prism, cylinder, and cone should be drawn from every position. The greatest difficulty will be found with the "vanishing lines," which the pupil will at first make not to vanish at all, and afterwards will make to vanish too quickly. It is surprising, too, how frequently the pupil will draw as oblique lines the short vertical lines of a drawing board.

When these simple models have been mastered it is well to vary the model drawing by introducing natural objects as frequently as possible, as well as harder geometrical models.

N.B.—In drawing all models the pupil should be taught the importance of "measuring" with a straight arm, so as to obtain the exact proportions of the model before him.

(c) *Scale Drawing.*

Scale drawing is at present put down as the work of Standard IV., and presents little difficulty.

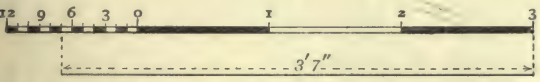
Its three branches are :—

Enlarging and reducing simple figures.
Drawing to scale on squared paper.
Drawing to scale on plain paper.

It is as well before teaching scale drawing to teach the class how to bisect a line and copy an angle, and the use of the ruler and set square in drawing right angles and parallels must of course be known. One or two lessons on the drawing of oblique lines, or of lines or points within a figure, will be found useful ; *e.g.* :—

The last copy presents some difficulty.

In teaching drawing to given scales it is well to give the scale both ways, *e.g.*, 1 inch to 1 foot or a scale of $\frac{1}{12}$. Frequent practice in making scales of $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2 in. to 1 ft. should be given, and great attention paid to correct numbering and careful shading.



The above is given as an example of how a scale may be drawn, and of the method of showing lines of given length.

Incidentally in the lower standards the simpler forms of geometrical teaching have been introduced, and the use of the ruler and set square should be

Geometrical Drawing.

familiar to every pupil before Standard V. is reached. There is no difficulty in selecting a course in geometry, and the main points to be aimed at in the teaching of geometry are (*a*) to secure neatness and accuracy of work, and (*b*) to leave the discovery of the geometrical principles to the pupils themselves as far as possible. Thus, among other facts, the pupil should discover from actual examples that :

1. The circumference contains the radius 6 times ; and hence the methods of making angles of 60°, 30°, &c.
2. The angles of a triangle = a semicircle, or two right angles.
3. The relations between the angles formed by a line falling across two parallel lines. Euclid I., 29.
4. The radius and tangent are at right angles.
5. The angle in a semicircle is a right angle.
6. The centres of touching circles and point of contact are in one straight line.

Every variety of problem upon these should be given, and they should be developed to the fullest extent. Thus No. 1 may be extended through all the usual angles, or may be used to inscribe a hexagon, equilateral triangle, a dodecagon in a circle, to divide a circle in 3, 6, or 12 equal parts, or to construct a hexagon on a given line. The teacher should endeavour to make the children suggest problems depending upon the fact discovered ; in other words, should guide them through the subject with as little direct teaching as possible.

To obtain neatness of work some rule must be made concerning the thickness of lines. The general rule is, " Working lines dotted or thin, given lines and result lines thick."

The solid geometry required in Standard VII. is

of little difficulty if the teacher has any knowledge of the subject. Small models of the cube and square prism should be in the hands of every pupil, and sectional models of these are also necessary.

Test cards are obtainable in scale and geometrical drawing, and a teacher who is taking the subject for the first time will be wise to read through the series of cards for his class. Many of the sets of questions are admirable, and he will be enabled to gauge the degree to which he is expected to carry the subject, and the lines his teaching should follow. Finally, we will say that in drawing, as in all other subjects, success depends principally upon careful supervision and attention to detail. Although the ability to draw excellently is given only to few, to few also is the power to draw absolutely denied, and wise care upon the part of the teacher will show results which will probably please him more than successful work in any other subject.

CHAPTER XV

SCHOOL MUSIC

In the curriculum of the ideal education described by Plato in the "Republic," music is assigned the first place, and is described as the education of the soul. Between the ages of 13 and 16[1] the young people were to study music, and not allow anything to take their attention from that study. In assigning such an important place to music, Plato considered not merely the effect of a musical training on the mind, but its rôle in the public and private life of the Greeks. A person was unable to take his part in religious ceremonies unless he could sing; while public announcements, such as the proclamation of edicts, were always sung to music. So much importance was attached to this subject by the Athenians that a man's education was considered neglected unless he had been taught to sing. Plato did not advocate instrumental music, and he allowed only such instrumental music as was serviceable in accompanying the voice; such instruments as the flute he would banish. Aristotle, also, in his "Politics" considered the refining effects of music so great that

[1] Our New Code very wisely excuses boy pupil-teachers from the practical singing tests; but probably among the Greeks and other Southern nations the voice broke earlier, and the adult voice began to develop at this age.

he advocated that three years should be devoted to a training in that subject.

As the political and social conditions of the present day differ widely from those of the ancient Greeks—even if we were to grant that the object of education is to produce individual citizens who shall be as serviceable as possible to the State—some of the above reasons for teaching music will be found no longer to hold good. Our political and municipal duties no longer afford scope for musical talent, and it is not absolutely essential in the performance of our religious duties, although people who consider music an aid to devotion ought to be able to take their part in it. The reasons for teaching music in school are perhaps less utilitarian than those for teaching any other subject. Certainly in our schools we should never aim at training professional musicians.

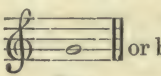
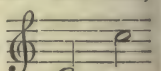
Objects.

Our objects are :—(1) *to provide a pleasing recreation* and amusement for the singer and his friends.

(2) *To cultivate the æsthetic faculty.*—If the musical teaching is carried on along the right lines, the pupil will not only learn to appreciate good music, but his general taste will be improved.

(3) *To afford training in morals, patriotism, &c.*, through the words of the songs learnt. If the music bears that relation to the words which it should bear, it makes the words more impressive and stirs the emotions more than the words alone are capable of doing. This fact points out the duty of the teacher in selecting his school songs, to choose such as have "music married to immortal verse;" not the "lean and flashy songs" full of bathos that one often comes across.

(4) *To train in distinctness of articulation.*—Over and above that which can be given in the reading

lesson, much valuable training can be given through the singing lesson. Many well educated people are unable to distinguish a "pure" from an "impure" vowel sound in speaking, but the difference is made very evident in singing a sustained syllable, particularly if the voice passes from one note to another. In North Britain the vowel sounds are generally pure, but it is difficult to convince a Southerner that his vowel sound in "fate" is not pure. Let him, however, sing  or better still 

Fate Fate

and observe whether he moves the vocal organs in sounding the vowel before it is stopped by the "t." The consonants also require greater care in singing than in speaking, and on the principle that

"Those walk easiest who have learnt to dance."

it follows that if good enunciation is insisted on in the singing lessons it must have a good effect upon the manner of speaking.

(5) *To provide a healthy pulmonary exercise.*—In Appendix A will be found a selection of breathing exercises suitable for use in connection both with the singing and reading lessons. It should always be borne in mind that whatever tends to increase the vital capacity (*i.e.* the difference between the distended and contracted lungs) must be health producing.

(6) *To aid in school discipline.*—Music is an undoubted aid to discipline, not merely on account of its psychological effects upon the individual pupil, but because in the singing lesson all are taught the necessity of submitting to the direction of the conductor, and a feeling of co-operation is induced when all join in rendering a fine melody. The weak ones

are taught to exert themselves, and the strong are taught self-restraint in the pursuit of a common good. The disciplinary effect of part singing on the other hand in teaching the pursuit of a common end —harmony—by the co-ordination of different means is particularly beneficial.

The Teacher.

It is a matter often discussed whether a singing teacher should himself be a brilliant performer. No doubt in the higher branches of singing the critical faculty in the teacher is of more importance than the voice. But no one can ever hope for much success in teaching singing to children who is not himself a fair singer and able to illustrate his precepts by setting a pattern to his pupils. In all subjects, but particularly in singing, children learn largely through imitation.

"We needs must love the highest when we see it," and in order to lead children to love the beautiful in music and to sing with purity of tone it is essential that the teacher should be able to use his own voice fairly well.

Scope of the Work.

It will be seen after a little reflection that the whole of the teaching of singing centres round the training of (*a*) the *Ear*, (*b*) the *Eye*, and (*c*) the *Voice*.

(*a*) The ear must be trained to appreciate the difference between the tones produced by others. To a certain extent this is a natural faculty, and in some few cases it seems to be entirely absent. People may be "pitch-deaf," just as they may be "colour-blind." But frequently pupils are eliminated from the singing class on the plea that "they have no ear," when with a little trouble they might be taught to recognise the difference in pitch between two notes, and even be developed into fairly good singers. It does not follow that a pupil is hopeless if when first tested he "sings *doh* and calls it by all the names in

the scale." It is important to discover whether the fault lies with the ear or the voice; a child may recognise clearly the exact relation between two tones without being able to produce either.

(*b*) The training of the eye is in itself a small matter in the teaching of singing, for it might fairly be assumed that at the time of the very first lesson every child in the class could recognise the difference between the signs *d* and *m*, and could tell whether a note was on a line or a space. We would include under this head, however, all the information respecting musical notation which is acquired through the eye, and what is still more important, the association of the sign with the mental image of the thing it represents. This is not very difficult with respect to *time* notation, but the power of mentally hearing *tones* represented by printed marks is much more difficult to acquire.

(*c*) The two points to attend to in voice training are—

(1) The quality of the sound produced and

(2) The amount of effort exerted in producing it.

As we have already dealt with the question of breathing[1] we shall direct the reader's attention chiefly to the methods of securing good quality of tone. The first point to secure is that the pupils may be able to imitate a given tone, and the best copies to set them are a clear tone from a well trained teacher and a tone from a tuning fork held over a resonance jar. The former has the advantage of inspiring them with the conviction that as the sound is of human origin it should lie within their own powers of production. The second method illustrates the necessity for forming appropriate resonance tubes with their throats, and

[1] Page 102 *supra*.

teaches them to rely on resonance for the quality and quantity of their tones instead of *straining* their voices.

When good quality has been produced with individual notes the next step is to secure a uniformly good quality in a succession of notes of different pitch. To do this it is necessary to make the pupils feel that there is an essential difference between the way of producing a high note and that of producing a low one. We doubt the need for recognising more than *two* registers;—the *thick*, in which the whole of the vocal cords are used, and the *thin* in which only parts are used. Not only is there an essential difference in the parts of the cords used but the efforts made to adjust the cords by means of the muscles of the larynx and to arrange appropriate resonance chambers leads to the subjective impression that in the *thick* register the notes are produced from the *chest* and in the *thin* register from the *head*. Some teachers would divide each register into an *upper* and *lower* section, but this division is neither so marked nor so important as the division between the registers themselves. It will be found that a few notes are common to both registers (about C to G), but it is extremely important to notice that while the lowest note producible in the thin register is very much like the one next below it in the thick, the highest note producible in the thick register differs very considerably in quality from the one next above it in the thin. This shows that if we are to conceal the transition from one register to the other we must aim at training the thin register downwards and not extending the thick register upwards. Attention to this point will not only result in rendering the break almost imperceptible but will lead to the production of purer tones and

Registers.

to the control over the voice in piano passages as well as to a marked diminution of the tendency to flatten in pitch, which is a common evil in school singing.

A class teacher never has any difficulty in obtaining *quantity* of tone particularly from boys. His constant care should be to secure *quality*, and the first condition of this is restraint. Children should never be permitted to sing their loudest, but always urged to sing their sweetest. With loud singing faults abound and are difficult to overcome, but with well controlled singing the teacher can more readily detect the faults and show the class how to get rid of them. The tendency to sing flat and to produce raucous tones, and the quickly resulting fatigue are avoided in the second case. The tones, if they fail at all, fail through being either "guttural" or "woolly." The former fault is remedied by telling the children to produce the tone well forward in the mouth; the second is due to the breath being allowed to escape through the glottis before its edges have been brought together, or to the use of too much breath. The teacher should point out how the fault occurs and give some pattern singing.

The two Notations.

Each notation has its own staunch supporters and we do not propose here to take up the cudgels on behalf of either system. The two considerations that should guide teachers are that on the one hand the Sol-fa notation is simpler and hence more suitable for beginners, while on the other the staff notation is in almost universal use for singing and has undisputed claims to superiority for instrumental music. It seems therefore advisable that the sol-fa notation should be used with the beginners and for the bulk of the school music, but it seems a great

pity that so many children are allowed to leave school knowing absolutely nothing of the staff notation, although their taste for music has been stimulated, and a considerable amount of practical skill acquired.

Stages of the Teaching.

The conditions under which singing can be taught in schools vary so widely that it is quite impossible to give a scheme which shall be applicable to all. The Instructions to Inspectors state that "for purposes of examination the standards may be grouped into divisions thus :—

1st Division = Infants.
2nd „ = Standards I and II.
3rd „ = Standards III and IV.
4th „ = Standards V. and upwards."

The requirements for these several divisions are sufficiently indicated by the specimen tests issued with the Instructions.

Songs.

In the junior and infant stages the songs prepared should be taught more by ear than in the senior division, in which they should be worked at in the first instance as sight exercises in time and tune. Sweetness of singing should always be aimed at. In the infant stage it is advisable to confine the work to simple melody. In the junior stage rounds should be introduced, as they are only a little more difficult than one part music and form a splendid introductory practise for part-singing. In the senior stage the songs should frequently be part-songs. Unison songs should in each division form a large part of the work. The general lack of real alto voices among children makes it difficult to take more than two parts. Unison songs afford better material for voice training and supply melodies which every child may sing at home.

The singing lesson is one that calls for great

Plan of a Lesson.

judgment on the part of the teacher. It should as a rule last about half an hour, and should not be allowed to exceed forty minutes, as childrens' voices soon tire and great harm is done by working with the voice after it begins to show signs of fatigue.

The principal interest of the lesson naturally centres round the songs, which should be regarded as the "finished product." The actual singing should therefore be allotted the greater portion of time in the lesson, but in every lesson a certain portion of the time should be devoted to the theory and technical exercises. The following is suggested as a suitable division of a forty minutes lesson with a senior class.

(1) Voice exercises, such as scales sung to the different vowel sounds . 4 minutes.
(2) Modulator work and ear-training 8 „
(3) Exercises from a graduated course on time and tune with instruction in theory . . . . . 13 „
(4) Songs, including points of theory which arise incidentally from them 15 „

It is not suggested that the songs should come all together at the end; after each section it is a good plan to sing one of the songs previously learned.

Arrangement of Class.

As soon as it is decided to take up part singing, the children should be carefully divided according to the "compass" of their voices. Much harm may be done by setting children to attempt to sing parts that are outside the range of their voices. The groups singing different parts should be arranged side by side and not one behind the other; the latter arrangement precludes that feeling of mutual support which is so necessary especially when beginning part music, and at the same time the children are more easily thrown off their part by hearing another part

sung just behind them. In singing, the influence of a child upon the children in front of him is so marked that it is a good plan to put the best singers at the back, where they can give more help to their weaker companions, and the worst singers in front, where they not only receive help from the better ones behind them (and in some cases are actually by this means prevented from "putting the others out"), but their singing is more under the teacher's ken than if it had to pass through two or three rows of good singers. Children should sit or stand at ease, and not in any cramped or constrained positions.

In class-singing it is especially important to cultivate habits of attention to such points as marks of expression, correctness of phrasing and articulation.

Although our chief object is to teach class singing, yet as the future singer will generally be required to sing alone, the teacher should endeavour to cultivate solo singing. To lead up to this the class might sing in sections, which, with practice, may be reduced in size, and finally individuals may be called upon to sing alone. Much greater self-confidence is required in this than in reading alone, and after once failing the pupil is only with great difficulty induced to make a second attempt, so that the teacher requires to exercise great discretion in calling upon individuals. He should afford them every encouragement, and begin with exercises well within their powers until they have gained confidence.

Characteristics of good Songs.

It must always be borne in mind that in a song we have to consider both music and words, and the importance of the latter cannot be overlooked. The words should be inspired by a true poetic feeling, and the tune should be in agreement with them. We find that the great song writers, such as Schubert, were careful to choose words by the great poets, and their

music was no doubt largely inspired by the beauty of the lyrics for which it was composed.

If the words and music are thus related they will always produce the same feeling. This is illustrated by the inability of most people to remember the name of a hymn tune, but they denote it by the first line of the words with which it is used. It is therefore advisable not to replace the tune generally associated with a given set of words by another, unless it is perfectly clear that the new one agrees with the words at least as well as the old. The opposite practice is even still more blameworthy, for a tune comes to be associated with the words sung to it, and recalls the thoughts they express, and frequently the memories evoked are so strong as to take away all interest in the new words. A very dispiriting effect is often produced on a bridal party when the organ indicates that the wedding hymn is to be sung to the tune associated in every one's mind with the words, "Brief life is here our portion."

The teacher should always make sure that the music is well within the range of the childrens' voices. Some songs—particularly those for infants—run up much too high. When the songs are unaccompanied the teacher can remedy this by taking them in a lower key, unless that would bring the lower parts out of range.

Instrumental Music.

In some cases one of the teachers in a school is such a skilled and enthusiastic musician that a school band or small orchestra is possible. This is an admirable thing as arousing the interest of parents and others in the school, but as it is the work rather of a musician than of an ordinary teacher, we cannot here advise that every teacher should attempt it, nor can we recommend any special methods for carrying the plan into execution.

CHAPTER XVI

PHYSICAL EXERCISES

THE importance of physical training and the necessity for proper attention to it in the earlier years of life has been thoroughly recognised in the Elementary Code, which makes this training compulsory in all elementary schools.

It is recognised that though the out-door games which are so eagerly followed by our race are excellent in their results upon the frame, they are too haphazard in their effects, and too likely to be neglected by those who most need them, to be relied upon as the only source of physical training.

Choice of Physical Exercises.

Several series of physical exercises have been drawn up, each of which claims to be founded on the most scientific physiological principles, and most of which are well adapted for the purpose in view. The aim of these exercises is the harmonious development of the frame by exercises carefully chosen to bring into play the parts of the muscular system likely to be neglected by the habits of life induced by the environment of the children.

In selecting a course of physical exercises the head teacher should carefully consider whether this harmonious development forms the ground plan of the series, and should clearly understand the particular object of each movement. Those courses should be

avoided which consist of elaborate movements of the body armed by implements of various kinds and aided by the extraneous effects of music. The best physical exercises are very simple in character, and require little or no apparatus. Each movement has its definite effect upon a particular portion of the body. The effectiveness of the exercise is directed towards the body and not towards the spectator.

Military Drill.

In some schools military drill replaces the course of physical exercises, and during the present war (1900) many attempts have been made to make the military drill general in all boys' departments. As a means of physical training the movements required in company drill have little claim, while it is to be remembered that the various exercises in the Red Book have been selected for adults whose faults of development are due to long neglect, and are not thoroughly adapted to the fresher and more plastic muscles of the young. There are many advantages in the teaching of military drill in our schools, but as a physical training it is far short of ideal, and cannot compete with the excellent systems of exercises more generally used.

Secondary effect of Physical Exercises.

The great necessity for prompt obedience and for accuracy of movement, which all physical exercises demand if they are to be successfully taught, gives them a secondary value as disciplinary agents only a little below that of their primary object, and it is in this secondary way that military drill is most effective. In the chapter on discipline obedience is spoken of as a habit, and it is by the rigid attention and smartness demanded in military drill and physical exercises that this habit is principally fostered.

Time for Exercises.

The motto for physical exercises should be "a little often," and in many schools a few minutes of

each session are very wisely devoted to them. A list of the various exercises to be practised is drawn up for each class, and fixed days are given to each exercise. These few minutes should be taken as far as possible midway in the intervals between the children's outdoor periods. A half-hour lesson in the playground or hall is all the extra time that will be needed.

Dangers of Physical Training (a) *Weakness.*

The head teacher must exercise the greatest care in excluding from physical exercises all children whose state of health renders such exercise in any way dangerous to them. In some of our large towns many children attend the schools who, from lack of food or warmth, or from excessive hours of work, are rendered so physically weak as to render the exercise a mild form of torture to them. It is useless to endeavour to develop a badly nourished or fagged muscle.

(b) *Over doing.*

The same exercises should never be continued for too long a period, as all the good obtained by exercising any part of the body is far more than counter balanced by the harm resulting from overstrain. On this account the exercises chosen for any lesson should be varied so as to require the use of different parts of the body, and a particular exercise should be repeated only a few times. Any child should be allowed to rest when tired, care being taken, of course, that it is fatigue and not idleness that causes the desire to rest. As a general rule the *esprit de corps* of the class will prevent any child from resting unless obliged. In the more difficult exercises no attempt should be made at first to keep the whole class in rhythm, but each child should be allowed individual practice until the exercise is well mastered. It must be remembered that the age and development of children in the same class varies very much, and

that any uniform rate must be a little too quick for some and a little too slow for others if the exercise is in any way trying.

Place for Physical Exercises: (a) *The Playground.* Apart from its effect upon the muscular system all exercise has naturally a most beneficial influence upon the lung-power, and it is in consequence necessary that the exercises should be practised in the fresh air as much as possible. The playground is, in consequence, undoubtedly the best place for exercises, although of course the difficulty of making one's self heard is a great strain on the teacher's voice. In towns, too, unless the playground is closed in by a wall and so protected from outside influence, there is more than a probability of unpleasant interference from the rudeness of some of our uncouth fellow subjects. In bad weather, of course, the playground is impossible, the covered portion being seldom large enough for a class in the extended order which the exercises require.

(b) *The Hall.* A school, therefore, which possesses a hall (and most good schools now are so provided) will naturally avail itself of this as the next best place to the playground. The teacher in charge of the class at exercise in the hall may need to be reminded that there are classes at work all round him, and that in consequence orders must be given in no louder a tone than is necessary, and the noisier exercises, such as lunging, should be omitted.

(c) *The Classroom.* In the few minutes of each session which are sometimes devoted to exercise the class-room is necessarily utilised for the purpose. Care must be taken that the exercises chosen for these times are such as require no movements of the body which are likely to result in accidents from the cramped and dangerous positions in which the desks compel them to be performed. Standing on the seats is not only

destructive of the school property, but is likely to lead to regrettable accidents.

Drill and Gymnastic Apparatus Music.

The best courses of physical exercises for elementary schools can be practised without the aid of apparatus of any kind, but there is no doubt that the use of bar-bells, dumb-bells, or clubs makes the exercise more attractive to children. The bells or clubs chosen should be as light as possible, as the intention is to exercise the muscle and not to strain it. The higher gymnastic apparatus, such as parallel bars, &c., is quite unnecessary in the ordinary elementary school, and the exertions required in using it are much too violent for children up to the age of fourteen.

The advantage or disadvantage of music in conjunction with physical exercise has been much discussed. It seems generally recognised now that music is very helpful in producing that exact rhythm of movement which makes the physical exercise of large numbers so attractive to the spectator, but that for ordinary school purposes it can easily be dispensed with, and is well replaced by the teacher's voice. The latter is less likely to be a cause of disturbance to the other classes in the school. The children actually engaged in physical exercise should not be allowed to sing or to number the exercises aloud. Their breathing should be as natural as possible, and should be affected only by the exercise in progress.

Drill Displays and Competitions.

The great epidemic of school entertainments which has affected our elementary schools has caused displays of these exercises to be included as one of the most popular items in the programme. There is no doubt that there are few sights more pleasant than that of a class of attractively dressed children who are performing these most beneficial movements to the rhythm of a well-marked tune. The appearance

of this item on the programme of these entertainments has, however, some drawbacks. It is apt to give a false impression of the amount of physical exercise done in our schools. Every one engaged in teaching knows well that it is impossible to get the perfection necessary for these performances without devoting to exercise an amount of time greatly beyond that on the Time Table, and that in the majority of cases the children who so perform are withdrawn from their ordinary work in order to give them the extra practice required. Only those children who show the most aptitude for the work are chosen for the displays, and it is precisely these who least need the extra time given. The same objection can be urged against drill competitions, and it is in addition questionable whether competition between school and school should not be avoided as much as possible.

Games as Exercises.

The fan-drill, tambourine-drill, scarf-drill, &c., so much loved by the teachers of our girls' and infants' schools, and upon which they lavish so much pains, have little claim to the latter portion of their names. The appearance of the children upon the stage in their tasteful dresses is a sight well calculated to please the parents, and the unity of action for this end between parent and teacher can only render their relation more pleasant in many other ways. It is not drill.

Owing to the energy displayed by our elementary school teachers there are few schools now where games of some kind have not become almost a recognised part of the school curriculum, and swimming, football, cricket, and tennis clubs in connection with the schools are very common. The physical value of these games needs no discussion, and their influence upon the discipline and *esprit de corps*

of the school is equally obvious. It must be remembered, however, that the physical exercise they give is very hap-hazard in its requirements[1] upon the muscular system, and that they need a well-balanced series of exercises as an aid and sometimes as a corrective.

[1] Except in the case of swimming, which calls into play a larger number of muscles than any other exercise.

APPENDIX

BREATHING EXERCISES IN CONNECTION WITH READING AND SINGING.

1*st Exercise.*—Stand upright, arms at sides, the head being erect, but not thrown back, close the mouth and inhale through the nose until the lungs are expanded to their fullest extent. The diaphragm must first be drawn down, then the ribs raised, beginning with the lowest ones. Exhale as soon as the lungs are quite filled.

2*nd Exercise.*—Repeat the above, but raise the arms and allow the fingers to lightly touch the trunk at a point about six inches below the blade-bone and six inches from the spine, to feel whether expansion is taking place there. Any tendency to begin by raising the collar-bones must be met by practising with the head bent forward and the chin resting on the chest. This deprives the collar-bones of their support. Afterwards the practice with head erect must be resumed.

3*rd Exercise.*—Repeat No. 1 five times in succession without interval, and after the fifth inspiration retain the air in the lungs as long as possible (20 secs. long enough).

NOTE 1.—Expiration is compulsory on us owing to the efforts of certain reflex centres to discharge the carbon dioxide from the system; but after the system has become as free as possible from carbon dioxide, the reflex centres become in-

active, and it is possible to suspend respiration for a much longer time than could otherwise be the case.

Note 2.—The breath may be held (*a*) with the air passages open, (*b*) with the glottis closed. The latter method is condemned by some voice trainers as throwing too much work on the delicate muscles of the larynx, but this is surely due to ignorance of such simple principles as are illustrated by the Bramah press. Moreover, a comparison of the "cough" of a man with that of a cow (in which animal the false vocal cords are absent) seems to point out that the false vocal cords prevent expiration, in which case the pressure is supplied by the air itself in the ventricles. The arrangement of what we may call the slopes and counterslopes seems to make it probable that inspiration is checked by the true vocal cords and expiration by the false vocal cords.

4*th Exercise.*—Repeat No. 3, reducing the number of inspirations to 4, 3, 2, and 1.

5*th Exercise.*—After filling the lungs endeavour to empty them completely. This is not such a good exercise as the endeavour to expand them, but it is one way of increasing the "vital capacity," and develops the elasticity and play of the thorax.

6*th Exercise.*—Fill the lungs as in No. 1, and allow the air to escape slowly, but regularly, increasing the time taken from five to thirty seconds as the practice proceeds.

7*th Exercise.*—To be practised in the playground. March, inhale through the nose during three paces, hold the breath through three, and exhale through three more.

8*th Exercise.*—Repeat No. 1 with the lips open, closing the passage through the mouth (*a*) by the front of the tongue and of the palate, (*b*) by the back of the tongue and of the palate.

9*th Exercise.*—Inhale slowly, and exhale suddenly.

10*th Exercise.*—Take a sudden inspiration, then exhale slowly.

11*th Exercise.*—Fill the lungs well and exhale in a series of puffs.

Most courses of ordinary physical drill will include exercises on the movement of the neck, which will help to give play to the muscles of the throat.

It is advisable to give a series of mouth exercises, with the view to develop the muscles used in articulation. Such exercises should include thrusting the tongue backwards and forwards, pointing it, flattening it, and moving it from side to side; moving the lower jaw from side to side, and backwards and forwards; pouting the lips, separating their angles, drawing them right over the teeth. The details of these practices must be left to the teacher, and will depend largely upon the ability of the class to take them seriously.

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